

Good morning Chair Borelli and all of the Council Members present. My name is John Sudnik and I am the Chief of Operations for the New York City Fire Department. I'm joined today by Chief of EMS James Booth, Deputy Commissioner for Support Services John Benanti, and Deputy Commissioner for Strategic Initiatives Edward Dolan. Thank you for the opportunity to speak with you today about evaluating emergency service needs in response to population shifts.

As the councilmembers present are aware, New York City has seen a steady increase in real estate development in the past ten to fifteen years due to rezoning and redevelopment throughout the city. We know that there are additional rezonings planned and likely more coming. The demand for fire and emergency medical services has increased in recent years, and it is expected to continue increasing as additional development projects are completed in the next fifteen to twenty years. While in the past the Department has always worked with the Mayor's office and our partner agencies to ensure that we could provide sufficient coverage to meet growing needs, the recent spate of large scale development has resulted in us taking an even more proactive approach. We know from experience that capital projects to build or expand department resources can take a long time to develop, so we are currently improving and streamlining this process.



Generally speaking, the Fire Department comes to a decision to build new facilities in a few different ways. Sometimes we are forced to adapt to emergency conditions, such as the closure of a hospital that hosts an EMS station. Other times, the decision to create a new or different facility is driven by a trend in response times that we want to address. In some cases, we are able to convert existing Fire Department facilities into a different type of resource, such as an EMS station. In other cases, we work with fellow city agencies such as the Department of City Planning and the Department of Citywide Administrative Services to find locations that are suitable for our operational needs.

The Department's Management Analysis and Planning unit – along with my team in the Bureau of Operations – monitors and evaluates both daily and long-term performance metrics including incident responses and type, resource deployment, response times, and overall effectiveness in our response and handling of emergencies across the city. We are always looking at one key objective: how can we improve our operations?

We know that major rezonings are often accompanied by growth in daytime and residential populations. A surge of people in a given location can lead to increased fire and medical calls, which can, in turn, lead to decreased availability of FDNY resources and longer response times. Given what we've learned from past rezonings, earlier this year, Commissioner Nigro instructed senior leadership to create a Facility Planning Workgroup



to focus specifically on the issue of addressing long term facility needs in a more proactive manner. This workgroup – which includes representatives from a variety of agency units including Support Services, Management Analysis and Planning, Fire Operations, and EMS Operations – will review rezonings and other developments that lead to changes in Department operations or response times.

In addition, the Department of City Planning (DCP) has indicated to FDNY that if a development being rezoned requires an Environmental Impact statement (EIS), FDNY should be aware of those proposals. To that end DCP will send the scoping notices for projects preparing an EIS to the FDNY prior to the scoping meeting. FDNY will also be involved with the Mayor's Office of Environmental Coordination's work regarding City sponsored rezoning actions. It is worth noting that although this hearing is on rezonings, rezoning actions are the source of only a sliver of all development and growth in the city. Only a small degree of new developments are the result of recent zoning changes. FDNY is focused on protecting and planning for population changes, the vast majority of which will come from as of right development that is not part of a recent rezoning.

I'd like to speak briefly about the legislation proposed today.



Introduction 746 would require the Fire Department to report annually on its new needs - based on rezonings that occurred during the previous year. We support this bill, though we would like to address the language to specify that it covers "significant" rezonings rather than all rezonings in the city.

Introduction 744 would require the Fire Department to report on emergency medical services supervisor to battalion staffing ratios. We understand that this legislation is meant to provide for greater transparency around span of control statistics and we support this bill. However, we are uncertain about the use of "battalion" and "division" in the text and we would like to suggest amending the language to reflect reporting on these categories by division only, which reflects the way that we actually operate.

Introduction 745 would require the Fire Department to report the effect on Department resources of significant rezonings in the city between 2002 and 2013. We appreciate that this bill creates a standard for defining significant rezonings. However, given the large number of significant rezonings over the course of those 12 years, the analysis that is called for in the legislation would be time consuming, burdensome, and not likely to yield useful information moving forward. Our data specialists are now fully engaged in analyzing real-time data, so we are concerned about the prospect of devoting significant resources to this backwards-looking canvas. However, we are open-minded about this topic and, perhaps, if



the Council is able to articulate the specific goal of the legislation, we can find a less burdensome way of reaching that goal.

I would be happy to take your questions at this time.



The Uniformed EMT's, Paramedics and Inspectors – F.D.N.Y.

