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Non-Emergency Utilization of EMS:
Contributing Factors and Strategies to Promote Effective Care with Appropriate Resources

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Abstract

Non-emergency use of EMS resources can impose a substantial burden on emergency response systems and the communities they serve by reducing the response capacity for time-sensitive and life-threatening situations and through subsequent diversion of funding that could be used to more effectively address health disparities. National EMS response data suggest that a large proportion of EMS patient encounters are for non-emergent reasons. Despite being a nation-wide issue, inadequate research has been conducted to understand why non-emergency and frequent use occurs and what strategies may be effective in mitigating avoidable use. Community paramedicine (CP), an emerging specialty in EMS that focuses on linking underserved populations with available resources to close gaps in care, may hold the key to reducing inappropriate use while simultaneously improving community health. The purpose of this comprehensive review is to examine existing emergency response data, research, and reports from an array of sources to provide insight into effective strategies for reducing non-emergency use while promoting health with appropriate resources.

Introduction & Background

In 1966 a report was published titled *Accidental Death and Disability: The Neglected Disease of Modern Society*. This report identified accidental injuries as the leading cause of death in the first half of life and served to pave the way for the first nationally recognized curriculum to train emergency medical technicians, published in 1969 (National Academy of Sciences [NAS], 1966). It was the report and subsequent curriculum that gave rise to modern emergency medical system (EMS) in the United States. The modern EMS system originated from an identified need for pre-hospital treatment and transportation of traumatic injuries; specifically, those which occurred on the national highway system. Over the years, the scope of EMS continued to grow to address other out-of-hospital medical needs of an emergent nature include pre-hospital treatment and transportation for heart attack, cardiac arrest, stroke, and more (Edgerly, 2013). While EMS continued to advance in treatment capabilities of pre-hospital medical emergencies, a crisis of identity emerged as many pre-hospital medical providers and administrators alike resisted the adoption of treatment strategies for non-emergency requests. Responses to non-emergent incidences were infrequent and did not impose a substantial burden on response systems in the early years of EMS. Increased frequency of non-emergency responses was matched with allocation of necessary funds to meet increased demands and the underlying causes for non-emergent response requests were left unaddressed. After years of increasing call volume with no suitable management strategy, tightening municipal budgets, and reduced compensation through insurance payments for service, many EMS systems have found themselves in a dire state; unable to cope with a crippling call volume and possessing no clear solution.

Emergency resources are both limited and costly to maintain. Non-emergency use of these resources poses a significant risk to the health and well-being of citizens in communities across the nation. When non-emergency use of emergency resources occurs in excess, EMS systems may be unable to expeditiously respond to life-threatening emergencies or may be delayed due to responding from greater distances. This can have an adverse effect on patient outcomes, particularly in time-sensitive emergencies such as overdose, stroke, cardiac arrest, and many others. The long-term impact is that limited financial resources may be diverted to ensure response capabilities are maintained, reducing funding for other valuable health services without producing positive health impacts that might have been otherwise gained. There may be opportunities to improve availability and access to appropriate healthcare resources, ultimately improving the health and wellbeing of community members while simultaneously enhancing the ability of EMS to respond to emergencies. The purpose of this comprehensive review is to examine existing emergency response data, research, and reports from an array of sources to provide insight into effective strategies for reducing non-emergency use while promoting health with appropriate resources.

A comprehensive search was completed for current peer-reviewed literature using PubMed and search terms related to emergency department, emergency medical services, and community paramedicine. Current public data from the National Fire Protection Association (NFPA), National Highway Traffic Safety Administration (NHTSA), United States Census Bureau, Centers for Disease Control and Prevention (CDC), and Centers for Medicaid & Medicare Services (CMS), and existing reports from both government and non-government organizations were reviewed and analyzed. The review is presented in the following 12 sections: 1) current use and trends, 2) motives for requesting EMS, 3) EMS dispatch complaints, 4) patient

sex, age, race, and income, 5) urbanicity and geographic poverty, 6) emergency department use, 7) reducing non-emergency use, 8) community paramedicine overview and interventions, 9) community paramedicine challenges, 10) developing a community paramedicine program, 11) limitations and research needs, and 12) summary.

Current Use & Trends in EMS Responses

Requests for EMS responses have increased substantially over the past decade. According to data from the National Fire Protection Association (NFPA), fire department calls for medical aid increased from 15.8 million requests in 2008 to 23.6 million in 2018, representing a 49.4% increase in responses. In fact, EMS responses have increased an average of 5.1% annually since 2000 (National Fire Protection Association [NFPA], 2019). This rate of increase is much greater than that of the US population, which has been 0.66% annually since 2010 and 0.97% annually from 2000 to 2010 (Johnson, 2019). EMS responses continue to increase while population growth slows. The increase in number of responses indicates that people are requesting EMS far more now than in the past and for reasons that cannot be explained by population growth alone. Interestingly, the increase in EMS responses do not appear to be the result of an increasing number of ill or injured persons in need of emergency treatment, but rather the opposite: an increase in lower acuity patients who rely on EMS to fill gaps in existing systems of care. To understand EMS use, it's important to know how EMS agencies measure patient acuity.

In EMS, patient acuity is categorized according to guidelines established by the National Highway Transportation and Safety Administration (NHTSA). The categories are lower acuity, emergent, critical, and dead without resuscitation efforts. These categories follow the four-color triage scheme of green, yellow, red, and black, respectively. Lower acuity is defined for National

Emergency Medical Services Information System (NEMSIS) reporting by the NHTSA as a patient who “presents with symptoms of an illness or injury that have a low probability of progression to more serious disease or development of complications.” Emergent refers to a patient that “presents with symptoms of an illness or injury that may progress in severity or result in complications with a high probability for *morbidity* if treatment is not begun quickly” and critical refers to a patient who “presents with symptoms of a life threatening illness or injury with a high probability of *mortality* if immediate intervention is not begun to prevent further airway, respiratory, hemodynamic and/or neurologic instability.” (National Highway Traffic Safety Administration [NHTSA], 2005). The primary difference between emergent and critical is the presence of imminent risk of mortality as opposed to disability.

National EMS response data is collected in the NHTSA’s NEMSIS database. While not all states have yet become integrated into the national database, it is currently the best resource to begin measuring and understanding the public’s use of EMS systems around the country. Out of 81.6 million incidents contained in the NEMSIS Version 3 database between 2017 and October 2020, only 18.9% were reported to have an acuity of emergent or higher; 15.4% reported as emergent, 3.0% as critical, and 0.5% as deceased upon EMS arrival. Of the remaining 81.1% of responses, 40.6% were reported as lower acuity. 40.5% did not report an acuity value, but rather, were recorded as either “not applicable” or “not reported” (NA/NR) (NEMSIS, 2020). Despite patient acuity being a mandatory report value for any incident where a patient received medical treatment, the NA/NR categories account for a substantial proportion of EMS responses. These incidents do not have reported patient acuities as most fall into one of several non-transport incident disposition categories that do not necessitate reporting of a patient acuity according to national reporting guidelines. The reason for this discrepancy is simple but alludes to a missed

opportunity in reporting. The initial acuity value is used for comparison to the final acuity value as a way of measuring treatment effectiveness, but final acuity is only required when a patient is transported. Without transportation, final acuity is not required and as such, initial acuity is not reported. These non-transport disposition categories often deal with various forms of public assistance, patient refusal of transportation, response cancellations, treat-and-release encounters, good intent requests where no treatment is required, or no responses where no patient is found. Context is important in understanding these categories. Responses categorized as public assistance can be the result of EMS providing lift assistance to an elderly or disabled person, blood pressure or glucose check, among many other reasons. Patient refusal of transportation is typically the result of EMS responding to a legitimate injury or illness but finding that the patient does not need or want to go to the hospital. The patient may receive some limited medical care such as assisting a diabetic person who has become hypoglycemic or an asthmatic whose inhaler ran empty. Many patient refusals are also the result of a patient needing information on how to access appropriate medical resources and upon receiving that information decides not to go to the hospital. The refusal process itself is generally conducted as a release of liability for the governing locality and responding organization. It is rare for a patient needing to go to the ED to refuse care as considerable effort is often made to convince them to change their mind and go to the hospital. Cancellations are common in tiered response systems where an EMS activation also gets the response of local fire apparatus (such as a fire engine). Upon fire department arrival, EMS may be cancelled due to no emergency being found. An example of this would be for a good intent call to 9-1-1 for an unresponsive person at a bus stop. Fire & EMS resources respond but find that the person reported to be unresponsive was just sleeping or that it was a homeless person using the bus stop as a shelter. Non-refusal treat-and-release incidents are generally minor

in nature such as a person who falls and suffers an abrasion. As should be evident, most incidents that fall within the NA and NR categories are of a low acuity and non-emergent nature.

In the absence of major changes to a population's health, access to healthcare, or quality of care received, it would be unexpected to observe a significant change in the number of critical patient presentations over a short period of time; in this case, several years. In other words, the rate of emergencies should remain relatively stable as the contributing factors that ultimately precipitate an emergency should too remain relatively stable. This stable incidence of critically ill EMS-treated patients is observed between 2017 and 2020 where the annual rate of responses with an emergent or higher acuity was found to be 19% in 2017 and 18.7% in 2020. What did change though was the proportion of incidents reported as lower acuity during the same period, with 38.2% in 2017 and 42.1% in 2020 (Figure 1). Even though the responses that do not report an acuity (NA/NR) are largely of a non-emergent nature, the trend of increasing lower acuity

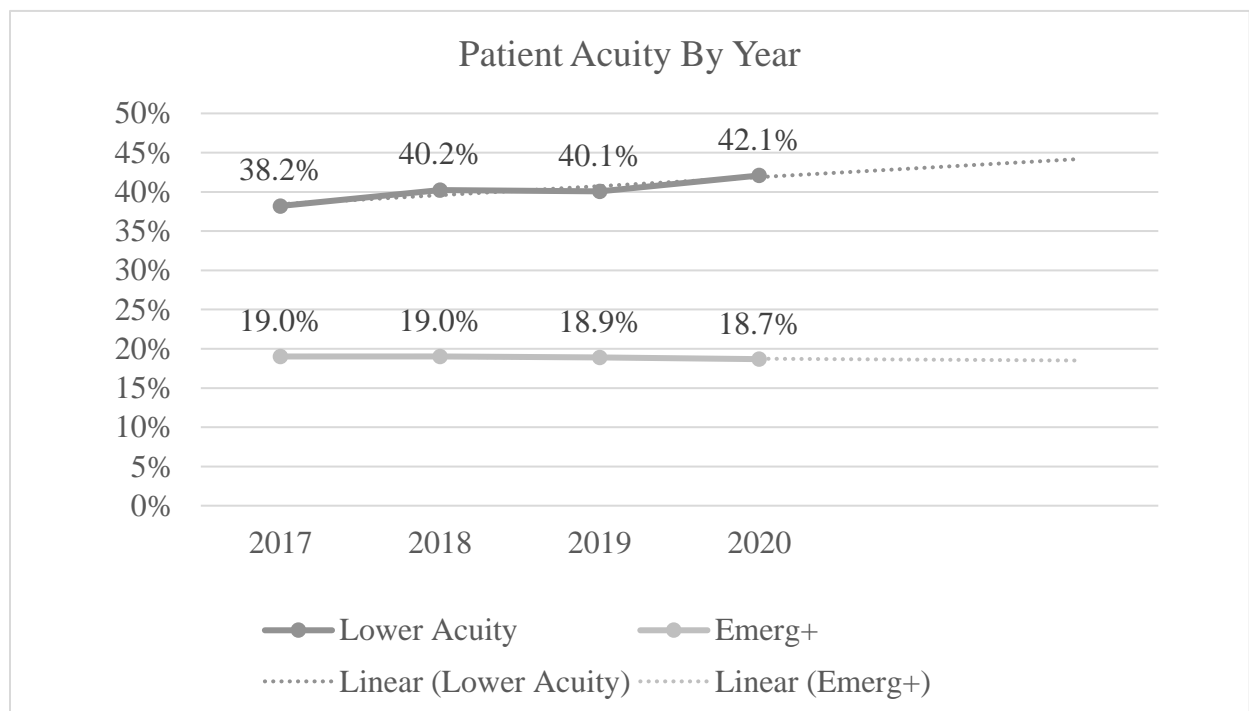


Figure 1 Patient Acuity by Year. Emerg+ is the sum of emergent, critical, and dead without resuscitation categories

responses persists if only responses that reported an acuity are considered; increasing from 66.8% of responses in 2017 to 69.3% in 2020 (NEMSIS, 2020). Considering the annual increase in responses and that there was only a 0.3% difference in emergent or higher acuity patient presentations between 2017 and 2020, the increase may indicate that more people are requesting EMS for non-emergent complaints. Regrettably, the previous version of NEMSIS (version 2) did not require patient acuity and thus no direct comparison can be made prior to 2017. Patient acuity serves as a reasonable starting point in determining how many EMS responses are for non-emergent complaints, but it alone does not tell the whole story. Further insight can be gained from evaluation of CMS billing level, transportation priority, and level of service provided.

The Centers for Medicare & Medicaid Services (CMS) establish billing levels for services provided by EMS; which are reported to the NEMSIS database as an incident's "CMS Service Level". Pre-hospital treatment is broadly classified as advanced life support (ALS) and basic life support (BLS). The level of service category is then further subdivided as ALS-1, ALS-2, and BLS (Centers for Medicare & Medicaid Services [CMS], 2016). For 2020, 63% of responses were billed at the ALS level. An additional 5.3% were billed at the BLS level but with emergent transportation (i.e. flashing emergency lights and audible siren) (NEMSIS, 2020). This may imply that 68.3% of responses were for legitimate emergencies; after all, receiving "advanced life support" implies an emergent if not critical nature of illness or injury. This is however not necessarily the case. To understand why, there needs to be an understanding of how CMS billing levels work and the difference between ALS-1 and ALS-2 designations.

