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Conner Griffin  
cg2422@rit.edu

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# RIT

## **An Analysis of Funding for Emergency Medical Services in New York State**

by

**Conner Griffin**

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Science, Technology and Public Policy  
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Rochester, New York*

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*Submitted by:*

Conner Griffin

Signature

Date

*Accepted by:*

Eric Hittinger/Faculty Advisor

Public Policy/Rochester Institute of Technology

Signature

Date

Eunju Kang/Committee Member

Public Policy/Rochester Institute of Technology

Signature

Date

Heather Allen/Committee Member

Clinical Manager/CHS MIHC

Signature

Date

Qing Miao/Graduate Director

Public Policy/Rochester Institute of Technology

Signature

Date

**Abstract:**

Emergency Medical Services (EMS) has been a misfit member of public safety and healthcare within the United States since the 1970s. As EMS has progressed into its modern form, policies haven't caught up, particularly concerning funding. Medicare and Medicaid reimbursement no longer reflect the reality of modern EMS systems. The need to transport a patient to an emergency department to recoup service costs perpetuates an already costly healthcare system (Munjal & Carr, 2013). To offset the loss encumbered by EMS agencies across New York State (NYS), local governments can provide much needed funding. Funding of this nature has also been identified as a way to fund community health services around the US.

A notable example is Austin-Travis County; paramedics within this county can serve as case managers for patients misusing EMS for non-emergencies. This system can't bill any of its services to government insurance agencies, even when these paramedics assist patients with Medicaid enrollment. (Olmstead, 2015) This study aims to gain insight into the level of support municipalities give to their EMS systems. Its additional goal was to characterize the communities providing funding and understand why they provide greater funding than others. Utilizing data from the US Census and the NYS Comptroller, the demographic differences between municipalities were explored concerning their EMS-related expenditures.

It was concluded that older communities were predominantly responsible for EMS funding across the state. This finding aligns with these populations' expected higher use of EMS but opens discussion on what gains the communities see from more sustainable care modalities. However, much is still left to question why a large part of the state leaves EMS funding up to traditional sources and, subsequently, how this impacts EMS sustainability in NYS.

## **Introduction:**

Emergency Medical Services (EMS) are an integral component of the US healthcare system. Yet, EMS doesn't have the same sustainable funding sources as its counterparts, both in healthcare and in public safety. EMS has also become a key component of the safety net for low-income Americans seeking access to health services. A funding report from the National EMS Advisory Council (NEMSAC) noted that only 21% of patients transported to the hospital in the US paid by private insurance, leaving the rest to government payors. Going further, in one area of Texas, a company billed Medicare for \$52.9 million and received only 26% of their billed claims. The implication is that almost 75% of the transports EMS provided for Medicare patients were charity under the Medicare fee schedule. (NEMSAC, 2016) Ultimately, EMS finds itself in a precarious position, possibly seeking local funding to try and offset costs. How or if they access these alternative funding sources is of great interest and worth investigating.

The first concept to better understand who provides public safety services to communities is the agency types present. Police and Fire protection for communities are almost exclusively provided to communities by government agencies, with 96% of fire departments accounted for by the U.S. Fire Administration being local departments. (USFA, 2021) Comparatively, EMS providers are more diverse, with 61% belonging to government agencies, both fire-department-based and non-fire-department-based. More interestingly, a significant minority of providers are hospital-based and private non-hospital-based. (NHTSA, 2011) This divide in service types contributes to confusion for researchers and policymakers on who provides EMS for communities: governments or the market.

This has presented a crisis within the US healthcare system as disadvantaged healthcare systems, mainly in rural areas, have slowly shrunk or closed. (Thompson, 2023) Rural

ambulances are disadvantaged since they typically have larger areas to traverse to reach their patients and a hospital. A problem accounted for in publicly funded services like Police and Fire, rural regions of New York for example, are primarily covered by the State and County police forces as towns don't have the population or funds to always support an agency for each jurisdiction. EMS, as a primarily private service, was not considered an essential service in NYS until May of 2024 (Mayer, 2024.) In a national study, the Maine Rural Health Research Center released a report in 2023 that found over 4.5 million people lived in an ambulance desert, where the population center was 25 minutes away from a stationed ambulance. It also found that 84% of rural counties were likely to contain at least one ambulance desert (Jonk et al., 2023). This lack of service availability, combined with insurance funding issues, leads to a question of what has been done to understand the financing required to support equitable services for communities.