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DELEGATES TO DC-37

Jennifer Aguiluz John Chiarovano Carl Gandolfo Sammy Gounden Lauren Hartnett Patricia Tanis Good afternoon: Chairperson Borelli and Committee members,

My name is Oren Barzilay, President of Local 2507. Thank you for the opportunity to speak today with regards to the issues of Evaluating Emergency Medical Services needs in response to population shifts and the Fire Dept. report on the effect of rezoning's.

On March 8 2018, a hearing was held by your committee on the FDNY preliminary budget for fiscal year 2019 and expanding operations. I was not able to attend that hearing, a few key issues were mentioned that I would like to briefly discuss today.

During the march hearing Commissioner Nigro testified that 186 tours have been added to the EMS budget since 2014, while we are greatly thankful for the FDNY and the city for adding additional resources to an already overworked, overstretched service, but we need more as the demand for EMS continuously increases. Our headcount has significantly increased in recent years, yet our facilities count have remained the same with the exception of one tactical trailer facility added in Queens.

Our EMS Battalions are busting at the seams with personnel, most of our stations are designed to hold 5 to 6 trucks, now they hold 10, 11, 12 trucks, if not more.

This is a health and safety issue for our members.

For example, Brooklyn EMS Battalion 57, the station is so overcrowded that lockers are on the apparatus floor. Our female members have to either change on the open floor or take their cloths and go into another room to change, then return back to the locker to store whatever item they used.

Brooklyn Battalion 40, the station was overcrowded with FDNY vehicles that the community complained to the proper channels, last year that station was decompressed by a few units, sending them to other stations that are already over the limit.

Queens Battalion 54, Dozens of members are with no lockers, a station designed for 5 to 6 units, now houses about a dozen units

Staten Island - the third largest Borough, 58 square miles, with a population of approx. hal: a million, yet there are only 2 EMS stations in the entire island.

Bronx Batta ion 15 - an old firehouse that was handed down to EMS, a building that's over 100 years old. The building is a hazard to all that work there. Walls are cracking,

equipment: ored next to the blood borne area where EMS crew clean their equipment, which is leaking to the basement area contaminating other areas and equipment.

EMS Battal on 26 in the Bronx- a facility that currently holds about 90 employees,

1/3 are females, the male rest/locker room has 3 toilet stalls and 3 showers, while the women have 1 stall and 1 shower. On numerous occasions the women have been forced to use the male restroom when there is a line at the women's restroom or when the toilet is broken.

Furthermore, our occupation exposes us to many hazards, one being blood borne pathogens, in which our crews must return to their station for a status that's referred as BBP, a status that places our crews off service so they can clean themselves off from blood borne pathogens soiled uniforms.

There have been occasions in which one crew member is forced to remain in a soiled uniform while the other is showering. again, due to the lack of showers in the female restroom, blood borne pathogens which consists of blood, fecal matter, vomitus and all other body secretions such as amniotic fluid from post-delivery of a child. it is unjust that our members have to wait to cleanse themselves in a timely fashion. These issues have been addressed with no resolution.

These issues are not just isolated to one facility or one borough, it's a systemic issue citywide, our EMS Battalions infrastructure is in need of major adjustments and growth.

In 1996, NYC EMS merged with FDNY, we were told the planning for EMS would be 70 Battalions citywide, here we are 22 years later with 37 Battalions to date.

EMS is bleeding, the pay is so low that we are losing employees every day to other job opportunities. There's a \$30k to \$40k pay differential among other first responders within the city.

The FDNY Budget Commissioner Rush testified that they spend \$4k on training each EMT, and \$20k on each paramedic. Multiply that by 400 to 600 EMTs a year and 120 paramedics a year that go through our academy each year, that's millions we spend on training people that are not staying, they're taking that training and utilizing it elsewhere with better paying jobs.

Attached in my testimony is a study showing survivability increased due to experienced EMTs & Paramedics.

EMS is not just a job, it's a calling, if you ask anyone as to why they left EMS, they will all say, the pay.

The FDNY also needs to reinstate the grant program you mentioned in March, we used to have a \$5k forgivable loan to our EMTs so they can train on the outside to become paramedics. Currently we have a severe shortage of paramedics. We train anywhere from 60 to 120 paramedics a year, that's simply not enough. Most get promoted or leave for higher paying jobs.

We need to give more people more opportunities to become paramedics. I don't want to sound like a broken record, but that's the reality in FDNY EMS.

Community hospital take over - recently FDNY took over its BLS/EMT unit covering that area, we couldn't take over the ALS/Paramedic unit due to paramedic shortages.