Of responses billed as ALS, 97% were billed at the ALS-1 level with only 3% billed at the ALS-2 level. (NEMSIS, 2020). ALS-1 requires only that an ALS assessment (patient assessed by a paramedic) was performed or that one ALS intervention was performed. An ALS

intervention can be as simple as obtaining and interpreting a 12-lead ECG, establishing intravenous access, or administering medication (CMS, 2016). For example, someone with nausea who is administered ondansetron (an antiemetic) would be considered to have received ALS care as ondansetron administration requires a paramedic-level provider. EMS systems that only staff ambulances with ALS-level providers can therefore bill ALS-1 for a larger proportion of patient encounters compared to systems that staff ambulances with a mix of BLS and ALS providers. As such, an ALS-1 billing level alone cannot be used to determine if an emergency was present as it may not represent the patient's actual acuity. However, any ALS-1 response that also resulted in emergent transportation to the hospital can be reasonably presumed to have been a genuine emergency. Billing at the ALS-2 level requires an ALS assessment and at least 3 ALS interventions or 1 critical ALS intervention (CMS, 2016). A critical intervention could be decompression of a tension pneumothorax, endotracheal intubation, electrical therapies such as cardioversion, or several other procedures considered necessary to stave off imminent death. All ALS-2 contacts are considered true emergencies due to the criticality required to necessitate such interventions. A rough approximation of true emergencies can therefore be gained through the summation of all ALS-2 patient contacts (3.0%), ALS-1 contacts that were transported emergently (10.6%), and BLS contacts transported emergently (5.3%). Transport priority is used as an indicator of severity since emergent transportation implies a patient condition that necessitates timely intervention only available at a higher level of care. This calculation, while imperfect, produces a result of only 18.9% of EMS responses being of an emergent nature as opposed to the original 68.3% obtained from level of service and transport priority alone. Prior years showed similar results with 16.2% in 2017, 18.4% in 2018, and 18.9% in 2019 (NEMSIS, 2020). Evaluation of the results derived from patient acuity and those from a mix of CMS service

level and transportation priority support the proposition that a large proportion of EMS responses are of a non-emergent nature. The question that must then be asked is why do people call 9-1-1 and request EMS for non-emergent complaints?

Motives for Requesting EMS

Non-emergency use of EMS is a nationwide issue that has remained largely understudied and as a result, remains poorly understood. Some research has been conducted on frequent or repeated use of EMS services by the same patient, but this too is minimal (Scott et al., 2014). A potential reason for the lack of research is that until recently, there has been inadequate reporting of standardized data and no comprehensive national database suitable for large scale analysis. The lack of comprehensive data has improved with the advent of the NEMSIS database, but more work must be done to ensure complete high-quality data is available for research. As such, there are still significant limitations to understanding EMS use.

When people call 9-1-1 for non-emergency issues, it is often to obtain information regarding treatment options, a lack of social support, a need for reassurance, or inability to contact anyone else. In some cases, a person may call 9-1-1 simply because they are legitimately unable to call anyone else (phones with disconnected service are still able to connect to 9-1-1). Sometimes an EMS response is activated for what initially seems to be an emergency to the 9-1-1 call taker and dispatcher, but upon EMS arrival, the patient is not only found to be in no acute distress, but they are dressed and have a packed travel bag with family members waiting to follow the ambulance to the hospital in their personal vehicle. The reason for this is that people commonly believe that they will be treated faster in the ED if they arrive by ambulance (A. Dorsey, personal communication, November 4, 2020). The unfortunate reality is that some patients experience prolonged wait times in the ED upward of 3 hours or more (Hing & Bhuiya,

2012). Having experienced such a long wait during a previous ED visit may influence them to go by ambulance in hopes they will be evaluated and treated more quickly. There have been cases in which patients experience such long delays in care that they leave without receiving the care they sought, or worse, call 9-1-1 from within the ED in hopes it will shorten their wait (Dejean et al., 2016). In a broad sense, people call 9-1-1 when they are no longer able to cope with their present situation. DeJean et al. (2016) also reported patient age, health system knowledge, system failures, and a lack of social support as important factors that contribute to patients' inability to cope with non-urgent or minor issues; ultimately leading to non-emergency use of EMS resources.

Patient age plays a role in a patient's ability to cope with illness or injury and therefore can be a factor in the appropriateness of requesting an ambulance. For example, an elderly patient may have difficulty coping with acute illness due to comorbid conditions and poor general health compared to a patient that is younger. An otherwise healthy elderly person who contracts influenza may be at higher risk for death compared to a someone much younger despite both suffering from the same illness. Lack of health system knowledge is another reason people may be unable to cope with otherwise minor illnesses or injuries. People who do not understand their insurance or do not know how or where to seek care for acute needs may resort to 9-1-1. In cases like these, EMS serves to close gaps in healthcare by providing information and connecting patients with appropriate healthcare resources whenever possible. Inability to cope does not always stem from a patient's lack of knowledge though, several system-level failures result in avoidable EMS responses. This is common when patients face substantial delays in placement within long-term care facilities because they are no longer able to adequately care for themselves. Sometimes these patients will have family or other social support that can reduce the

burden while they wait for placement, but this is not always the case. A person who cannot ambulate well, cannot self-administer medications, or properly clean themselves are at much higher risk for injuries from falling or developing infectious processes (i.e. urinary tract infections or decubitus ulcer development). Inability to self-medicate can be a challenge and cause serious consequences among diabetic patients taking insulin injections. Another system failure occurs when a patient enters the healthcare system through EMS and the ED only to be discharged without addressing the root cause for the visit. Patients can get caught in a sort of revolving door with frequent ED visits that do not adequately address their needs because the system is not well equipped to address long-term needs in acute settings. Finally, lack of social support plays a major role in ability to cope. An example that illustrates the effect of social support on avoidable EMS responses are lift assistance calls. A lift assistance call occurs when someone falls and does not suffer an injury or only suffers a minor injury but is unable to get up on their own and lacks adequate support from family, friends, neighbors, etc. The EMS response would likely be avoided if there was adequate social support but amidst a lack of support, the call occurs. This scenario is a common cause for EMS response and is most often a low acuity situation. An inquiry of the NEMSIS database from 2017 through October 2020 produced 8,063,795 EMS responses with a dispatch complaint of “fall”. This dispatch category was the second highest reason for EMS response, below “sick person”. Of these responses, only 15.1% were found to have an acuity rated as emergent or higher upon assessment by EMS and only 57.6% were transported to the hospital (NEMSIS, 2020). Oftentimes, transportation is done not because there is a medical emergency or injury that requires further evaluation, but because the patient has a demonstrated lack of support and is therefore unable to cope with their situation. Not transporting them may result in additional falls that could result in serious injury.

Additionally, transportation to the ED may be the only option available other than staying home. Emergency response agencies are rarely able to transport patients anywhere other than the ED. So, while the patient may recognize they do not need to go to the ED and may not necessarily want to be evaluated at the hospital, they have nowhere else to go (Dejean et al., 2016).

An emergency is generally thought to be any illness or injury that is both severe and requires timely intervention to avoid death or disability. Non-emergency use of EMS would therefore seem easy to define; however, it is not. The difficulty in identifying the extent of non-emergency use is that no two patient presentations are identical and the circumstances that led to 911 being called differ. Two patients with the same complaint resulting from the same etiology may differ in both severity and urgency. Consider a young healthy patient with mild flu-like symptoms who possesses the means to see their physician, but who calls 911 instead with the intention of obtaining ambulance transport to the ED. This decision may be the result of many contributing factors but is likely unnecessary as the present conditions do not constitute a medical emergency. Now consider a similar patient with the same symptoms but that does not possess insurance, does not have the means to physically reach a doctor, and has no social support to gain assistance. While neither may necessarily constitute a medical emergency, it is far more reasonable for the patient without access to care to call for an EMS response; whether to be transported to the ED or to gain information about available treatment options and how to access them. In this way, EMS serves as a component of the healthcare safety net. Regardless of access or ability to pay, prompt medical evaluation, treatment, and transportation to a hospital is available. The following data on EMS responses and use must be evaluated with an appreciation for the safety net concept. While a considerable amount of non-emergency use occurs, a variety of unique circumstances may exist that can legitimize otherwise inappropriate use. If 100% of

patients encountered by EMS were found experiencing a genuine emergency, then there would undoubtedly be emergencies missed by the response system.

EMS Dispatch Complaints

It has been demonstrated that EMS is requested at an increasing rate and, based on inferences from acuity, service level, and transportation priority data, for reasons that are not always of an emergent nature. To understand motives for requesting EMS response and to identify opportunities to address non-emergent use, the actual complaints that trigger 911 response must be examined. Upon contacting 911 and identifying that there is a medical complaint (as opposed to fire suppression, law enforcement, animal control, etc.) Emergency Medical Dispatch (EMD) equipped call centers ascertain additional details according to EMD Guidecards. These EMD Guidecards provide 911 call-takers a standardized process of determining what the nature of the complaint is and what responder resources will be required. An example of an EMD Guidecard is shown in Figure 2. EMD Guidecards are designed to ensure consistency and accuracy in call classification. Not every emergency response agency uses EMD due to the increased cost; among other factors. In 2019, EMD was reportedly used in 60.8% of responses (12.2 million) (NEMSIS, 2019). As EMD improves the accuracy of call classification, the following initial complaint statistics include only responses where EMD was used.

There are 42 EMD categories for EMS response, which are shown in figure 3 along with the percentage of calls each category accounts for. The top 10 categories account for 74.2% of responses with the other 32 accounting for the remaining 25.8%. When examining patient acuity in each category, no single category stands out as wholly non-emergent compared to the others. Each classification group contains real life-threatening emergencies; however, certain categories

have an overall lower percentage of emergent or higher patient presentations. The proportion of calls reported to have an acuity of emergent or higher is shown in figure 3 as “% Acuity Emergent+”. The psychiatric and assault categories stand out as particularly low percentage of emergent or higher acuity encounters with 8.5% and 7.9%, respectively. Conversely, stroke, breathing problems, and chest pain have higher percentages of higher acuity encounters at 28.1%, 36.1%, and 24.9%, respectively (NEMESIS, 2019).

Chest Pain/Heart Problems	
<p>Vital Points Questions</p> <p>Is the patient breathing normally? Is the patient conscious? Where in the chest is the pain located? Does the patient feel pain anywhere else? Where? How long has the patient had chest pain s? Sudden Onset? Does the pain change when the person breathes or moves? What is the age and gender of the patient? Is the patient weak, dizzy, or faint? Is the patient nauseated or vomiting? Is the patient sweating profusely? Is the patient experiencing rapid heart rate with chest pain? Does the patient have a history of rapid heart rate? Does the patient take nitroglycerin? Any relief? Has the patient taken an aspirin after the onset of pain? Provide relief? Dosage? Any use of prescription or illegal drugs in the last 48 hours?</p> <p><u>Information Only Questions</u></p> <p>Does the patient have a history of heart problems (previous heart surgery or heart attack)? Does the patient have any other medical history? Does the patient have any type of cardiac device?</p>	<p>ALS Priority</p> <p>Unconscious and/or not breathing normally/difficulty breathing Decreased level of consciousness Center of chest, upper abdomen Jaw, Shoulder blades, throat, teeth Minutes, hours, days, weeks (All will be ALS) Painful Breathing Male over 35 years of age or Female over 40 years of age 15-40 years of age with any of the following symptoms: Weak, dizzy, or faint, Short of breath Nausea Diaphoretic Rapid heart rate with chest pain, irregular rapid heart rate History of rapid heart rate Nitroglycerin—more than 1/less than 3 Aspirin – How many Small orange pill or large white pill Cocaine/crack or other illicit drug use / Prescription drugs such as Viagra, Cialis, Levitra, etc... in the last 48 hours</p>
<p>Pre-Arrival Instructions</p> <p><i>If unconscious/not breathing, go to CPR for the appropriate age group. Trained bystanders may still need instructions. ASK?</i> <i>If unconscious, go to AIRWAY CONTROL (Trauma) instructions.</i> Have the patient sit or lie down, whichever is more comfortable and remain calm. Does the patient have prescribed nitroglycerin? Has the patient taken any? If NO: Have the patient sit down and take as the physician has directed. Make sure they take no more than 3 doses. If the patient complains of being weak or dizzy, do not take nitroglycerin. Has the patient been instructed by their physician to take an aspirin? Is the patient allergic to aspirin or have a bleeding disorder? If NO, have the patient sit down, take one adult aspirin (325 mg) or 4 baby aspirin (81 mg).</p> <ul style="list-style-type: none"> • Loosen tight clothing. • Keep the patient calm. • Nothing to eat or drink. • Allow position of comfort. • Gather patient's medications and give to responders when they arrive. • Put any pets away. 	<p>BLS Priority</p> <p>Male under 35 yrs without critical symptoms Female under 40 yrs without critical symptoms Rapid heart rate without critical symptoms</p> <p>BLS Standard</p> <p>Male under 35 yrs or female under 40 yrs with chest wall trauma without critical symptoms</p>