### **How EMS Service Delivery differs from Other First Responders:**

Like other public safety service providers, EMS operates unscheduled whenever someone calls 911. Understanding how it's delivered can offer context for funding variances between communities and why efficiency is an arduous topic for emergency services. To compare against police and fire again, these two sectors of first response operate primarily on a tax base, with their budgets supplemented by cost recovery or grants from higher-level governments, both state and federal (e.g. insurance fees for Fire Departments). The communities' expectation for these tax burdens is that should they have an emergency, whether a fire in their home or a need for a police officer, one is available to respond. The inefficiency that comes from this is that while waiting, the resource is idle. Fire departments seemingly compensate for this with volunteer

workforces, as volunteer departments account for 70% of fire departments in the United States (USFA, 2021). Using the same database, the US Fire Administration reported 27,163 fire departments listed in their registry, and a little over 1.3 million fires were reported in 2021 (USFA, 2021). While this proposal does not aim to compare EMS and fire services, separating the two is important to understanding system pitfalls for EMS. Fire Departments in recent history have been responding to fewer house fires, and as they redefine the services they provide to the community, it's important to separate how busy transporting ambulance services are relative to what was traditional for fire departments. Benchmarking against previous statistics, the US NHTSA's National EMS Information System (NEMSIS) receives data from 12,225 EMS Agencies in 50 states or territories, which is about half the number of registered fire departments. At the same time, over 19.5 million patients were transported to the hospital after a 911 response (NEMSIS, 2021). Put another way through Unit Hour Utilization (UHU), which is the time any unit (ambulance or fire apparatus) spends actively assigned to an incident divided by the shift or total time of the year, the trend continues. Fitch & Associates (2024,) a public safety consultant, noted that the Fire Service faces serious issues with fatigue, particularly for units that respond to a large number of EMS incidents at their station. The traditional UHU goal noted within the article is to be under 0.3, meaning the goal is for Fire Units to be off calls 70% of the time. This "idle" time allows for training, administrative work, and finally sleep, should time permit. However, in another Fitch Report on how EMS can demonstrate value to local government managers, they reported that EMS with only 911 calls typically aims for a UHU of 30-50% (Fitch, 2015). In simpler terms a transporting ambulance has 20-30% less time to dedicate to off call activities, whether that is training, completing after run reporting, or in the case of any agency that does 24 hour shifts, sleep.

## **Funding Definitions and Background:**

Unlike other first responders, EMS utilizes a mixed-payer model similar to the rest of the US healthcare system, primarily relying on insurance and Medicare/Medicaid reimbursement to fund operations (Avsec, 2020). However, insurance reimbursement may not be enough to support EMS operations fully, and this background is designed to explain the critical details necessary to understand later findings.

### Medicare Fee Schedules:

Medicare remains one of the most significant sources of revenue for EMS. As discussed before, the NEMSAC found that 44% of patients transported by EMS were Medicare payers (NEMSAC, 2016). The critical difference for EMS when billing for Medicare is that reimbursement is solely based on transport to hospitals or transfers to nursing facilities.

“Medicare Part B (Medical Insurance) covers ground ambulance transportation when traveling in any other vehicle could endanger your health, and you need medically necessary services from a:

- Hospital
- Critical access hospital
- Rural emergency hospital, or
- Skilled nursing facility”

(Medicare, 2023)

The prescriptive requirements set forth by Medicare allow very little deviance for EMS services to be reimbursed. Medicare defines the services they'll cover under the pretense that "traveling in any other vehicle could endanger your health." This sets a tone that you must consider how severely your illness or injury would impair your ability to use any other transportation first, otherwise, Medicare may be unwilling to cover the fees. The second important note is that Medicare codified the transport destinations it is willing to cover for patients utilizing EMS. This upholds the "fee for transport" model and restricts the treatment options EMS can bill for, ultimately making EMS absorb costs for any care that allows a patient to stay home. Mobile Integrated Healthcare models look to expand the capabilities of EMS to more patient-oriented decisions, such as treatment at home by EMS, that aren't covered under the Medicare fee schedule, a deadweight loss many agencies can't afford to consider. (Maryland Institute for Emergency Medical Services Systems, 2019)

#### Special Districts:

Special districts are specialty government units that some states permit to fund specific community services (e.g. waste disposal, fire protection, and ambulance services) (Census Bureau, 2021). These districts will be important in the coming literature review as they allow communities to establish funds outside their local government. These districts operate independently of the local governments, with their respective commissioner boards providing oversight. This creates an even murkier environment when tracking funding for ambulance services.