This once again goes back to my earlier statement about wages within the FDNY EMS

Ballistic Vests - our members are issued a ballistic vest one time in their career, the manufacturer recommends that these vests be replaced every 5 years, as time goes by our vests deteriorates, guns are getting more powerful, we have members wearing vests that are 15 years old. We need a replacement policy and a budget for our members safety.

Our members are assaulted on a daily basis, the time to protect our members is now, let's be proactive and not reactive before a tragedy strikes us.

I am asking the council members to authorize a program to re-issue ballistic protection for the EMTs, Paramedics and Fire Inspectors. I believe it is this council's responsibility to protect the men and women who protect and serve this city.

My testimony today consists, not of harsh criticism of the FDNY, but is an effort to enlighten committee members to the reality our members are faced with every day.

Enclosing, FDNY EMS is a great job, Commissioner Nigro has been instrumental in improving our needs. However, we need your help. FDNY is known as the Bravest, NYPD is known to be the Strongest, FDNY EMS is known to be the Best, help us be the BEST.

I look forward to the chance to work with this committee and the department to remedy these issues and build a stronger FDNY EMS for New Yorkers.

I'll take any questions you have.

Thank you

Oren Barzilay President FDNY EMS Local 2507



The Uniformed EMT's, Paramedics and Inspectors – F.D.N.Y.

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Jennifer Aguiluz John Chiarovano Carl Gandolfo Sammy Gounden Lauren Hartnett Thank you chairperson of this committee, my name is Darryl Chalmers along with Michael Reardon, executive board members of the Local-2507 representing Uniformed EMT, Paramedics, Fire Protection Inspectors and Supervising Fire Protection Inspectors.

The New York City Fire Department's Bureau of Fire Prevention is a life safety and revenue producing Bureau, generating approximately **85 million dollars** annually for the Department.

The Bureau of Fire Prevention members consists of 360 Fire Protection Inspectors in inspectional units which check for compliance of all Fire and Building Code regulations directly related to fire safety. Fire Protection Inspectors are tasked to inspect and witness testing of safety equipment in buildings for firefighting operations, such as standpipe systems, sprinkler systems, etc. at various locations throughout NYC, including our bridges, tunnels, piers, roof top ladders, subways, constructions sites, restaurants and basements in commercial and residential hi-rise buildings. Fire Protection Inspectors make sure the systems used for firefighting operations on premises are in working order, plus protecting the lives and property of City residents, employees and visitors. The effort of the Fire Protection Inspectors over the past several years has resulted in a significant reduction of fires and deaths related to fires at a record low in the history of the fire department within the five boroughs of the City of New York.

Fire Protection Inspectors also aided and was the lead inspection group during the extremely dangerous Legionnaires' Disease epidemic that spread from the cooling towers throughout the city.

Each Fire Protection Inspector at a salary of \$46,600 brings in approximately \$250,000 per year.

75% of the NYC Department of Buildings inspectors have cars, whereas we have only 1 car for every 7 fire protection inspectors.

With the ongoing construction boom throughout the 5 boroughs, there are only 20 inspectors with 840 construction sites to be visited on a monthly basis. On the other hand, Suppression unit has only 41 inspectors with 58,000 sprinkler/standpipe accounts and growing 8% every year.

2008-2014 Fire Code provisions for more detailed inspections which put a substantial load to the existing issue with the man power compare to the extensive work load of the bureau.

District office is operating at a capacity of just over 50%. If we had more fire protection inspectors, we would be able to operate at 100% and could generate over a **100 million dollars** annually for the city.

FDNY Uniformed Fire Protection Inspectors

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The FDNY Headquarters Unit is staffed with Uniformed Fire Inspectors conducting life safety code inspections that include, but are not limited to the following:

- Conduct fire code safety inspections for any premise(s) throughout New York City that store, handle, or use flammable, combustible mixture and/or liquids,
- Conduct fire code safety inspections for any premise(s) throughout New York City that store, handle, or use flammable, combustible compress gases.
- Conduct the Annual fire safety maintenance inspection on all approved fire suppressions systems installed in commercial kitchens in the City of New York.
- Conduct life safety inspections at street fairs and places of special events to ensure that
 entities comply with all city regulations in regards to the storage of flammable gases and
 liquid; storage of combustible mixtures/liquids located at street fairs or places of special
 events.