Figure 2 Example EMD Guidecard for Chest Pain/Heart Problems

<i>Complaint Reported by Dispatch</i>	% of Incidents	% Acuity Emergent+
<i>Sick Person</i>	15.92%	14.66%
<i>Falls</i>	9.57%	14.87%
<i>Transfer/Interfacility/Palliative Care</i>	8.62%	20.74%
<i>Breathing Problem</i>	8.57%	28.06%
<i>Traffic/Transportation Incident</i>	8.26%	13.24%
<i>Chest Pain (Non-Traumatic)</i>	5.99%	24.94%
<i>No Other Appropriate Choice</i>	5.41%	19.54%
<i>Unconscious/Fainting/Near-Fainting</i>	4.99%	26.97%
<i>Unknown Problem/Person Down</i>	3.68%	16.66%
<i>Convulsions/Seizure</i>	3.22%	26.33%
<i>Psychiatric Problem/Suicide Attempt</i>	2.98%	8.53%
<i>Abdominal Pain/Problems</i>	2.62%	15.67%
<i>Traumatic Injury</i>	2.34%	17.54%
<i>Overdose/Poisoning/Ingestion</i>	2.04%	20.60%
<i>Hemorrhage/Laceration</i>	1.93%	15.46%
<i>Stroke/CVA</i>	1.87%	36.09%
<i>Assault</i>	1.67%	7.94%
<i>Diabetic Problem</i>	1.61%	26.42%
<i>Cardiac Arrest/Death</i>	1.43%	50.19%
<i>Heart Problems/AICD</i>	1.17%	28.05%
<i>Back Pain (Non-Traumatic)</i>	1.00%	11.42%
<i>Allergic Reaction/Stings</i>	0.82%	18.55%
<i>Medical Alarm</i>	0.72%	8.28%
<i>Pregnancy/Childbirth/Miscarriage</i>	0.54%	19.86%
<i>Headache</i>	0.48%	13.50%
<i>Fire</i>	0.37%	5.20%
<i>Standby</i>	0.37%	4.95%
<i>Choking</i>	0.33%	15.23%
<i>Stab/Gunshot Wound/Penetrating Trauma</i>	0.30%	36.09%
<i>Well Person Check</i>	0.27%	7.77%
<i>Heat/Cold Exposure</i>	0.18%	18.35%
<i>Animal Bite</i>	0.17%	9.80%
<i>Burns/Explosion</i>	0.12%	22.46%
<i>Eye Problem/Injury</i>	0.09%	7.70%
<i>Carbon Monoxide/Hazmat/Inhalation/CBRN</i>	0.09%	7.51%
<i>Airmedical Transport</i>	0.07%	27.33
<i>Industrial Accident/Other Entrapments (Non-Vehicle)</i>	0.07%	11.14%
<i>Drowning/Diving/SCUBA Accident</i>	0.04%	29.00%
<i>Automated Crash Notification</i>	0.03%	13.90%
<i>Healthcare Professional/Admission</i>	0.03%	22.40%
<i>Electrocution/Lightning</i>	0.02%	18.66%
<i>Pandemic/Epidemic/Outbreak</i>	0.02%	24.40%

Figure 3 Complaint reported by dispatch with percent of responses and percent of incidents with emergent or higher patient acuity

Patient Sex, Age, Race, & Income

In 2019, 48% of people evaluated by EMS were male and 51.9% were female (0.1% unknown). The average patient age was 55 years old. 6.5% of patients were under 18 years of age, 53.7% were between the ages of 18 and 65 and 39.8% were 65 or older (NEMESIS, 2019). In comparison, 50.8% of the US population is female and the average overall age of all people in the US in 2019 was 39 years of age. People under the age of 18 accounted for 22.3% of the population, age 18 to 65 accounted for 61.3%, and 65 or older accounted for 16.5% (Census Bureau, 2019). Comparing the number of responses per age category to the population of that category show a response rate of 1 in 49 people age 0-18, 1 in 16 ages 18 and 65, and 1 in 6 ages 65 or older.

Patient age appears related to acuity. Incidents with a reported patient age 0-100 years were evaluated for differences in acuity. Overall, 22.5% had an acuity of emergent or higher, recording a patient acuity (i.e. public assistance). As shown in Figure 4, fewer patients presented with a high acuity in lower age groups compared to those in more advanced age groups. This trend is to be expected as the prevalence of chronic disease and the impact of comorbidities increase with age. 18.3% emergent, 3.5% critical, and 0.6% deceased. 48.4% were lower acuity (NEMESIS, 2020) and the remaining did not have a reported acuity due to be an incident type that did not require

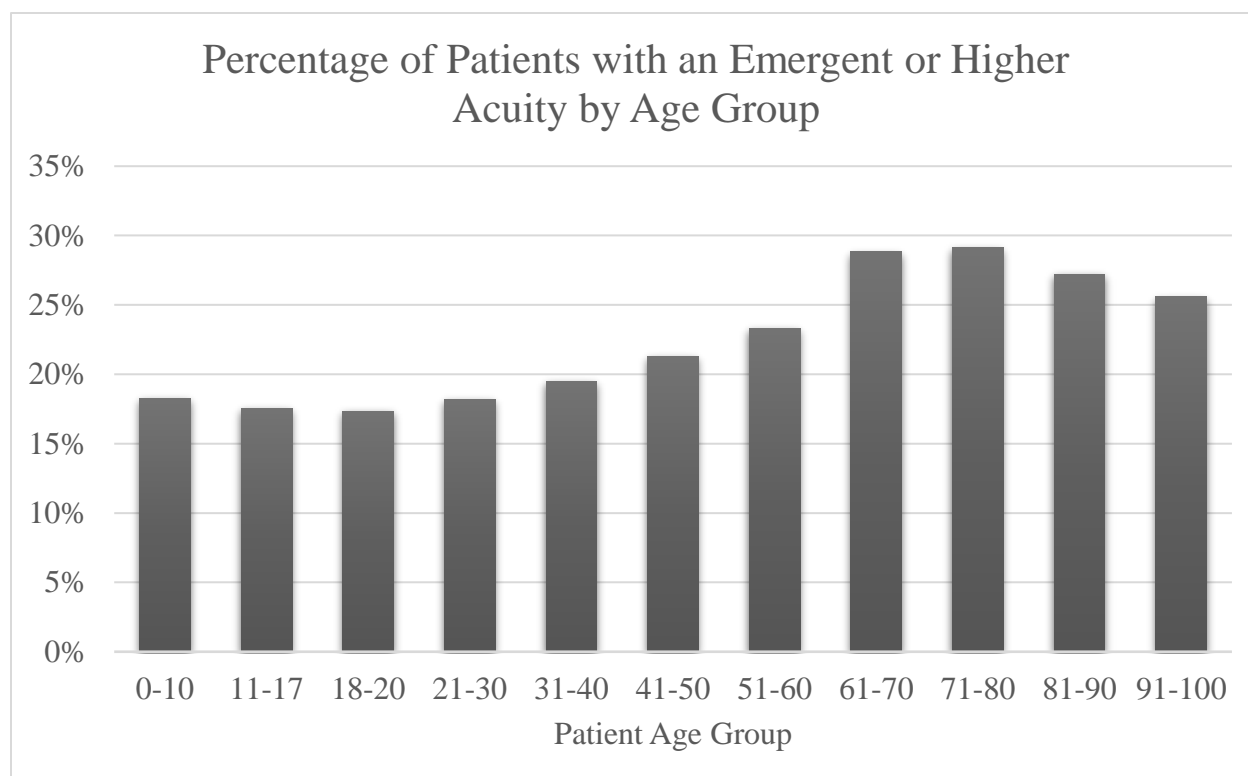


Figure 4 Percentage of patients with an emergent or higher acuity by age group

A relationship also appears to exist between race and EMS use. 64.5% of responses were for white people, 23.7% for black or African American, 9.1% for Hispanic or Latino, 1.4% for Asian, 1.0% for American Indian or Alaskan Native, and 0.4% for Native Hawaiian or Pacific Islander (NEMSIS, 2020). Comparison of percentage of EMS responses by racial group to those of the US show several interesting differences. 60.1% of the nation is white, which is closely represented by responses for white people. While 13.4% of the US is black or African American, 23.7% of EMS responses were for this race group. The opposite appeared to be true for the Hispanic population, with only 9.1% compared to 18.5% nationally. Finally, 5.9% of the US population is Asian but this race group only accounts for 1.4% of responses (Census Bureau, 2019). Average acuity was evaluated for selected races using a rated scale whereby lower acuity had a value of 0, emergent had a value of 1, critical had a value of 2, and deceased upon arrival

had a value of 3. It was found that White and Asian groups have a higher average acuity with a score of 0.415 and 0.395, respectively, while Black and Hispanic groups have lower average acuity scores of 0.336 and 0.328, respectively (NEMESIS, 2020). As seen in Figure 5, Acuity appears to be lower in each race group for younger age groups compared to older age groups. Acuity is higher for the white racial group compared to Asian, Hispanic or Latino, and Black or African American (NEMESIS, 2020). This may indicate that fewer people must rely on EMS for non-emergencies in the white group compared to others. This would likely be from greater access to traditional healthcare services (e.g. insurance coverage and a regular physician).

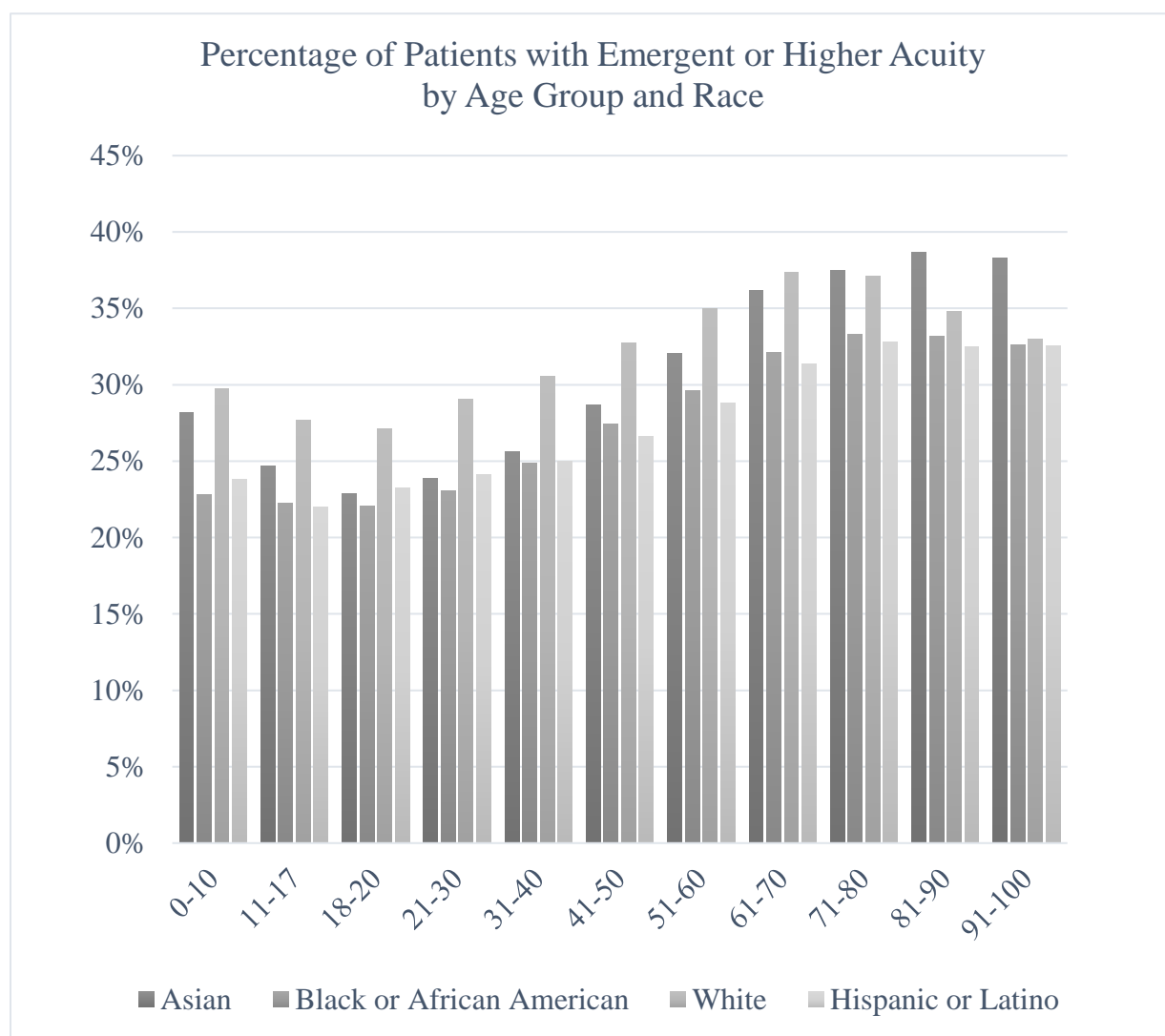


Figure 5 Percentage of patients with an acuity of emergent or higher acuity by age group and race.

Income may be related to EMS use as well. Income and EMS use was evaluated for several racial groups. Median income for people who are white is 106% of the national median. This group makes up 60.1% of the nation and 64.5% of EMS responses. However, the median income for Black or African Americans is just 65.5% of the national median. This group makes up 13.4% of the country's population but 23.7% of EMS responses. An opposite relationship is observed among the Asian group, whose median income is 138% of the national median and is responsible for only 1.4% of EMS responses despite representing 5.9% of the nation (Census Bureau, 2019). These values may indicate a relationship between race, income, and use of EMS; likely as a function of access to and affordability of healthcare.

Urbanicity & Geographic Poverty

Patient acuity was examined further to determine if a relationship existed between acuity and urbanicity, geographical poverty rate, and geographical uninsured rate. Urbanicity is categorized as urban, suburban, rural, and frontier. As seen in figure 6, urbanicity appeared related to patient acuity with the proportion of responses with a reported lower acuity decreasing as population density decreases and the proportion of emergent or higher (Emergent+) increasing as population density decreases. The increase in responses for lower acuity patients as population density increases is not clearly understood but may be influenced by greater accessibility of emergency departments in increasingly urban regions. Figure 6 shows patient acuity based on geographical poverty percentage; with an increase in lower acuity patients as poverty rate increases and an increase in higher acuity as poverty rate decreases.