**Literature Review Methods:**

For this literature review, Google Scholar was utilized to obtain papers. The search terms can be seen in Table 1 and were entered directly into the Google Scholar search bar. A total of 15 articles were selected for review. Due to the search results of Google Scholar being less specific than other literature databases, titles and abstracts weren't reviewed past the fifth page of the search results. These papers were selected based on whether they were at least after the year 2000, if they were in the US, and if they focused on economic factors influencing EMS systems. The specific papers reviewed also discussed the funding or performance metrics and their impacts on entire EMS systems, whether a city, county, or state. This was to screen papers that focused on specific patient populations or clinical presentations of interest, which is common when evaluating new procedures or techniques. The objective of the search was to determine what literature is currently available on the topic of EMS funding pitfalls and the inequity it may cause.

Table 1: Google Scholar Search Terms

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<b>Search Terms</b>
Emergency Medical Services Reimbursement
Emergency Medical Services System Performance
Funding Effects on EMS Response Performance
Emergency Medical Services Efficiency
Funding in rural Emergency Medical Systems
Emergency Medical Services Care Outcomes

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In Table 2, you will find the categorized results from the final 15 papers and the topics of interest each covered. The first column is for any paper that discussed reimbursement for EMS, whether it was Medicare/Medicaid or private insurance. The second column marks any paper that included local tax funding in their discussions. The third is for papers that discuss system performance metrics, which are of interest because they quantify the disparities between areas or the issue being addressed.

Table 2: Matrix of Papers Reviewed

<b>Authors</b>	<b>EMS Reimbursement</b>	<b>Local Tax Funding</b>	<b>System Performance Metrics</b>	<b>Response Times</b>
Davis et al. (2004)	X	X		X
Gunderson (2021)		X	X	X
Hatley & Patterson (2007)	X	X		
Jonk et al. (2023)			X	X
Lambert & Meyer (2008)		X	X	X
Luo et al. (2022)	X		X	X
Moriah et al. (2022)	X	X	X	
Munjal & Carr (2013)	X	X		
Sell et al. (2021)	X	X		
Williams (2012)	X	X		

## **Literature Findings:**

Across the ten papers reviewed, there were several key observations. The first is that most of the papers reviewed discuss response times, both as their defined metric and as a potential system issue. While the response time doctrine has existed since federal legislation in the 1970s, it is still present in studies today (Shah, 2006). The second general observation, while less present, is that geography and urbanicity have been significant discussion points in recent years, especially rural health ( Gunderson et al., 2021; Jonk, 2023; Luo et al., 2022). The last major trend is that Medicare is the key policy suggestion discussed surrounding reimbursement (Hatley, 2007; Sell et al., 2021; Williams, 2012).

## Reimbursement and Local Funding:

Funding is a source of inequity across EMS, but it isn't well understood based on the papers reviewed. There are two categories of funding discussed across several papers: funding issues as a result of reimbursement shortfalls (Hatley, 2007; Williams, 2012; Sell, 2021) and funding discrepancies among municipalities (Lambert & Meyer, 2008; Moriah et al., 2022; Munjal & Carr, 2013).

Insurance reimbursement continues to represent most of the budgets EMS service providers have access to, with 77% coming from insurance reimbursement; Munjal and Carr went on to note that, specifically, the limitations insurance reimbursement places on the interventions EMS can perform holds EMS back (Munjal & Carr, 2013). Hatley & Patterson had discussed earlier in 2007 how Medicare hindered care delivery for EMS providers, noting that “\$402 million dollars in ambulance transports did not meet the government’s criteria for medical necessity” in 2002. The Inspector General of DHHS stated that transports like those to

alternative care centers like dialysis were unnecessary and wouldn't fall under medicare necessity. (Hatley & Patterson, 260, 2007). The significant trend between these two authors is that both point to Medicare reimbursement as a known problem and that it favors transport to a hospital, making any supplemental services unsustainable to fund.