The Headquarters Inspection Group is divided into several units within the Bureau including Fire Suppression, Rangehood, Bulk Fuel Safety, High Rise, Public Buildings, License Public Place of Assembly, Construction Demolition and Abatement, Explosives, Fire Alarm Inspection, Fireworks Safety, Hazardous Cargo, Central Station Signal and Field Public Operations, respectively.

- Fire Suppression Unit This unit conducts inspections and check for code compliance of
 the installation and maintenance of Sprinkler and Standpipe systems and/or similar type fire
 suppression system. Additionally, since the fire on the Queens Borough Bridge, the Bureau of
 Fire Prevention, Fire Suppression Unit has inherited the task of testing bridges and tunnels in
 New York City. To test fire suppression systems in tunnels and bridges, it coordinates with
 the local fire units and the New York City Department of Transportation, New York City
 Transit Authority and AMTRAK.
- 2. Range-Hood Unit This Unit conducts inspections and check for code compliance of the installation of fire suppression systems installed on commercial cooking equipment(s).

- 3. <u>Bulk Fuel Safety Unit</u> This Unit conducts inspections and check for code compliance of the installation of underground storage tanks containing flammable and/or volatile inflammable oils. Conducts the annually Buckeye Pipeline Drills with FDNY Divisions and Fire Units, Conducts inspections of the following facilities that include but is not limited to: all Gas Stations even after there is a fire to determine the cause, Bulk Oil facilities, Key span, C.N.G. facilities, new construction and testing of new equipment.
- 4. <u>High Rise Unit</u> This Unit conduct life safety inspections on all office and hotel occupancies in New York City that are requirements of Local Law 5, Local Law 16, Local Law 58, Fire Code and Building Code regulations. Since the unfortunate casualties of 9-11, the High Rise Unit will be testing certified Fire Safety Directors to certify them as Emergency Action Plan Directors pursuant to new regulations that was enacted, including active shooter.. The High Rise Unit will also be responsible for enforcing several new life safety code requirements that was enacted as a result of 9-11 currently known as Local Law 26 and the new (E.A.P) Emergency Action Plans.
- 5. <u>Public Building Unit</u> This Unit conduct life safety inspections on building(s) classified as shelters for the homeless; closely monitors life safety inspections of schools conducted by the local field units and is a liaison to other City Agencies that may be in violation of any fire code violations.
- 6. <u>License Public Place of Assembly (LPPA)</u> This Unit conduct life safety inspections on any premises that congregate more than 75 persons in one space and check for compliance numerous Fire and Building Code regulations pertaining to that premise(s). Additionally this unit also inspects places at of public gathering consisting of supervising fire inspectors and fire lieutenants enforcing code deficiencies during night time.
- 7. **Explosive Unit** The Explosive Unit conducts life safety inspections and supervises any location(s) that use of explosive material. Also, this Unit supervises the display of special effects fireworks usually conducted inside of premises.
- 8. <u>Fireworks Safety Unit</u> This Unit consist of specially trained Inspectors that conduct site safety inspections at any location that requires a permit for fireworks display in the City of New York such as the famous Macy's Fireworks and Coney Island Fireworks.
- Field Public Operations Support Unit This Unit enforces premises that has been vacated and/or vacated and sealed by the Fire Department. This Unit is also a complaint Unit and acts as a liaison between the public and Department field units (Fire Divisions and Firehouses) and City Wide S.R.O task force.
- 10. Construction Demolition and Abatement Unit (CDA) This is a specialized unit initiated by the Mayors Office and the Department that conducts coordinated fire safety inspections on all buildings under construction or demolition stages in the City of New York including non-jurisdictional buildings.

Post 30-day inspections from the Fire Units, the CDA Unit is tasked with inspecting buildings 75' or more to ensure fire safety and building code requirements on premises that include, but is not limited to the following:

Ensure all egress and exits are in place and unobstructed.

- Premises have all required permits.
- Ensure proper maintenance of the Sprinkler and/or Standpipe system for firefighting operations.
- Special Projects such as: The LaGuardia Airport, World Trade Center, Jacob Javits Convention Center, The Barclay Center, United Nations, Madison Square Garden, and the Hudson Yards Development Projects.



FIRE PROTECTION INSPECTOR

FDNY Fire Protection Inspectors (FPIs) are tasked to inspect and witness testing of safety equipment in buildings for Firefighters, such as Standpipes systems, sprinkler systems etc. at various locations throughout NYC, including our bridges, tunnels, piers, roof top ladders, subways, construction sites, basements in commercial and residential high rise buildings. Fire Protection Inspectors make sure the systems used for Firefighting operations on premises are in working order, plus protecting the lives and property of City residents, employees and visitors.