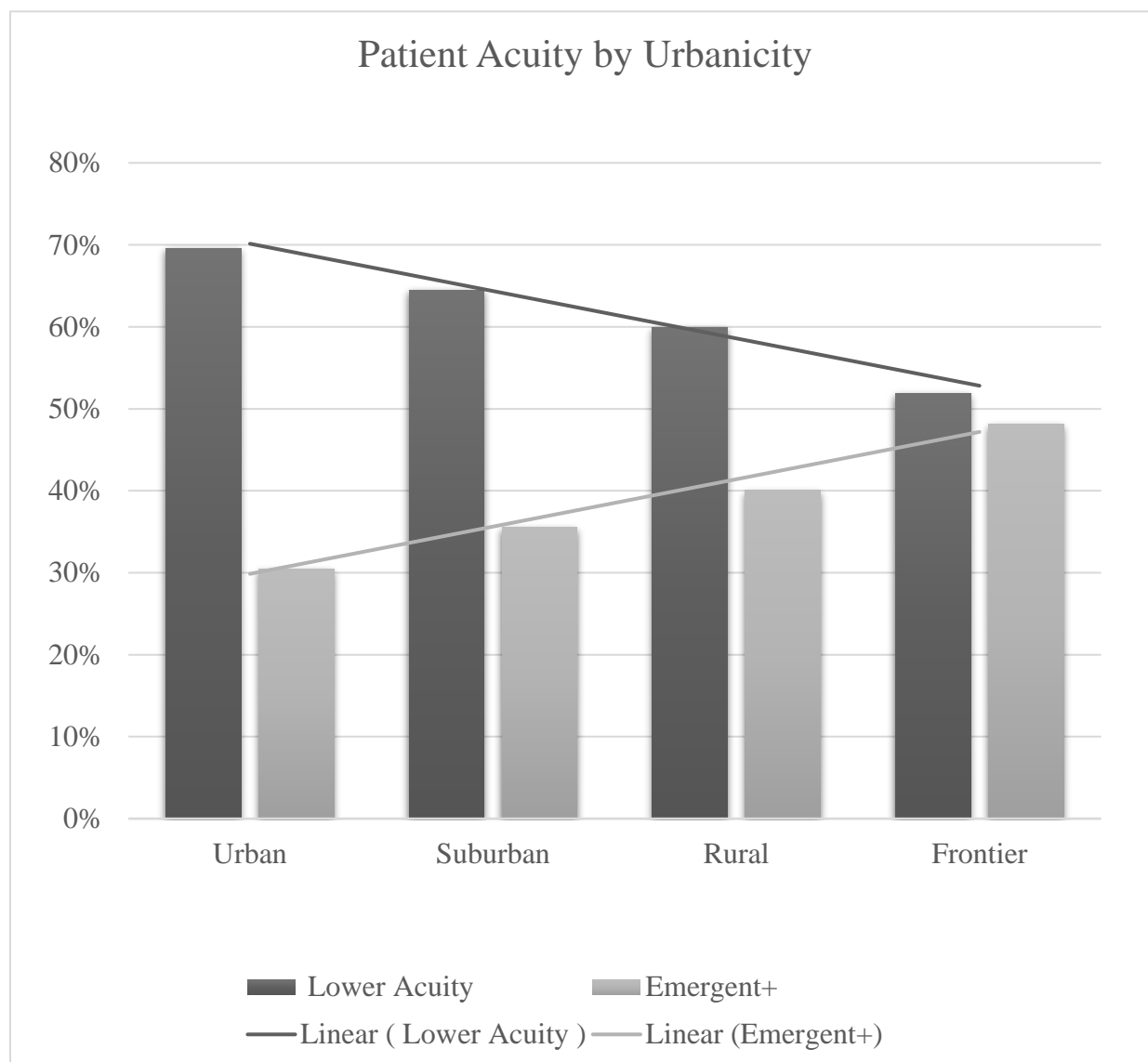


Figure 6 Patient acuity by urbanicity category

The relationship between acuity and poverty was explored further to also include urbanicity. In urban centers, the rate of lower acuity patients increased substantially as poverty rate increased; increasing by 10.1% from 64.1% when poverty rate was <5% to 74.2% when poverty rate was 26% or greater. Suburban areas showed a similar trend with exception of when poverty was $\geq 26\%$, which increased in acuity. Acuity in suburban, rural, and frontier areas were

generally lower in the mid-poverty categories and relatively increased in both the highest and lowest poverty groups.

Patient acuity shows a similar trend when compared against geographical uninsured rate. Figure 7 shows that as the rate of uninsured increase, the percentage of lower acuity patients also increase (and with it, the percentage of higher acuity patients decrease). What this may be representing is an issue with access to healthcare services leading the poor and/or uninsured to seek medical care through emergency services and the emergency department.

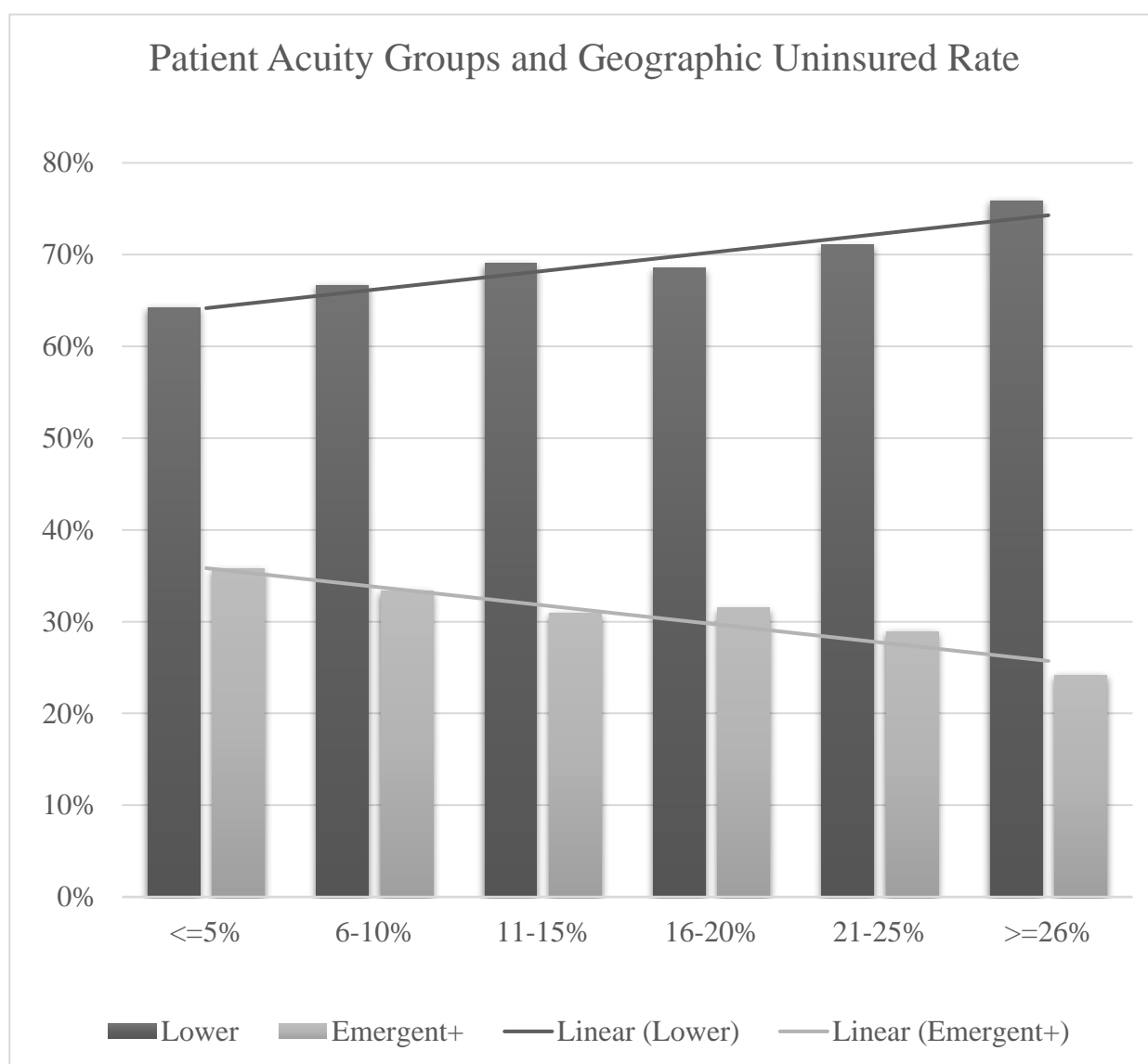


Figure 6 Patient acuity and geographic uninsured rate

Emergency Department Use

According to the most recent National Hospital Ambulatory Care Survey (NHACS), 138,977,000 emergency department visits occurred in 2017, with 20,151,000 (14.5%) of visitors arriving via ambulance; a percentage that has held relatively stable over the years. (Rui & Kang, 2017). Similar to trends in EMS responses, the annual number of emergency department visits is increasing. As the number of ER visits increase, it is reasonable to presume that the number of patients arriving to the ED via ambulance will also increase. While some patients request EMS out of a need for reassurance, advice, or just to assist in a variety of ways with no intention of going to the hospital, the majority are calling with the intention of being transported to the emergency department where they will be treated by an emergency physician and either discharged home or admitted for further treatment; EMS serves as a means of achieving this goal. EMS functions as a natural “middleman” between patients and the ED and it is for this reason that ED and EMS use are intrinsically connected. Increasing ED use will result in increasing EMS responses and increasing EMS responses will inevitably result in more patient transports to the ED. With this relationship in mind, it would be unreasonable to attempt understanding of non-emergency EMS use without also gaining insight into non-urgent ED use. Furthermore, EMS agencies are unlikely to reduce non-emergency responses without understanding patient motives for being treated in the ED. The following section will evaluate knowledge on non-urgent ED use, particularly the scope of the problem, reasons it occurs and the factors influencing patient’s decisions to attend the ED for non-urgent conditions.

There are over 138 million ED visits per year in the United States equating to a utilization rate of 43.3 visits per 100 people. In terms of individual attendance, about 20% of adults in the US visit the ED each year (Gindi et al., 2016). Despite so many visits, only 14.5 million (10.4%)

visits result in inpatient admission and of those, only 2 million (1.4%) are critical care admissions (Rui & Kang, 2017). The ED has long been a place for 24/7 medical care for those who are sick or injured. However, as its name suggests, the ED is intended for patients who have injuries or illnesses that necessitate a certain immediacy in treatment to prevent loss of life or ward off disability. Yet, a sizeable proportion of patients seeking treatment do so for non-urgent conditions. In a systemic review, it was determined that upward of 37% of visits to the ED were of a non-urgent nature. While people seek treatment in the ED for non-urgent complaints for many reasons, a few common themes have emerged: perceived severity of illness or injury, perceptions of quality of care, poor access to alternative care, referral by others, convenience, and financial flexibility (Uscher-Pines et al., 2013). For some, the decision can be based on just one of these factors, while others are the result of several interacting motives such as convenience and payment flexibility. Each of these themes will be explored further to achieve greater understanding.

Perception of Severity

Severity is reported as the deciding factor in seeking emergency care among 77% of adults between the age of 18-64 (Gindi et al., 2016). Patients may perceive that their symptoms are of such a severity that they need to be seen in the emergency department or that they cannot wait for treatment elsewhere (Uscher-Pines et al., 2013). Perceived severity may however be over-estimated. Andrews & Kass (2018) found that when patients and their treating emergency physician were asked to rate the severity of the presenting condition, there was a significant difference in perceived severity. On a 10-point scale, with 1 being the most severe and 10 being least, the average estimated severity reported by patients was 5.22 while the average severity reported by their treating physicians was much lower at 7.57. Patients who self-referred to the

ED, patients with an annual income <\$25,000, and patients without college education were all found to have significant differences in perceived severity. Rassin et al (2006) also observed a substantial difference in patient reported urgency when compared to urgency rated by their nurse.

A possible explanation for differences in perceived severity is poor health literacy among patients. Poor health literacy is associated with increased ED use and is found in disproportionate rates among those with Medicaid (Griffey et al., 2014). Of interest, Medicaid beneficiaries are more likely to report perceived seriousness as the reason for seeking treatment in the ED (Gindi et al., 2016). Many patients simply feel that their complaint cannot wait and perceive their condition to be a true emergency. However, what is an emergency? Various definitions exist, but a medical emergency is generally considered any condition that produces symptoms of such severity that a prudent layperson would reasonably expect serious harm or death to come from failure to receive immediate medical attention. The prudent lay-person (PLP) standard establishes that the determination of severity be based on presenting symptoms rather than final diagnosis. This is meant to ensure patients will not fail to seek emergency care out of fear they become financially liable in the event their complaint is later found to be non-urgent. This standard is important as it is foundational to the ED functioning as a healthcare safety net. Imposing a financial burden on those seeking emergency treatment for what otherwise meets the PLP standard would undoubtedly delay future care or decrease the likelihood of seeking care in the future.

Inappropriate use of the emergency department for non-urgent complaints has led to overcrowding for decades and is an issue that has been studied extensively with no clear solution. The challenge with reducing non-urgent visits to the ED is that it is in direct contradiction with the concept of a healthcare safety net. Attempts to reduce ED volume through

dissuasion of use can disrupt this vital role in healthcare; allowing people to slip through the cracks so to speak and become excluded from the healthcare system. By willingly accepting everyone who comes to the ED, and treating them for whatever their complaint may be, the safety net is preserved. ED overcrowding must be alleviated not by limiting access or by poorly constructed diversion policies, but by improving efficiency to maximize throughput in tandem with follow-up care coordination, improved patient education strategies, and distribution of information for future medical care outside of the ED.

Perceptions of Quality of Care

As previously identified, patients may overestimate the severity of their illness or injury (Andrews & Kass, 2018). As such, many may feel that their condition is outside the scope of their primary care provider (PCP) or that they will receive higher quality care if treated by an emergency physician (Northington et al., 2005) as opposed to other providers such as those at an urgent care center or retail clinic. Patients may also seek treatment in the ED when they are otherwise dissatisfied with the care they receive through their regular source of care (Server et al., 2002). This belief can be amplified when the patient – PCP relationship is not strong. Additionally, some may elect to skip seeing their PCP or other alternative care providers because they believe they require certain testing or radiological exams that might not be available outside of the ED. In a meta-analysis evaluating why people self-refer, it was found that 35% of patients did so because they expected a need for testing such as blood testing or x-rays (Kraaijvanger et al., 2016). Of course, the ED may also be perceived by patients as a convenient location where a physician can conduct an evaluation, diagnostics can be performed with rapid results, and treatment rendered, all during a single visit.