In response to the shortcomings of insurance reimbursement, in addition to some systems needing more than just patient transport, EMS providers have to turn toward local funding to support additional services, whether community paramedicine or hazmat support (Munjal & Carr, 2013). However, prevalence is poorly understood, and not every state allows taxes to be dedicated solely to emergency services, specifically EMS. Moriah et al. (2022) explored this concept by analyzing the laws of five states and defined which services local governments could fund autonomously. Of the five analyzed states, only two allowed special districts for EMS funding, and four had tax limits on property taxes. Of the fifteen studies, five others mention local funding. Still, none of them go further in-depth than the challenges associated with convincing localities it is necessary and that local funding is related to patient-centered care (Davis et al., 2004; Hatley & Patterson, 2007; Lambert & Meyer, 2008; Munjal & Carr, 2013; Williams, 2012) One outlier specifically pointed toward other cost recovery or mitigation options such as partnering with local hospitals to lower supply costs or increase program options instead of local tax subsidization (Sell et al., 2021).

### Geography and Urbanicity:

The second common theme across the literature is the distinct realities between rural and urban community health services. Lambert & Meyer (2008) point out that as population density decreases, the efficiency of EMS services decreases and overall costs climb while discussing

EMS deployment models in fringe suburbs. Jonk et al. (2023) most clearly addressed the difference in ambulance services between urban and rural with the introduction of ambulance deserts, areas where the population center is greater than 25 minutes from a stationed ambulance. While response time may not be ideal, no other study speaks to a preferred response time greater than 15 minutes, with the key implication being the best response for these communities is greater than 25 minutes, drastically longer than the cut-offs discussed in any other studies. One study that is also worth discussing here is the only study from outside the US; Luo et al. (2022) created models to analyze how rural areas in China have longer response times due to geographic barriers. The secondary consideration discussed is how many additional ambulances it would take to address the response discrepancy going into rural areas. While Jonk et al. (2023) mention the distance between urban centers, Luo et al. (2022) highlight how natural obstacles, such as mountains, contribute to the varying levels of response capabilities between urban and rural areas. If more studies are to be performed analyzing how rural communities are disadvantaged, geography could be controlled to mitigate using it as a scapegoat.

### **Literature Discussion:**

Based on the literature reviewed, efficiency has been a continuous challenge when providing care for the patients EMS providers serve. A system model with ambulances is unlikely to be prepared for people's emergencies without idle time. However, reimbursement models inherently come with high costs per use or incentivize keeping ambulances busy. Primarily attributed to insurance reimbursement policies, that has been an established issue since the late 90s and early 2000s, and every article that spoke to these issues mentioned that it fell

short of sustainable operational costs. Fitch and Associates (2017), explored this topic when discussing how EMS can demonstrate value, precisely as healthcare systems try to mitigate rising costs and demand for EMS services. Personally, as a certified EMT and provider, I've witnessed many patients who wouldn't have significant benefits from transport to an emergency department and would be better served by seeing a primary care physician (PCP). Unfortunately, after the passing of the Affordable Care Act, healthcare systems were not prepared to meet the demands of populations that previously didn't have access to healthcare. Without access to already swamped PCPs, emergency departments and potentially EMS have become the next most logical place to turn for immediate access to a healthcare provider (Qiu, 2017). While I may work in a system that is sustainable enough that I don't feel pressured to transport every patient, the need to recoup costs for service is still a consideration every EMS agency has to be conscious of. If every treatment or evaluation an EMS provider performed was reimbursed by government and private payers, independently of transport to a local emergency department, this pressure could be alleviated, providing more significant revenue for EMS agencies.

With the closure of rural hospitals, communities lose access to routine services and experience more significant barriers to care, creating greater costs for regular care. It is concerning that these communities are being left behind while health systems localize in urban and suburban areas. Jonk et al. (2023) highlight how dire the situation can be for communities and shine a light on the service disparity among rural communities. Healthcare and EMS have to consider framing, as discussed by Stone (2012) when appealing to policymakers for support, both when it comes to pre-existing legislation changes (e.g. Medicare fee scheduling) and funding from local municipalities. Without appropriately establishing the need, it's difficult for budget-minded governments to justify increased costs for community members.