Convenience

Convenience has been identified in several studies as a factor in deciding to seek medical treatment in the emergency department for non-urgent complaints (Coster et al., 2017).

Kraaijvanger et al (2016) found that 18% of self-referred patients reported convenience as a factor. In another study, convenience was found to be a driving factor of seeking treatment in the ED as opposed to with a PCP among 60% of patients treated for non-urgent conditions (Redstone et al., 2008). In contrast with a PCP, patients do not have to make an appointment to be seen in the emergency department as they can go at any time due to 24-hour operation and availability during weekends. Even when patients have access to primary care, they often turn to the ED before first contacting their PCP (Coster et al., 2017).

Access to Primary Care Provider

While some patients bypass their PCP, others legitimately try to obtain care through a PCP prior to seeking care in the ED. In fact, 12% of patients who present to the ED for non-urgent complaints reported that their PCP's office just wasn't open (Gindi et al., 2016). Limited operating hours present a challenge when injuries occur or illnesses develop after-hours, over weekends, during holidays, etc. Others turn to the ED when they encounter difficulty obtaining a same-day appointment with a PCP despite reaching out during normal operating hours. When a same-day appointment can be made, provider continuity, the ability to see one's established PCP as opposed to another provider within the same practice, may be an issue. Yoon et al. (2015) found that both inability to obtain a same-day appointment and provider continuity were significantly associated with seeking care in the ED. Patients may also find it difficult to obtain an appointment if they have not been seen regular or at least annually by their PCP. Furthermore, it can be nearly impossible to see a PCP for a first-time appointment on short notice. The average

wait time to see physician for a first-time visit is 24 days, a significant increase from 2014 when it was 18.5 days (Merritt Hawkins Team, 2017). Access is not just about appointment availability, but also the patient's ability to physically reach the provider. Even when a same-day appointment may have been possible with the patient's regular practitioner, the ED may be more convenient for several reasons. Most obvious is physical proximity to the patient. Perhaps the PCP's office is a 30-minute or greater commute (particularly for rural communities) and the ED is only 5 minutes away. Mode of transportation may also be a factor, particularly if a patient does not have a functional or reliable motor vehicle or their vehicle does not have adequate fuel. Poor access to efficient and reliable public transportation options also create barriers and may influence the decision to bypass the PCP in favor of the ED. Available public transit routes and time of operation may make the ED a more viable option. Of course, the patient's complaint can exacerbate difficulties in transit such as if the nature of illness or injury effects one's ability to ambulate, stand, or travel by foot. Furthermore, appointment availability for unscheduled visits may, by necessity, be later in the day if few schedule openings exist. Schedule conflicts can also arise with other obligations such as work, school, childcare needs, etc. Finally, pain and anxiety are strong motivators to seek the fastest available form of treatment to alleviate suffering.

Referral by Healthcare Provider

Thus far, the focus has been on factors contributing to a *patient's* decision to go to the ED, however patients don't always make this decision; some are instructed to do so by or on the behalf of a healthcare provider. When a patient seeks medical care or advice, they are sometimes instructed to go to the ED instead. Shaw et al (2013) reported the case of a 35-year-old male who ran out of his medication to treat epilepsy. After contacting his neurologist, he was referred to the ED for a medication refill after his appointment was rescheduled. This is arguably an avoidable

ED visit whereby a patient sought care through appropriate means but was still referred to the ED. Referral to the ED by healthcare professionals is not uncommon when patients seek care outside of scheduled visits. Hill et al (2016) surveyed 660 stable consenting adult patients who presented to an urban ED, finding that 71.5% reported having an established PCP. 23.2% had an established PCP and attempted to contact the PCP's office prior to being referred to the ED. Of those patients referred to the ED upon contacting the PCP's office, 55.1% reported referral without physician consult and 42.9% reported referral without consultation with either a nurse or physician. 11.2% felt that the phone recording directed them to the emergency department but never spoke with either a clinician or other staff member. The extent of referrals to the ED that occur as a result of a patient calling their PCP and perceiving that they were instructed to do so is unclear. Many healthcare providers use pre-recorded messages, either at the beginning of the call or as part of a voicemail instructing patients "if this is an emergency, hang up and dial 911". Knowing that patients may overestimate the severity of their condition, it is reasonable to believe messages such as these would not only contribute to ED use, but also EMS use; after all, the message provides specific instructions to call 911. A patient who did not intend to call 911 may become so inclined to do so after hearing this instruction if they are unable to get through to the receptionist or other staff member in the office.

Another source of healthcare referral to the ED are urgent care centers (UCC). Patients may turn to UCCs or retail clinics when they are unable to obtain an appointment with their PCP or when they do not have an established PCP. While UCCs can treat a wide range of acute complaints, they also serve as a substantial source of healthcare provider referrals to the ED. In a study by Zitek et al (2018), it was found that 35.9% of patient transfers from an UCC to the ED were unnecessary. Of these cases, 11.3% arrived at the ED via ambulance. The reasons for so

many UCC to ED transfers is understudied. Many physicians staffing UCCs are trained in internal or family medicine rather than emergency medicine, and as such may not be adequately trained or comfortable managing certain types of acute conditions). One such example to support this hypothesis is that a large proportion of patients with lacerations seen at a UCC were transferred to the ED where most were then discharged (97.5%). 81.3% of these transfers were determined unnecessary (Zitek et al., 2018).

Financial Flexibility

The cost associated with obtaining medical care has an important role in seeking non-urgent treatment in the ED. In one study, 42% of patients seen for non-urgent complaints reported choosing the ED for treatment due to having no requirement to pay at the time treatment was received (Northington et al., 2005). Others have reported financial considerations as a motive in 33% of cases (Kraaijvanger et al., 2016). Of course, this may be a considerable motivating factor among patients who are poor and/or lack insurance. While the uninsured do not use the emergency department significantly more than those with insurance, they do use other forms of care less (Zhou et al., 2017); presumably due to inability to pay out-of-pocket for health services, particularly if payment is due at the time of service. The overall rate of ED use between uninsured and insured adult patients is similar at 20.7% for uninsured and 20.0% for insured (Ginde et al., 2012). However, in the event of acute injury or illness, the uninsured may lack access to more appropriate forms of care and, as a result, must rely on the ED for treatment. Those with insurance may seek treatment in the ED for other reasons outside of their ability to pay, such as inability to access other forms of care. In other words, the rate of use is similar, but the reasons may differ. Of interest is that the rate of ED use is higher among those who are newly insured compared to those who have been continuously insured (Ginde et al., 2012). One

possible explanation for this is that people who become insured after a long period without coverage may attempt to obtain treatment for acute worsening of a chronic condition but have not yet become established with a PCP.

Related to the cost of receiving care is type of insurance one has. In 2014, 16.6% of uninsured and 14.3% of privately insured adults between the ages of 18-64 had at least one visit to the ED. In contrast, 35.2% of people with Medicaid had at least one visit. Additionally, those with Medicaid were more likely to receive care in the ED more than once compared to those without insurance and those with private insurance (Gindi et al, 2016). While the reason Medicaid beneficiaries are seen in the ED more than other insurance groups may be due to poorer overall access to quality healthcare, there is also a substantial difference in the out-of-pocket cost associated with ED care that cannot be ignored. Most private insurance plans incorporate a variety of cost-sharing schemes to dissuade unnecessary use and offset the cost of treatment. With an average cost of more than \$1,300 per visit nationally, this serves as a powerful motivator to avoid the ED for anyone who has not met their annual deductible. Of course, copayments and coinsurance can have a similar effect, but financial motive to not receive care in the ED for non-urgent reasons is nearly absent for Medicaid beneficiaries.

Medicaid beneficiaries are exempt from all out-of-pocket expenses for emergency care; a reasonable approach to prevent the creation of a financial barrier among low-income families. While states may charge a copayment for non-emergency services delivered in an emergency setting, they may only do so after first establishing that the patient is not in need of emergency medical care, that alternative care is available and accessible in a timely manner, and that upon these determinations, notice has been provided to the patient informing them that copayment may be required, the name and location where they can receive the required treatment, and a

referral to the specified provider to schedule treatment (Centers for Medicare & Medicaid Services [CMS], n.d.) In an ED not already inundated with patients, this approach may be reasonable, however in most cases it simply is not. Effective workflow is vital to ensure efficient ED operations and an alteration of workflow for such administrative purposes is largely unreasonable for many emergency physicians. The process creates an administrative burden that could potentially reduce throughput in the ED and impose an avoidable delay for other patients as staff members devote time fulfilling the requirements necessary to impose a fee that remains largely uncollected if successfully imposed. What makes this even less likely to be worth the labor hours and administrative hassle is the federally-set copayment limit of \$8. While a \$25 copayment is permitted for second or subsequent non-emergency visits within a 1-year period, this amount is unlikely to be worth the resource investment needed to obtain it. Copayments in themselves remains controversial as a method of dissuading non-emergency use as they have not been reliably shown to reduce non-emergency ED use, do not offset costs due to low collection rates, and may create barriers to care; both for the Medicaid beneficiary and other patients in the ED (American College of Emergency Physician [ACEP], 2018).

Reducing Non-Emergency Use

Non-emergency use of EMS is a complicated issue for which no simple solution exists. While there are many factors that contribute to why a person would call 911 and request EMS respond when their complaint is minor or otherwise not of an emergent nature, the fact is that when people call 911 they are more often than not doing so with the intention of being transported to the emergency department where they will be evaluated and treated by a physician. In this way, EMS is thought of as a means to achieving a particular end. The challenge is that in some cases, reducing EMS calls may have unintended consequences such as worsening

access to care in populations that already struggle with getting their healthcare needs met. Community members must also not lose trust in their emergency response organization lest they not request EMS when genuine emergencies do occur. Therefore, it would not be appropriate to simply refuse transport to a patient presenting with a non-urgent complaint as the consequences of such an approach could be dire. Any interventions aimed at reducing non-emergency use must be carefully constructed, and with an understanding of what a community intends its EMS systems' mission and function to be. Reducing non-emergency use of EMS can only be accomplished by addressing both the reasons why EMS is requested and the reasons why people seek treatment in the ED for non-urgent needs in the first place.

As previously identified, people seek care in the ED for many reasons, most notably poor access to more appropriate care such as a PCP, convenience of the ED compared to other sources of care, the financial flexibility the ED provides, perceptions about the quality of care they will receive and the severity of their illness or injury. In varying degrees, these reasons also influence the decision to request EMS. While such use creates a substantial burden on both EMS agencies and emergency departments, the fact is that people do not use these resources with the intention to waste resources; they merely have a problem or are enduring some level of suffering and want to achieve resolution of their symptoms as expediently as possible. Until their needs can be adequately addressed, these treatment-seeking behaviors will likely persist.

Reducing visits to the ED by patients with non-urgent complaints is a complicated issue; were it not so, the solution would have long since been discovered and the issue largely resolved. There have been a host of interventions over the years aimed at reducing ED overcrowding by reducing use for non-urgent reasons. Gonçalves-Bradley et al. (2018) conducted a review to evaluate the effect of placing primary care professionals in the ED to treat patients with non-

urgent complaints as opposed to receiving treatment by an emergency physician. This approach could theoretically be useful in reducing operating costs however the effect on reducing non-urgent use or improving throughput performance remained uncertain.

Various cost-sharing strategies could theoretically incentivize patients with low acuity complaints to seek care outside the ED however, Xin (2018) found no association between ED use for non-urgent complaints between high and low-cost sharing policies. High-cost-sharing ambulatory care policies were not associated with increased non-urgent ED care utilization among chronically ill and healthy people with an insignificant difference in ED attendance between high-cost sharing and low-cost sharing policies.

Primary care plays an important role in patients' decisions to seek care in the ED. Ability to obtain an appointment, provider continuity, and perceptions of care received are all factors that influence this decision (Yoon et al., 2015). As such, reduction in ED visits for non-urgent primary care treatable conditions will require improvements in patients' ability to schedule appointments, the ability to be seen in a timely manner and with flexible appointment times, to be treated by providers with whom they feel will deliver high quality care, and to possess effective means for reaching their PCP. Effective triage of patients contacting their PCP for care is necessary for identifying patients who may need to be seen more quickly (Carret et al., 2009) Nurse triage and increased availability of appointment slots can also reduce ED attendance (Huntley et al., 2013). Xin et al (2015) found that patients who perceived poor or intermediate primary care were more likely than those who received perceived high-quality care to seek non-urgent care in the ED and Backman et al (2010) found that patients seeking care in the ED for non-urgent conditions often lacked regular healthcare use prior to attendance. Improving access to and perceptions about quality of care may be effective at reducing non-urgent ED use.

There may be opportunities for reducing ED use through improved patient follow-up and patient education. Patel et al. (2018) evaluated several patient education follow-up strategies to reduce recurrent ED use. Patients educated on alternative venues of care during phone call follow-up by an emergency physician resulted in a 22% reduction in subsequent ED use among patients 65 or older and patients under 65 who received education via mailed information achieved a 27% reduction in subsequent ED use. Shuen et al. (2018) conducted a pilot study to determine if phone or text-message follow-up with patients discharged from the ED would affect reattendance compared to usual discharge instructions without follow-up. While the study was underpowered, the authors concluded that phone call or text message follow-up may potentially reduce reattendance; but that further study with more patients would be needed. A possible intervention that could improve PCP follow-up and possibly reduce reattendance in the ED is scheduling of appointments prior to ED discharge (Merritt et al., 2020). Biese et al. (2014) also found that telephone follow-up can improve patient engagement with their PCP compared to those without but was unable to determine if this reduced ED use. A combination of these strategies may be useful in reducing ED attendance for non-urgent complaints. Patients who are assisted in scheduling an appointment prior to discharge and receive follow-up education and reminders of their upcoming appointment may have greater success in keeping the appointment and receiving appropriate care through their PCP. By seeing their primary provider for concerns that resulted in an ED visit, they may be able to build a strong patient-PCP relationship and receive better control over chronic health conditions. However, the ability of the ED to perform extensive follow-up and care coordination activities can also be difficult, particularly when census is high. There are opportunities for emergency departments to work collaboratively with

local EMS agencies to help overcome this challenge through partnering with agency community paramedicine programs to close gaps in care and aid in improving accessibility of care.