General recommendations that can be made after reviewing the literature are that Medicare needs to reschedule the EMS fee schedule and change the language surrounding medical needs. With more inclusive language surrounding reimbursement, EMS agencies can implement additional services or treatment options. This will also support activities EMS already engages in, as many 911 activations for EMS might have been perceived as an emergency by the caller but, after assessment by a prehospital provider, don't always align with a medical problem requiring additional evaluation at the hospital. This treatment in place is a modality EMS systems have been exploring throughout the country, with some notable systems coming to fruition. These systems aim to divert low-risk patients away from costly and unnecessary emergency department visits. For example, Austin-Travis County EMS in Texas has come to the forefront of managing patient care outside the traditional path toward care in the emergency department. Austin-Travis' program attempts to redirect these patients to local primary care doctors and establish connections to non-emergency transport services to get patients to outpatient appointments. The paramedics within the program also serve as case managers, assisting patients with Medicaid or Medicare enrollment while completing at-home visits to monitor the patient's health. Yet, as previously identified, the system can't recuperate the costs of these services through Medicaid or Medicare and has had to seek alternative funding sources. (Olmstead, 2015)

If no action is made to realign Medicare and Medicaid with modern EMS services, reimbursement from insurance will remain tied to transport to hospitals, continuing to generate downstream costs in an already costly healthcare system (Munjal & Carr, 2013). The second is further research surrounding clinical factors affecting rural areas so that policy decisions can be more informed. Lastly, research investigates the prevalence of tax bases dedicated to EMS and



their effects on system performance. If some communities can afford to supplement EMS, why do they or why not, and what is the advantage of local funding quantified?

### **Limitations of literature review:**

One limitation of the review is that comparing studies from different states can be a potential factor when evaluating studies, as each state has a separate governing body and its geographic challenges. Secondly, EMS research is incredibly scarce; of the 350 articles that Google Scholar returned in the first five pages of search results, 10 met the above criteria.

### **Research Question and Hypotheses:**

After the literature review, the question that remains unanswered is which communities invest in their EMS systems. The secondary question becomes, what characterizes these communities with the resources or desire to support their EMS systems?

The first hypothesis is that smaller communities will have less or no spending than their urban counterparts. The second hypothesis is that older communities will spend more due to increased use identified in the literature. The third hypothesis is that more affluent communities will report more spending due to greater tax bases to support detailed accounting in addition to funding EMS. The fourth hypothesis is that areas with increased reliance on public health insurance will have more spending due to the possible subsidization needed to offset low reimbursement. The last hypothesis is that similar to the median income of communities, educational attainment will positively correlate with spending.

## Methods:

Regression analysis and t-testing are the empirical methods to answer the two overarching questions. The EMS budget from municipalities will serve as the dependent variable of interest in the regression analysis, with the independent variables being much less defined. EMS systems are dynamic and have variable regulations between states and sometimes between counties. The communities they serve can be just as variable within New York State, with incredibly rural areas of the Adirondacks to the urban sprawls of New York City. To account for as many factors between communities as possible, the independent variables of interest range considerably. The independent variables can be found in Table 3.

Table 3: Independent variables for regression analysis

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<b>Independent Variables:</b>
Median Household Income
Percent People in Poverty
Population
Median Age of Population
Education Attainment
Percentage of people with Public Health Insurance
Percent People of Color

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### Data collection and assumptions:

The variables above are all available from PolicyMap, an online database that compiles data based on location in the US by zip code, county subdivision, and census block (PolicyMap, 2023). Each independent variable above aims to account for specific factors in each county

subdivision, with two likely becoming controlling factors. The first assumption was that areas with higher mean income are more willing to contribute to community programs, including emergency services like EMS and Fire. The second control variable was population size; as previously mentioned, rural areas have less resource availability to contribute through government spending.

Regarding the dependent variable, the New York State Comptroller's office collects and publishes spending records for local governments in the state at the municipal and county levels, collectively called Openbook data. The data contains classifiers for most government expenditures, including fire and police spending, but it does not explicitly classify spending for EMS. However, within the data is an "emergency response" column with expenses labeled for ambulances; the totals from this column will be used for the dependent variable in the regression analysis. (NYS Comptroller, 2023) To align with per capita independent variables, ambulance-related expenditure was divided by the population of the County Subdivision. Regression analyses were performed with the variables defined to determine which variables are associated with EMS system funding with and without control variables.