Community Paramedicine Overview & Interventions

Community Paramedicine or Mobile Integrated Healthcare (CP-MIH) is an emerging specialty within EMS that expands the traditional role of paramedics to more appropriately serve the health needs of a community through the identification of local needs and gaps in health services, development of organized systems of services, and implementation of processes for connecting underserved community members with health resources that were either previously unavailable or inaccessible (Department of Health and Human Services [DHHS], 2012).

Paramedics are under-utilized healthcare providers who are well-suited for delivering integrated care for patients with chronic illness given their mobility and ability to reach patients in the home setting; though there is a lack of large-scale research on the efficacy of paramedics working in an expanded capacity outside of emergency response (Drennan et al., 2014). Communities often face a wide range of differing challenges from one another and as such, CP programs can vary significantly in their function and scope. For example, a rural community whose EMS system is composed of volunteer EMTs and does not have a substantial call volume or funding to support full-time ALS staff may start a program to hire paramedics who possess an emergency response role when needed but otherwise work in the community in some other public health function; allowing for more efficient use of limited funding through dual role positions. Conversely, EMS agencies within urban communities that possess high call volume and strained resources may implement a CP program to limit use of emergency resources to reduce frequent callers through managed care and connection to necessary health services or attempt to reduce the occurrence of non-emergency use through public education initiatives. Additional goals for CP programs may

be to reduce avoidable injury from falls, particularly among elderly populations, through proactive engagement, education, and residential fall-safety inspections. While many opportunities exist for CP interventions, a common barrier to implementing such programs is cost, especially when proposed interventions are not guaranteed to produce long-term cost-saving benefits (Guy, 2014).

Community paramedicine programs may be useful in reducing non-emergency and/or frequent use of emergency resources; however, these programs require firm understanding of factors that influence non-emergent use and must be carefully planned to ensure the needs of the public are adequately and appropriately met. This paper evaluates several initiatives aimed at reducing use: non-conveyance and alternative destination decisions for non-emergency complaints,

There are six potential services that community paramedicine programs aim to provide; three relate to the pre-hospital setting and three relate to the post-hospital setting. Pre-hospital initiatives involve alternative transportation services for patients who require medical evaluation but do not require the services of an emergency department, treat-and-release or non-conveyance with referral, and connecting frequent callers with appropriate non-emergency treatment services through primary care or social services. Post-hospital initiatives include follow-up care for patients at high risk for readmission to the ED or hospital, for chronic disease management, and provision of preventative care through cooperative partnerships (Kizer et al., 2013).

Pre-Hospital Initiative: Alternative Transportation

Not every patient who calls 911 and requests that EMS respond need services provided by the emergency department. It is important that the conditions and criteria for diversion are clearly established prior to implementing this intervention. Chronically ill patients or patients

with subtle complaints and no clear diagnosis are not ideal candidates for diversion from the ED. Diversion to a lower, more appropriate level of care such as to an urgent care center, primary care provider, or mental health facility may present opportunities to reduce treatment costs, but such efforts would be undermined if the patient was then redirected to the ED. Examples of minor illnesses or injuries that would not require the ED and would be appropriate for diversion to an alternative treatment destination could be simple upper respiratory infections in the absence of chronic pulmonary disease, minor musculoskeletal injuries such as sprains or minor integumentary injuries, diseases, or disorders such as minor burns, simple lacerations, or localized rashes. Diversion for psychiatric evaluation or substance abuse detoxification may also be considered so long as bed availability issues and medical clearance needs are also addressed.

Pre-Hospital Initiative: Treat-and-Release, Alternative Destination, and Non-Conveyance

Treat-and-release, transportation to alternative destination, and non-conveyance strategies may be enticing initiatives for EMS agencies. While these practices may be beneficial for lowering healthcare cost through reduction in ED visits, and can return EMS assets to an available status more quickly (Langabeer et al., 2017), they possess challenges; particularly those aimed at non-conveyance.

Treat-and-release is a practice not uncommon in EMS, though typically not endorsed by agency policies that typically recommend any person who calls for an ambulance be transported to the ED. These policies provide a limitation on liability for both the EMS provider and the governing body that employs them; often evident in the language of the release patients are required to sign should they decide not to be transported. Current treat-and-release practices are generally of an informal nature where a patient is given medical treatment for a minor condition and then given advice on appropriate follow-up care. More emergent presentations such a patient

presenting with hypoglycemic commonly result in refusal. In these cases, a patient is found to be severely hypoglycemic and is treated on-scene with intravenous infusion of dextrose solution or injection of glucagon. Upon returning to a euglycemic status, the patient is often given instructions on how to prevent recurrent hypoglycemia and instructed to follow-up with their physician. The refusal is not so much an adamant rejection of medical advice by the patient as much as it is the patient reaching an agreement that further care in the ED is not warranted. In the case of hypoglycemia patients, it is unclear if the patient does in fact follow-up with their physician and therefore their long-term glycemic control may remain poor, prompting future responses with the potentially avoidable situation of EMS arriving too late. The challenge with informal procedures such as this is the agency lacks control because they lack information. A medically competent patient is well within their rights to refuse transportation, but whether that was a bone fide decision made by the patient remains unclear. An opportunity exists to improve patient care, patient education, and follow-up care by formalizing an already existing informal process and providing additional training and education to improve the decision-making process of providers implementing the procedure. By embracing this as an acceptable practice, with pre-established guidelines, agencies will be able to better control quality of care through quality assurance programs rather than assume blindly that the patient did not want help. Under a treat-and-release model, care coordination on behalf of and with the consent of the patient combined with agency-initiated follow-up may prevent further exacerbation of a condition.

Interventions focused on diversion at the point of care may be effective if properly implemented, though diversion can pose increased risk and may result in poor outcomes if not properly conceived. One technique for diversion found to be effective in reducing use employed a physician at the dispatch center for consultation with EMS providers and patients at the scene.

This strategy resulted in a significant reduction in patient complaints; though, patient safety concerns were identified (Peyravi et al., 2015). In another study conducted by Breeman et al (2018), it was found that on-scene nurse assessment and treatment was effective at reducing unnecessary transportation to the ED and had a high level of patient satisfaction (79.7%) with the non-transport decision. There was a low rate of missed urgent medical conditions (1%) and low rate of incorrect determinations on medical necessity for transportation (4%). Of concern in this study was the rate of requests for secondary examination within 48 hours, which was 24.7%. A review conducted by Fraess-Phillips (2016) concluded that there was insufficient evidence to support the decision to not transport non-urgent patients based on paramedic evaluation alone; citing patient safety concerns associated with non-conveyance. A similar conclusion was reached by Brown et al (2009). Patient safety is a recurring theme in evaluation of non-transport initiatives by EMS and is likely the reason that so few agencies elect to adopt such programs. In fact, the number of agencies with such programs is declining. For such a program to be effective, an agency must incorporate robust quality assurance procedures, incorporate active physician oversight, and provide additional education for providers making the determination; all of which are resources many agencies lack (Millin et al., 2011).

It is of course important to consider that poor access to primary care is a common factor in a patient's decision to seek care in the ED with transportation facilitated by EMS.

Implementing policies that allow for paramedics to decide if transportation is needed presents significant liability and may create a substantial burden to accessing care of any type. Non-conveyance decisions should only be made once an acceptable plan of care has been formulated, preferably with the input of a physician. Physician involvement can be accomplished in a variety of ways. EMS agencies may employ an EMS physician who can respond to the scene or at the

very least be readily available for remote consultation either by phone or through video conference platform. Few agencies currently employ EMS physicians and those who do typically do so to provide on-scene medical expertise at complex incidents or to assist in managing critically ill and medically complex patients. Even so, EMS physicians can have a role in determining medical necessity in the decision to transport when their expertise is not required elsewhere. Alternatively, EMS may be able to involve an emergency physician at the local ED for remote consultation. With or without physician involvement, a plan of care must be able to adequately address the patient's complaint and perhaps should include provisions to allow for on-scene scheduling of an appointment with either the patient's established primary provider or, if no primary provider has been established, to facilitate an expedited initial appointment with a suitable primary provider that the patient has the means to reach. Such an arrangement would require collaboration with healthcare providers in the community. A potential initiative could be to form agreements with several primary care providers throughout the community to grant a reserve or priority appointment slot for which patients referred by EMS can fill. This appointment slot would likely have to be at the end of the business day and may be limited to one per day to reduce disruption of normal business operations. Finally, if a patient refuses the terms of the formulated plan of care and lacks alternative means to obtain care elsewhere, the decision to facilitate transportation to the ED should not be wholly withheld. The decision for non-conveyance must be mutually reached and agreed upon by both provider and patient. Even if this occurred, EMS does not necessarily need to be the transporting entity, particularly during peak utilization times when a non-emergency transport may tie-up already limited resources. In such a scenario, private medical transportation services not part of the emergency response system can be utilized under a pre-arranged contract agreement between the locality and private

entity. In any case, adopting a policy to conduct patient refusal follow-ups may be of value in ensuring appropriateness and patient satisfaction.

An alternative option for non-conveyance would be to integrate telehealth into existing EMS systems to reduce the need for transport to the ED, while ensuring patients receive immediate medical care. In 2014, the Houston Fire Department implemented their Emergency Telehealth and Navigation (ETHAN) program, of which 5,570 patients participated and were compared against a control group to determine if the program could reduce non-emergency transports to the ED. 18% of participating patients were transported to the ED compared to 74% in the control group. Mortality and patient satisfaction were not statistically different between groups. The intervention also resulted in a substantial reduction in EMS resource utilization with a median time on call of 39 minutes for the ETHAN group and 83 minutes for the control group. Non-ambulance transport (i.e., taxi) was arranged for patients deemed non-emergent who still wanted to go to the ED (Langabeer et al., 2016). The ETHAN program resulted in an estimated cost saving of \$2,468 per avoided ED visit and cost an average of \$167 in the telehealth group compared to \$270 for the control group (Langabeer et al., 2017).

Pre-Hospital Initiative: Connecting Frequent Callers with Primary Care and Social Services

Frequent requesters of EMS can account for a significant proportion of responses in an emergency response system. The extent for which people call frequently is unknown as the number of frequent callers differs by locality and no database exists for analysis of frequent callers at the national level. Additionally, there is no established definition of how many calls over a given time period classifies a patient as a frequent caller. An analysis of EMS responses within an urban low-income city in Virginia was performed to evaluate the frequency of responses for individual patients during a one-year period. Of 22,389 responses, 18,713 had

recorded patient demographic information. There were 13,664 distinct patient encounters. This locality defined a frequent caller as a patient who requests EMS five or more times in a rolling 1-year period. Of these distinct patient encounters, 13,342 (97.6%) utilized EMS four or fewer times and were responsible for 87% of responses in the evaluated period. 322 patients (2.4%) requested EMS five or more times during the year accounting for 13% of responses. A community paramedicine program was established to engage patients identified as frequent callers or patients with specific resource needs such as inadequate self-care, fall prevention, and connection with primary care for the purpose of identifying unmet needs and to facilitate connection to resources. The program achieved a modest 15% overall reduction in requests by frequent callers, but faced a significant challenge in staffing (A. Dorsey, personal communication, November 4, 2020). In another EMS system, 21 patients were identified as being transported to the ED over 800 times in a 1-year period (MedStar, 2012). In yet another city, one family requested fire department personnel to respond over 1,100 times over a 3-year-period due to self-care issues. (Kavanaugh, 2016). In San Diego, a pilot program was implemented to reduce use by a small group of frequent requestors through case management and referral to other community services. The program achieved a 37.6% reduction in use by participants, which saved \$314,406 in healthcare charges and recovered 262 hours of task time by EMS personnel (Tadros et al., 2012).

Frequent callers often struggle with issues related to self-care, mental illness, substance abuse, homelessness, fall hazards, access to primary care, and access to adequate medication, among others. It is worth noting that not all responses initiated by a frequent caller is of a non-emergency nature. Some patients, such as those with advanced chronic obstructive pulmonary disease (COPD) or patients with diabetes, request EMS frequently for life-threatening

exacerbations of their chronic medical conditions and rely on EMS for necessary stabilizing treatment and transport to the ED for follow-on treatment or hospital admission. Regardless of the reason, the goal of a community paramedicine program for these patients is to improve their access to care and reduce the need for recurrent responses through effective case management.

Patient encounters related to psychiatric/behavioral problems is another group where community paramedicine programs may be of assistance in both reducing unnecessary ED visits while also improving patient care. 2.98% of EMS responses were classified as a psychiatric problem/suicide attempt however, based on provider primary impression, 7.7% of patient encounters were for psychiatric, behavioral, or neurodevelopmental disorders. Of these, 32% were alcohol related, 30% were for unspecified mental illness, and 13% for anxiety (NEMESIS, 2020). Capp et al (2016) found that ED visits by patients with mental health disease is increasing faster than visits overall (20.5% compared to 8.6%). Patients with illnesses related to mental health are too often taken to the ED and then discharged no closer to improving their unique situations or overcoming the challenges that ultimately resulted in ED attendance in the first place. These patients often have long lengths of stay, particularly when mental health clinicians are not available onsite to conduct an evaluation. Patients expressing suicidal or homicidal ideation require an evaluation by trained mental health professionals to determine if a need exists for a temporary detention order (TDO) based on risk of self-harm or harm to the public. While paramedics receive training related to management of patients with psychiatric complaints, EMT curriculums often do not include much training in this area. Police departments around the country have improved their ability to engage this patient population through widespread adoption of Crisis Intervention Training (CIT) programs, but police officers lack the medical training to adequately address medical needs through the lens of mental illness. Extension of CIT

programs to EMS providers is gaining traction and may be able to improve outcomes through coordination of care with community mental health resources. In Virginia Beach, VA., EMS providers are receiving specialized CIT training and a program is being implemented to divert stable patients with mental health complaints to psychiatric hospitals or for follow-up with community mental health providers rather than the emergency department. The program combines pre-established evaluation and treatment protocols and limited laboratory testing outside of the ED to medically clear patients so they may be admitted directly to a psychiatric facility for stabilization or for admittance to an appropriate facility for alcohol detoxification. Outside of crisis requiring immediate intervention, CIT trained paramedics are also trained to connect patients with other community resources related to basic needs such as housing, food, and work placement (J. Bianco, personal communication, August 25, 2020). This approach enables patients with mental illness to have improved quality of life, particularly if they have become homeless or are soon to become homeless. Many people are unaware of community resources that are available to them and having paramedics who are trained to assist in connecting people with these resources can help them to overcome the challenges they face.

Post-Hospital Initiative: Follow-up Preventative Care and Care Coordination

EMS has historically served an exclusively reactionary role with little to no preventative function; care effectively ends when a patient is turned over to emergency department staff. This role has primarily been the product of having to rely on members of the community requesting responses with little self-initiated contact. Community paramedicine programs challenge this traditional role through surveillance of response trends and screening of patients to identify potential resource needs and anticipated future responses. A prime example of this function can be seen for an elderly patient who calls 911 due to a fall. Little can be done at the point of injury

other than to provide treatment and transport to the hospital, however, emergency responders can initiate a referral to the agency's CP program for follow-up evaluation. A fall patient may report that they tripped, but to what extent is their risk for tripping again? EMS can come out to the residence after the patient returns from the hospital to identify common trip hazards such as transition strips between rooms, uneven carpet or rugs, floor materials that increase the likelihood of falling, excessive clutter, or issues related to lighting (particularly at nighttime when a patient may get out of bed to use the bathroom). Additional hazards that could be identified are poorly maintained porches or stairs without suitable handrails. These are relatively simple issues to fix, but if not identified, can cause substantial risk to elderly or disabled people. This is valuable information that healthcare providers in the emergency department simply do not have access to because they do not get to observe the environment from which the patient came. A patient may be identified as being at risk for falling again and as such may be provided a walker in the ED, but they may be unable to use the walker if there aren't unobstructed paths for which the patient can navigate the home. Falls are the second leading cause for EMS dispatch, accounting for 9.6% of responses. 76% of fall calls are for elderly patients with 27% of elderly falls occurring between the hours of 9pm and 6am (NEMSIS, 2020).

Another CP function that may reduce the need for patients to return to the ED can be providing them with assistance in obtaining their medications. Inability to obtain a medication refill is a common reason for patients with chronic illness to visit the ED (Miller, et al., 2005). Some patients lack the financial resources to obtain their medication while others simply do not have reliable access to their pharmacy. The lack of a personal vehicle, poor public transportation infrastructure, and inadequate social support are just some factors that make it difficult for some patients to reach a pharmacy. These factors will also likely influence the decision to call 911 to

get an ambulance to take them to the ED. After all, if they couldn't reach the pharmacy, how would they reach the ED? In such a situation, the patient may have simply needed assistance in getting to the pharmacy, or perhaps help setting up delivery of their medications, but escalated into so much more. The patient may now be left with both an ambulance bill and an ED bill and be no closer to a solution for when they run out of their medications again. This can develop into a perpetual cycle that is all too avoidable. Of course, a patient who cannot reach their pharmacy is also likely to have difficulty keeping or making appointments with their PCP. CP paramedics may also be able to help in this regard through assisting with enrolling in and scheduling of medical transportation services outside of the emergency response system. Many patients do not understand the difference between non-emergency medical transportation services and EMS, much less how to request them.

Finally, CP follow-up can aid patients who simply do not understand their treatment plan, the importance of taking their medication as prescribed, or how to properly take their medication. Patients discharged from the ED are often given paperwork explaining their discharge diagnosis that include self-care and follow-up instructions. It is common for patients recently discharged from the ED to call 911 to be either be taken back to the hospital or to be taken to another hospital; often reporting that the hospital did not tell them anything or that they did not get the care they needed because they were still having symptoms. Such situations may be the result of inadequate patient education at discharge. By sitting down with the patient and reviewing their discharge instructions and medical record, a CP paramedic can explain their plan of care, coordinate follow-up appointments, ensure prescriptions are filled, and answer questions the patient may have, all without being pressed by time in the way providers in the ED may be.

Post-Hospital Initiative: Periodic Care Coordination for Persons with Chronic Disease

There are opportunities to improve care through identification of patients with chronic disease or those with newly diagnosed chronic diseases such as hypertension, diabetes, congestive heart failure, or COPD. A program implemented in Fort Worth, TX focused on patient education, periodic reassessment, and navigation of care was able to achieve substantial reduction in hospital readmission and achieved an estimated healthcare cost-saving of \$16,000 per patient enrolled in the program (MedStar, 2012). It is important to note that programs focusing on care coordination and periodic reassessment are not intended to replace the existing systems of care, but rather, to complement existing services by serving as an extension of these services to identify and close gaps in access to care.

Post-Hospital Initiative: Preventative Care

Preventative care initiatives can open the door to many opportunities for improving a community's health, particularly in underserved communities. Activities may include screening for disease, administering flu shots, or providing various forms of health education. These activities are not necessarily focused on individual patients who call 911, but rather can be used to extend the reach of community health departments and other organizations who may lack adequate personnel on their own. In Virginia Beach, VA. paramedics work with the local health department to hold drive-through events where the public can receive free flu vaccines (J. Bianco, personal communication, September 3, 2020). Screening and vaccination events also provide an opportunity to provide the public with important information about other healthcare assistance programs available to them.

Community Paramedicine Challenges

As demonstrated, there are many applications for community paramedicine programs within a community but designing and implementing these programs are not without challenges.

Key challenges relate to medical supervision, exchange of health information, reimbursement for services, statutory and regulatory barriers, training of community paramedics, stakeholder buy-in, and development of treatment protocols.

Challenge: Medical Direction & Medical Director Buy-in

Medical directors play a vital role in EMS operations; establishing what procedures and medications may be used by field providers and authorizing what treatment protocols may be implemented by the agency. CP programs incur additional responsibilities for medical directors (NAEMT, 2015). Without medical director buy-in, CP programs are effectively rendered useless as they cannot be operationalized. This issue was identified as an important barrier encountered in Newport News, Virginia, particularly when the local emergency response organization tried to implement a telehealth program to address poor access to care amidst the COVID-19 pandemic. A local health system showed tremendous support for the telehealth program by offering to provide funding for start-up costs. However, the agency ultimately did not support the endeavor due to fears of increased liability. After further consideration, the agency became supportive of the program, but it was too late as the health system no longer showed interest after undergoing changes in executive leadership. It was this fear of increasing liability that also contributed to the decision to delay an alternative destination policy whereby patients who did not need to be evaluated in the ED could be taken to an urgent care center or their primary instead (A. Dorsey, personal communication, November 4, 2020). Increased liability is a legitimate concern of medical directors (Rural Health Information Hub, 2018) however, liability may be mitigated through development of protocols that standardize procedures and establish strict criteria for when a CP intervention (such as telehealth, non-conveyance with treatment plan, etc.) is appropriate as opposed to transportation to the ED. Furthermore, liability may be reduced using

release of liability statements agreed upon and signed by patients determined medically competent and informed; as previously identified, the treatment plan must be mutually agreed upon by both the patient and provider and adequately address the patient's needs.

Challenge: Exchange of Health Information

When patients are questioned about their medical history, it is common for them to explain that the hospital has their information; not knowing EMS agencies often lack access to health records maintained at the hospital. Complicating the matter is that some patients may not be good historians and may be unable to reliably cite their medical history. The quintessential example of this would be a patient who reports that they do not have hypertension despite taking multiple antihypertensives. Confusion may arise from the fact that their blood pressure is normal and therefore they may legitimately feel they no longer have hypertension. Exchange of health information is challenging due to health privacy laws and organizational fears about misuse or wrongful access of information and the civil penalties such misuses would impose. Outside of privacy concerns, interoperability of health information systems poses another significant challenge; particularly if a patient's information is stored across two or more health systems who use different software. There is unlikely to be a solution that can be applied to each agency and health system nationwide, however, solutions exist at the local level. Multiple agencies in the tidewater region of Virginia have successfully reached agreements to allow for remote access by select individuals to health information managed by the region's prominent health systems for care coordination and quality assurance activities (A. Dorsey, personal communication, November 4, 2020).

Challenge: Reimbursement for Services

Perhaps the greatest challenge to implementing a CP program relates to reimbursement for services. Most payment models for reimbursement of EMS services have been focused on transportation. Medicaid has established transportation as mandatory for billing (CMS, 2019). A patient transported by EMS will be billed for services at either the ALS or BLS level plus a set per-mile fee. When a patient refused transport, the agency is no longer able to bill the patient's insurance as no transportation occurred. Oftentimes, the patient will then be billed directly by the locality. As one example in Newport News, VA, a non-transport evaluation fee in the amount of \$125 is billed directly to the patient (City of Newport News, 2020). Such fees have the potential of imposing a substantial financial burden on patients, particularly those already living in poverty and can have dire unintended consequences regarding future care needs. A patient who requests multiple responses due to frequent falls causing injury may feel punished for calling for help and as a result might not call in the future; potentially leading to a missed emergency such as intracranial bleeding secondary to head injury from a fall. Of course, an emergency response agency should be able to recover costs related to a response and should have a means to receive reimbursement for community paramedicine activities. A possible answer to this issue may be found in the Department of Health & Human Services' ET3 program.

Emergency Triage, Treat, and Transport (ET3) model is a new voluntary program released in 2019 that allows for Medicare fee-for-service billing by emergency ambulance systems. This new payment model allows for reimbursement of treatment in place services, telehealth, and alternative destination transportation billing. The goal is to reduce out-of-pocket cost by way of facilitating an "appropriate level of care at the right time and place" (CMS, 2019).

Notwithstanding the difficulty of billing for CP services, some agencies have deferred

attempts for reimbursement for specific services and instead taken the position of regarding their CP program as an effective strategy for cost reduction. Emergency response organizations incur considerable costs in staffing, equipment, supplies, vehicles, and fuel. By reducing the number of non-emergency responses each year, agencies may achieve reduced operational costs and avoid potential costs associated with expanding resources (fielding additional ambulances and hiring personnel to staff them) to meet increased need.

Challenge: Legislative and Regulatory Barriers

Each state has its own set of legislative and regulatory requirements that govern EMS agencies in addition to requirements at the federal level. Some states allow for CP programs while others do not. Upon surveying state EMS offices, the National Association of Emergency Medical Technicians (NAEMT) found that many EMS agencies are unclear if their states' statutory language allows for CP programs and if so, what activities are permitted. Unclear statutory language or perceptions around what is permitted has been a contributing factor in agencies being unable to implement programs. An example a barrier can be seen when statutory language dictates that EMS must respond to the scene of an emergency as such language may be interpreted as prohibiting EMS response to conduct follow-up care in the absence of an identified emergency. EMS conducting community paramedicine activities may be interpreted as being beyond the scope of the organization and beyond the scope of practice of EMS providers. In some states, an EMS agency must first gain licensing as a home health agency in addition to being licensed to provide EMS response before they can engage in CP activities. Any agency interested in designing and implementing an CP program must be careful to ensure state licensing requirements are adhered to. In states where legislative and regulatory barriers exist,

EMS agencies must work with local and state attorneys to clarify statutory language and work closely with lawmakers to amend applicable laws (NAEMT, 2015).

Challenge: Qualifications of Community Paramedics

Paramedics are traditionally trained to respond to emergencies, provide stabilizing treatment, and transport patients to definitive medical care. Multiple subspecialties exist for paramedics (i.e. tactical/SWAT, marine rescue, wilderness, critical care) but these specialties have remained focused on the core function of paramedicine: retrieval and treatment for medical emergencies. Community paramedicine extends the role of paramedics into a non-traditional role of healthcare outside of emergencies and as such requires additional training and education. Minnesota was the first state to define the role of a community paramedic in its state statutes and establish qualifications for this new role. The state stipulated that community paramedics must undergo additional initial formal education and must then undergo further continuing education requirements every two-years (Minnesota Department of Health, 2016). This requirement ensures paramedics are better suited to successfully transition from episodic care to longer-term care coordination from a multidisciplinary approach. States and EMS agencies must determine what qualification standards a community paramedic must possess and ensure these standards are upheld.

Challenge: Buy-in

A successful CP program requires broad buy-in, both from within an organization and among stakeholders in the community. Steeps et al. (2017) found that many surveyed paramedics felt their communities would benefit from having a CP program and that most were willing to both undergo additional training and perform CP duties. However, some believe that community paramedicine is a departure from the core function of EMS: to respond to life-threatening

emergencies (Kizer et al., 2013). Others perceive CP programs may create a duplication of services due to the overlap with home healthcare organizations and existing community health worker programs (Rural Health Information Hub, 2018). Some resistance has been met from organizations providing in-home healthcare services as they perceive EMS CP programs as a competitor. The reality is that many patients either lack eligibility for in-home services or have not become established with a provider of these services; either from lack of care coordination or knowhow in arranging such services. Stakeholder engagement is vital to gaining support. CP programs should not be seen as an expansion of EMS into new markets or as a competitor in any health services market, but rather a complimentary resource for connecting patients with these traditional service providers and as a means to fill gaps in care that cannot or have yet to be filled elsewhere (NAEMT, 2015). Another argument against the development of CP programs is that resources that would go to such a program should be invested in other existing non-EMS services (Kizer et al., 2013). Healthcare is largely fragmented and suffers from a lack of coordination. This fragmentation results in inefficiencies that increase the cost of care while reducing its quality (Shih et al., 2008). Existing systems are simply not effective at identifying all those with needs and connecting them to required resources; evident by the shortcomings EMS agencies observe during day-to-day operations. EMS CP programs may be the best way to expand the healthcare safety-net because EMS agencies are often outside of established healthcare systems and can serve as patient-centered advocates that liaise between multiple health systems, government entities, and other non-government organizations. Public EMS agencies, such as those working directly as part of a local government entity, are often not driven by profit and answer to the community they serve.