#### Statistical analysis and unit of analysis:

To create a funding dataset, the data from the NYS Comptroller was first summed in Excel for each town, village, and city. Once compiled for each NY municipality, the data was mapped manually to the county subdivisions defined by the US Census. Due to the additional municipal level of villages in NY, the census defines the 1013 subdivisions by town, city, or native american reservation. To match state data with census data, spending by village governments was added to any town spending within a subdivision; the total of all local

government spending within a county subdivision was used in the analysis. An example is the village of Honeoye Falls, which is geographically bounded within the town of Mendon. This means that the census county subdivision is “Mendon” which accounts for the population statistics of the village and town. This means to align the comptroller data, the EMS spending for both the village and town was added together, aligning them with the census unit of analysis. This resulted in a dataset of 1013 county subdivisions for analysis, but only 413 of these subdivisions had any reported funding. This allows for two separate analyses, one on the difference between communities with spending themselves ( $n = 413$ ) and one for the difference between communities that report funding and those that don't ( $n = 1013$ .) The first dataset was analyzed using regression analyses for each combination of the six independent variables outlined previously. Regressions are also performed after taking the natural log of spending across the state to investigate variance among the dependent variables; the results after transformation can be seen in Table 2. The second was investigated using two-sample t-tests for each independent variable and an alternate variable to determine whether there was any reported spending in the municipalities.

### **Results:**

In the following section, I present the findings from three statistical analyses. The first two tables aim to explain differences among the 413 county subdivisions that report spending under the “ambulance” line item to the state comptroller. This is captured through the coefficients and p-values obtained through several regression models and variable transformations. The second data grouping was analyzed using t-testing ( $n = 1013$ ) to determine

statistically significant differences between county subdivisions with reported funding and those without.

**Table 4:** Regression models with untransformed variables. (Coefficients)

Independent Variables:	1A	1B	1C	1D	1E
Constant	-59.3	-32.6	-36.0	79.8	34.26
Median age	1.923***	2.145***	2.128***		
People in poverty	-44.2	-46.0	-50.3	-115.9**	-104.9**
People with at least a high school diploma		-48.4	-44.8	-46.9	
Median household income	0.000239*	0.000247*	0.000255*	0.000194	0.000202
People with public health insurance		6.1	6.5		
People of color		35.0	-49.8	-4.5*	15.9*
Population			-0.000079		-0.000089
R-squared	7.07%	7.86%	8.35%	2.09%	2.51%
Adjusted R-squared	6.38%	6.49%	6.76%	1.13%	1.55%
No. observations	413				

\*, \*\*, \*\*\* indicate p values < 0.1, 0.05, and 0.01 respectively

Throughout all variations of the regression model, any inclusion of median age as an independent variable would result in a p-value of zero. It was found that as communities age, they spend more per capita on EMS, about 2 dollars per capita for each year the median age increases. After the regression models were recreated without median age among the

independent variables, the poverty rate rose into the position of the sole dominant variable. A negative relationship was found that each percentage increase in poverty correlated with a \$100 decrease in spending per capita. Interestingly, in each case with median age included, the median income's p-value is much lower but not entirely below the  $< 0.05$  threshold for significance. A similar relationship can be seen for the percentage of people of color when the poverty rate and population are included.

Table 5: Regression models with the natural log of EMS Spending (Coefficients)

Independent Variables:	Model 2A	Model 2B	Model 2C
Constant	2.32	4.17	4.18
Median Age	0.0366***		
People in Poverty	-1.76	-2.93***	-2.93***
Pop. with at Least a High School Diploma	-1.63	-1.58	-1.58
Median Household Income	0.000006	0.000005	0.000005
People with Public Health Insurance	0.024		-0.009
People of Color	0.778	0.101	0.101
R-squared	4.36%	1.98%	1.98%
Adjusted R-squared	2.92%	0.75%	1.00%
No. observations	413		

Several communities in NYS had spending per capita excess of \$300, which resulted in significant residuals in the initial regressions. A natural log transformation was performed on the independent variable to explore if these residuals were skewing the data. The results of this transformation did not change any significant findings among the three models presented.

However, a particularly interesting trend of note is that between all the regression models studied, the percentage of people with public health insurance (Medicare and Medicaid) has little to no impact on the amount of spending in a community.

Table 6: t-test results

Independent Variable	Difference in Means	P-Value
Median Age of Population	-0.126	0.777
Percent People in Poverty	-0.0492	0.25
Median Household Income	-1953	0.251
Percent People of Color	-0.612	0.314
Percent People with Public Health Insurance	0.00038	0.949
Percent People with at least a High School Diploma	.00113	0.756
Population	-9300	0.215
No. Observations	1015	

“Difference in Means” represents the average difference for each variable between census county subdivisions that reported any funding for EMS and those that did not.

The second set of empirical analyses performed was string t-tests to explore whether there was an explanation for why some communities funded their EMS system and others did not. This t-testing aimed to compare the mean of each dependent variable for the two populations. However, among all the variables tested, no statistical difference was seen between the groups reporting funding and those that do not. It was particularly surprising that the population size of communities had no significance as initially hypothesized. Some similar trends from the regression analysis were observed: the percentage of the population with public health insurance remains insignificant, and so does the education of the community. This remains surprising as both communities were expected to positively impact funding.

## **Discussion:**

The regression results didn't yield as many expected results as initially thought. Age and poverty were expected to impact communities' defined needs and ability to provide additional funding for EMS. Yet, some variables seemingly had no part in determining the amount or presence of spending for EMS. The most unexpected of these variables was the rate of public health insurance, otherwise known as payor mix by EMS administrators. The previous findings in the literature pointed to significant issues with lack of reimbursement or insufficient reimbursement to EMS by Medicaid/Medicare that was sometimes compensated by private insurance rates or additional funding sources, such as local funding.

### Median Age of Communities:

The first area to understand is the implications and reasoning behind age dominance in the regressions. Geriatric populations throughout the state represent about 16% of the total state population and are expected to grow to 25% by 2030 (Hochul, 2022.) While older people in New York represent only about a fifth of the population, nationally, 1 in 3 EMS patients are older than 65 (Duong et al., 2018). Given the significant minority of the patient population geriatric patients represent, it isn't astonishing the average age of a community impacts funding as much.

Governor Hochul's executive order about the older and aging populations in New York also noted that "Older adults and baby boomers generate sixty-three percent of the household income in the State" (Hochul, 2022). Older communities reasonably have a vested interest in the quality of EMS services they receive and that they have the income to support additional tax-based expenses within their town, village, or city.



One of the problematic pieces discussed during the previous literature review was determining what factors could be utilized to analyze the value of increasing spending. For local lawmakers, it needs to be tangible while still holding a basis in clinical science. It would be reasonable to argue that geriatric care is a prime candidate. The geriatric population will only increase in the next decade, but it remains a small portion of an EMS provider's education. In NYS, to recertify as an EMT or Paramedic, less than 10% of the education you receive is focused on geriatric care (NYS DOH, 2024). Older communities, who receive a fraction of the state mandated training, stand to benefit the most from increased funding and care at home, something members of New York have already identified. In the Monroe County region of the state, there is at least one active study focused on repeat geriatric patients with the goal of improving care for older patients by EMS (Carr, 2024). While grants fund that study the potential outcome differences and training to implement better geriatric care could be one way agencies justify the subsidies coming from municipalities.

#### Poverty Rate:

The poverty rate's prevalence as a predictor variable within the analysis was predicted to have a negative correlation. Its statistical significance as a factor in the amount of spending was to be expected. A study by the Lincoln Institute demonstrated that among municipal expenditures, each percentage of the population in poverty would reduce municipal spending by ten percent over ten years (Scholl, 2018.) However, Scholl noted that areas with lower municipal spending have associated increased expenditures from state and federal sources. The analysis within this study doesn't include funding from county, state, or federal sources; future studies could focus on grant distribution to EMS agencies to determine how competitive allocation is.

Exploring potential sources of inequity from grants awarded to agencies with the time and resources to pursue them, potentially overlooking agencies struggling to cover payroll or find volunteers in NYS (NYS EMS Council, 2023).