As stated, buy-in is an important aspect of a successful program. Agencies interested in developing a CP program must include stakeholders in the planning, development, and implementation of their programs to not only ensure concerns are addressed but also to ensure understanding of program goals and to assist with the development of strategies for identified activities. Support may be gained through conducting small-scale well-controlled pilot programs to demonstrate efficacy, safety, and cost-effectiveness before expanding into full implementation of any given intervention.

Recommendations

The recurring theme in community medicine is that programs will vary due to unique challenges, resources, stakeholders, and community needs. For this reason, specific details that can be applied to individual organizations are beyond the scope of this paper. Many program planning models already exist that can be adapted to assist agencies in developing and implementing programs specific to their needs. There are however several recommendations that may assist agencies in developing effective and successful community paramedicine programs.

Recommendation: Define Problems, Goals, and Objectives

Program planners must be able to define the problem they wish to address using available community needs assessments, emergency response data, and other sources of information concerning their specific communities. The Patient Protection and Affordable Care Act of 2010 requires that non-governmental non-profit hospitals conduct a community health needs assessment every 3 years and as such, this may be one of the best resources for identifying current needs within a community. While each community will have varying needs and gaps in care common issues may exist in varying degrees among different communities. Some of the common issues that CP programs can address include improving access to mental health services

and crisis intervention, connecting the homeless to resources, improving access to primary care, care coordination and chronic disease management, and prevention of falls.

Planners must identify a specific set of goals for which they hope to achieve. For most, this may be to reduce non-emergency calls as a way of reducing the strain on existing response infrastructure, while others may start off by trying to improve the quality of care delivered and the health outcomes of members in their community by addressing current gaps in services. Regardless of the goal, it is important to note that without careful planning and implementation, there is a substantial risk of increased liability and the potential for disrupting the healthcare safety net; both of which cannot be acceptable outcomes. The core of a CP program must be to improve access to care and health outcomes with the downstream effect of reducing avoidable EMS responses; not reducing EMS responses without regard to how it impacts health outcomes. A reduction in responses can be achieved only through connecting patients with services that fill gaps in existing systems of care. These gaps are the reason people oftentimes rely on EMS for non-emergency reasons and therefore closing these gaps holds the potential for achieving fewer responses without adversely effecting patient care.

Specific goals and objectives must be identified early in the planning process and agencies must strive to not overreach in their endeavors, lest they overwhelm the organization's capabilities. Community paramedicine can quickly expand into many potential interventions with the potential for an agency to pursue too much too quickly, with the result of doing none well. Resources will likely already be strained as this is often a factor that leads to developing such a program. Stretching already thin resources with aspirations of tackling broad issues, many of which are systemic within the healthcare system, can result in program failure. Failed early

attempts to implement a successful program will inevitably limit the ability for an agency to pursue future attempts.

Recommendation: Enlist Support Early

EMS agencies will need to enlist the assistance of key stakeholders early in the development of their programs. Representatives of each partner agency and organization must have the authority to make decisions on behalf of their respective body. Typical organizations that will need to be represented are city council, local and state health departments, health systems within the operational region, community clinics, home health organizations, skilled nursing facilities, non-emergency medical transportation agencies, community services board, adult protective services, substance abuse centers, psychiatric hospitals, and all components of the emergency response system (fire, EMS, and police). Representatives from these organizations should form a Community Paramedicine Advisory Committee where interdisciplinary collaboration can occur to address issues. Bringing these organizations together will help in determining what community resources are available and reduce duplication of efforts. Early buy-in will be vital to developing an effective program. Agencies must focus on building relationships with and solidifying support from these key stakeholders. A key for success will be building and maintaining momentum and keeping partner organizations engaged. This can be achieved through facilitation of broad integration both with the EMS agency and among partner organizations.

Furthermore, agencies will need to work with their state EMS offices to determine regulatory requirements for providing medical services outside of the emergency response role and may need to obtain additional licensure as a home health agency. If statutory or regulatory barriers exist, the agency will need to work closely with the state EMS office and legislature to

overcome these issues. There may be benefit in partnering with multiple agencies when petitioning the state to make changes to statutory and regulatory requirements.

Recommendation: Formally Establish Community Paramedic Positions

Community paramedicine is a departure from the traditional EMS role in healthcare and as such, community paramedics will require additional training and education. The Community Healthcare and Emergency Cooperative (CHEC) has developed a national curriculum for training community paramedics that includes 300 hours of additional training on topics such as social determinants of health, health assessment and community resources, cultural competency, and clinical components regarding sub-acute and semi-chronic patient needs. Agencies may be able to partner with local educational institutions to provide this additional education (Patterson & Skillman, 2012). Alternatively, the International Board of Specialty Certification (IBSC) offers a certification course for paramedics to become certified as community paramedics. In addition to identifying training and education requirements for community paramedics, the agency will have to establish a formal job description and scope of practice for this new position. This will have to reflect the specific needs in any given community and will vary greatly between programs. Finally, the agency will have to determine how positions will be funded. Some agencies may be able to secure funding through grants or may have additional funding authorized in the agency's budget. If funding cannot be secured, reclassification of an existing position may provide a temporary solution until long-term funding can be obtained.

Recommendation: Establish Medical and Operation Oversight

Gaining support from the agency's medical director is crucial. The medical director will need to take an active role in planning, protocol development, and quality control and can be an asset when engaging other healthcare providers and enlisting support. An agency's existing

quality control program personnel should work closely with the medical director and executive leadership to continuously evaluate program activities for efficacy and to avoid unnecessary liability. The agency will need to determine where the program fits within the current organizational structure, who will have operational oversight and responsibility, and how community paramedics fit in the current ranking structure.

Recommendation: Develop Strategies for Reimbursement

As previously discussed, reimbursement for EMS services is largely tied to transportation of patients to the ED and as such, agencies will encounter difficulty with obtaining reimbursement for services. The ET3 program is currently in a 3-year evaluation period and is not accepting new organizations but may be expanded after this period. Agencies may partner with local healthcare systems to obtain funding if they can demonstrate a reduction in cost elsewhere, such as through fewer ED visits or by offsetting penalties by reducing 30-day readmission rates. Alternatively, EMS agencies may partner with other healthcare providers to become integrated in or establish new accountable care organizations (ACOs). If reimbursement for services cannot be obtained, agencies operating under local government bodies may be able to secure additional funding from the locality upon demonstrating reduction in resource utilization. The challenge is that agencies may have to divert funding from other operations in their existing budget to fund the program before they can then collect the necessary data to be used for demonstrating benefit to secure funding in future budgets. It is for this reason that agencies will need to document their activities thoroughly to both demonstrate improvements in patient outcomes but also to show reduction in operational costs. A couple potential ways to show reduction in operational costs can be through demonstration of fewer responses or fewer miles travelled by emergency vehicles (less fuel consumption, fewer repairs, and extended service life

of vehicles). If an absolute reduction in responses is not gained, showing a difference in actual responses compared to anticipated responses, based on historical trends, may be of benefit.

Recommendation: Start Small

It is important to recognize that community paramedicine is constantly evolving and adapting to needs of the community and expanding as new resources become available. No two programs will be identical in size, structure, or function as community needs and resources vary. As such, an EMS agency does not have to wait until it has an expansive, multi-faceted, and robust program to begin interventions. An agency's CP program can initially start off small and with a narrow focus, identifying "low hanging fruit", and gradually expanding as additional support and resources are acquired. Three common issues an agency can attempt to address early are preventing falls, assisting the homeless, and reducing use by frequent callers.

Fall prevention among elderly and disabled people is an easy to implement intervention many agencies can accommodate with little external support. This intervention is focused on identifying any patient with an injury from a fall and then following up with that patient to do a risk assessment on the home, ensuring that they have the resources they need to ambulate safely such as access to a wheelchair, cane, or walker and that the home is free from obstructions or common trip hazards. These patients can be readily identified and referred to the program by EMS providers during usual emergency responses. For example, if EMS responds to an elderly patient who fell, the EMS provider would ask for permission to refer them for follow-up. Upon being granted permission to conduct a follow-up the EMS provider can then call, email, or (if the software solution in use allows) initiate the referral directly from within the electronic patient care report. Upon receiving the referral, the community paramedic can conduct a follow-up, identify hazards and needs, and assist them in mitigating future risk.

A second early intervention that may yield positive results is providing resources to a community's homeless population. Homeless patients can impose a substantial burden on EMS systems as they often have poor health and very little access to resources to provide long-term care or to assist them in getting out of homelessness. A common misconception by EMS providers is that these patients are homeless by choice. This is very problematic as patients may be treated with contempt, especially when they call EMS frequently. Homeless people may call 911 so they can be taken to the ED to escape harsh weather or so they can get food.

Compounding the issue is that many homeless people struggle with mental illness and substance abuse. The unfortunate reality is that many homeless patients do not receive adequate care in the field or in the ED and many of them are quickly discharged from the ED without being linked to resources that can assist them in defeating homelessness, treating mental illness, or overcoming substance abuse. It is extremely unlikely that a patient struggling with all three of these issues will be able to overcome their circumstances without substantial assistance. While EMS cannot give them long-term shelter, EMS providers can receive better education on homelessness and the difficulties homeless people experience to improve the relationship they have with this vulnerable population. Additionally, there are opportunities to help by way of referring the homeless to a community paramedic who can then walk them through how to obtain resources related to food, shelter, and insurance so they can obtain any required medications and medical care. Of course, being homeless presents a unique challenge in that a homeless person does not have a permanent residence for which a paramedic can follow-up and some do not have phones that can be used to contact the paramedic for assistance. To overcome this issue, EMS providers should be given comprehensive informational pamphlets with clear explanation of resources available to them throughout the community so that the patient can seek assistance after being

discharged. Additionally, the homeless can be instructed to call 911 or the non-emergency number using publicly accessible means and identify themselves as needing a community paramedic to link them with assistance. This approach recognizes that the homeless may be unable to contact anyone else but provides them a way of seeking assistance through the 911 system without necessarily needing a full emergency response.

The third early intervention for new CP programs involves identifying frequent requestors of EMS and conducting follow-up for care coordination and patient education. Emergency response data can be examined for high-frequency dispatches to the same address or alternatively, electronic patient care reporting systems can identify high-frequency patients by demographic information within the database. While early care coordination endeavors may be limited until stakeholder partnerships can be formed, community paramedics can assist patients in a limited capacity by assisting them in setting up appointments, ordering medications for delivery, or enrolling them in non-emergency transport services to assist them in keeping appointments. In-home follow-up visits should follow a standardized approach and to accomplish this, a standard initial home visit checklist and workflow process should be constructed.

Once systems are in place to address these common issues, agencies can begin expanding to address system-specific issues and implement other interventions focused on alternative transport destination or telehealth, among others. The keys are to recruit support, build momentum, and recognize that while barriers exist for certain interventions, there are small scale interventions agencies can pursue that do not require broad integration. These small initiatives can have a meaningful impact in the community and over time can be used to demonstrate effectiveness and gain additional support.

Limitations and Research Needs

Community paramedicine is a relatively new venture for EMS agencies. While an increasing number of organizations are developing programs, community needs vary greatly and as such no two programs are likely to be identical. Limited pilot programs have demonstrated success, but the benefit of these programs remain largely anecdotal and based on theoretical concepts. National EMS data remains largely focused on measurements important to patient outcomes amidst life-threatening emergencies such as response times, identification of stroke, and efficacy of resuscitation treatment modalities, but there is little data gathered about patients' access to care. Some inferences can be made from existing data about the criticality of patients encountered by EMS, but there is a great need for more data to truly understand community needs. Demographic information should be gathered for all patient contacts regardless of disposition. Additionally, EMS agencies should be collecting data about insurance availability and identifying potential future needs. EMS needs to move away from limited episodic care and lean into transitional care and connecting patients with resources within the community. Finally, EMS agencies engaged in community paramedicine need to come together to conduct larger scale research on the effectiveness and safety interventions.

Summary

Non-emergency use of EMS resources is a growing issue in the US. As the number of requests continue to increase, many agencies may experience increased difficulty meeting the demands of the communities they serve. Patients request EMS, and subsequently treatment in the ED, for non-emergency problems for a myriad of reasons; most notably poor access to primary care or alternative acute care, convenience, lack of transportation, financial flexibility, and perceptions of severity and quality of care. For many patients, the reason can be reduced to a

lack of means in obtaining appropriate medical care. EMS agencies ultimately serve as a vital component of the nation's healthcare safety net and careful consideration must be applied to any interventions that may unintentionally disrupt this function. Given the fragmented nature of healthcare in the US, EMS agencies have a unique opportunity to facilitate connection of patients to available resources and to fill gaps in care that have not yet been addressed by existing systems of care. Agencies can expect to encounter several barriers when attempting to implement a CP program. These barriers may come in the form of legislative and regulatory challenges, difficulty in reimbursement for services, gaining internal and external buy-in, qualification standards for providers, access to and exchange of health information, and medical direction; among others. Through understanding of community needs, assessment of available resources, and patient-centered advocacy and care coordination, community paramedicine programs can achieve better health outcomes and reduce healthcare costs while enhancing the availability of emergency resources to respond when genuine emergencies occur.

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