#### Public Health Insurance Rates (Payor Mix):

The last finding of initial interest was the impact of public health insurance rates on municipal funding. As mentioned in the literature review, Medicare is one of the most cited hurdles for EMS regarding cost recovery. It was inferred that areas would have high rates of publicly insured people, especially since Medicare populations also coincide with older populations, and this could have been a talking point for agencies pursuing public funding. Yet, the analysis doesn't indicate that Medicare and Medicaid rates influence how much funding towns place toward ambulance services in any regression. The State Emergency Medical Services Council (2023) report on the sustainability of EMS in NYS focused on Medicaid reimbursement scheduling in NY and discussed the creation of education materials on the role of EMS. The focus on state legislation change, while vital to close the gap for reimbursement pitfalls, doesn't take note or advantage of the spending by local governments. Reimbursement changes would also need to address the fee-for-transport model, which remains the dictator of funding models for EMS. Without changes to reimbursement, local subsidies may be directed toward maintaining the status quo instead of improving the overall system for the community. With rescheduled reimbursement for the traditional roles of EMS, budgetary constraints could make way for improved community programs and new roles for EMS agencies in the communities that support them.

### T-testing and qualitative analysis:

It was a surprising discovery to find that the two samples of municipalities, those with reported budget lines and those without, were statistically the same. It was expected that similar trends would be observed as had previously been seen in the regressions to appear again. The most interesting of the variables used in t-testing was population. It was originally hypothesized that small rural communities, ones that should be represented in the simple totals of population, wouldn't have the ability to support or itemize EMS as a budget line. As someone from a rural community in New York, I also expected that it was an accepted status quo that we relied on volunteer ambulances primarily supported by donations. However, this was not the case in the analysis. Factors initially sought were to create a rural density variable for analysis within the methods. Still, it was not an available statistic from the Census, nor in the scope for creation. Other than demographic variables, the other potential area of investigation would be whether these agencies engage in conversations with local governments and what information they utilize to educate administrators about the need for a subsidy.

### **Conclusion:**

EMS in New York is delivered in a dynamic and diverse way, with private-public partnerships and municipal services intermixed. It is clear that among older communities with funding, the older they become, the more willing the municipality and its population are to provide funding. It has been stated throughout literature and in the NYS EMS Council's own reports that public insurance is no longer a reliable way to keep EMS operations sustainable. With the increased desire for EMS administrators and researchers to push for a new role for EMS, public funding remains a viable option to support these endeavors.

While this study sought to provide greater insights into spending disparities between communities throughout the state, the results weren't as clear as anticipated. However, the prevalence of EMS funding at the local level had not been explored empirically, and the lack of findings, particularly surrounding public health insurance and population density is worth further study. The largest contribution of note, however, is the implication that older communities see value in EMS care. This finding itself is worth investigating, is it that these communities are more aware of the impact quality EMS care can have on their life, or is it more simply that they expect to use it? This kind of speculation remains common in EMS, but this study demonstrates it can be empirically supported. Allowing a new path for EMS to demonstrate the need for growth as it catches up with its older public safety counterparts.

For future research, it would be beneficial to incorporate care related statistics to not only characterize the communities that have subsidized EMS systems but to begin to evaluate the effectiveness of local funding. It would also be important to understand local government officials' rationale behind appropriating the funding, their talking points to their constituents, and their relationship with the agency that serves them. The NYS Comptroller seems to expect that County governments are going to take an increasingly active role in the provision of services, and continuous studies of each system would be paramount to ensure healthcare costs remain sustainable and equitable across the state (NYS Comptroller, 2024.)

**Limitations:**

This study aimed to explain the presence and variation of funding for emergency medical services within NYS. One of the chief limitations identified was that jurisdictions for emergency services don't always coincide with the geographic borders of a municipality, sometimes with multiple agencies sharing the same geographic area or multiple municipalities being served by one agency. This makes it difficult to trace funds directly from one agency to a town. The second limitation was that the Census doesn't recognize villages in NYS as a government unit separate from a town. This forced the analysis to combine the funding from villages into the unit of analysis available from the census, a county subdivision, which is geographically bounded by the towns and cities of NYS. This compromise reduced the total number of government units that could have been included in the analysis to match the data used as independent variables.

It is also important to note that county funding was not included in the funding analysis; this decision was made due to the low prevalence of counties reporting "ambulance expenses" and uncertainty on how those funds actually map across the counties where they offer services. Each county system supports its municipalities and agencies in a unique way, as the State Comptroller recently discussed, with some providing direct ambulance services while others distribute funds to areas of their county that need additional support (NYS Comptroller, 2024). In the same report, it was discovered that another line item, "Rescue Squad," could have been included in the analysis. It was not considered that rescue squads were equivalent to EMS or if they represented other emergency services adjacent to rescue or fire department related services. If the study was replicated it would be important to include this funding for exploration of its impact.

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