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Subject Chief-Leader Study on EMT/EMS experience and impact on patients

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The goal of EMS is to transport patients to definitive care as soon and as safely as possible

The Quality of Emergency Medical Services

Editor's note: Although Emergency Medical Services (EMS) is a crucial part of the health care system, there is relatively little research on the quality of those services. EMS agencies often measure their performance using criteria such as response time or total prehospital time. But larger scale studies that cross counties and providers are rare. This Issue Brief summarizes two studies that use comprehensive, longitudinal data from one state to assess the demographic, geographic, and professional factors that affect EMS performance.

EMS networks respond to, stabilize, and transport patients experiencing acute medical symptoms or trauma. They play a pivotal role in saving lives and ensuring timely transport of patients in need of advanced medical care.

- EMS systems provide prehospital care for more than 18 million patients each year. The systems vary in their ownership, structure, and personnel, but their goal is the same: to get patients to definitive care as soon and as safely as possible. Transport services are provided by fire department agencies, private ambulance services, or hospital-based agencies.
- Response time (time from initial dispatch to arrival on the scene) and total prehospital time are recognized quality measures in EMS. For example, faster response times generally improve a patient's likelihood of surviving an out-of-hospital cardiac arrest. For trauma patients, the first hour of care (also known as the "golden hour" from incident to hospital treatment) is usually considered critical.
- Despite general agreement on these process measures of EMS quality, little is known about the factors that affect quality. Do
 more experienced or skilled personnel provide higher-quality care? Are county-level characteristics, such as population
 density, racial composition, or income, associated with performance? Are there racial disparities in the process or outcomes
 of EMS?

David and colleagues used longitudinal data from Mississippi to assess characteristics that affect the process and outcomes of EMS care. Mississippi has systematically collected data on EMS incidents through its information systems since 1991.

• The data include detailed information on each incident, including response time and total travel time; race, age, and sex of the patient;

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when and from where the emergency call was made, and the condition/diagnosis of the patient.	
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Studies investigate provision of EMS in one state over a decade

Study analyzes racial differences in EMS care

• The data also include information on the type of personnel who respond. Three levels of training exist: Emergency Medical Technicians (EMT)-Basic, EMT-Intermediate, and EMT-Paramedic. Having the most advanced skills, only paramedics can give shots, start and manage intravenous lines, and provide advanced life support.

David and Harrington analyzed the existence and scope of possible racial disparities in EMS care in Mississippi during 1995-2004. They focused on emergency calls for chest pain and cardiac arrest, for which rapid response time, advanced technology, and skilled paramedics are important dimensions of quality.

- The study included nearly 120,000 heart disease-related EMS episodes. These calls are always treated as emergencies and require a team with advanced life-support capabilities.
- The investigators looked at two important process measures of care: response time, and whether or not a paramedic was part
 of the response team. They also measured the percentage of ambulance "runs" with a response time of 8 minutes or less,
 which is a common benchmark among EMS providers.
- The investigators also analyzed one medical outcome measure: whether the patient was dead-on-arrival of responders to the scene (DOA). Because of missing data, this analysis was limited to the period 2001-2004. In that period, 2,015 patients were DOA.
- The study controlled for other factors that could affect EMS outcomes, including county-level indicators for population density, racial composition, and income.
 - Overall, paramedics responded to 90% of all incidents. The average response time was about nine minutes, with 62% of incidents falling within the eight-minute benchmark. After controlling for population density and other factors, the results revealed no differences between African American and white patients in response time or in the certification of responders.
- Initially, the investigators used a simple county-level measure of population density (population per square mile) and found that response times were faster for African Americans than whites. However, when they used a more refined measure that accounts for racial differences in density at the Census-tract level, the counter-intuitive, reverse disparity disappeared.
- Controlling for response time and other factors, African Americans were significantly more likely to be DOA at the scene
 than whites. Not surprisingly, longer response times increased the likelihood of a death on arrival. Population density was
 associated with a lower probability of death on arrival.
- The greatest racial disparity was in the age 80 and over male population, where African Americans were 4.5 percentage points more likely to be found DOA than whites.

While there is considerable evidence in the case of hospitals and surgeons that high volume is associated with better patient outcomes across a variety of medical conditions, no study has examined whether paramedic experience matters in a prehospital

setting. David and Brachet used the Mississippi data to study the effects of paramedic experience, tenure, and credentials on EMS performance.

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Another study assesses whether paramedic experience matters in the prehospital setting	

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Paramedic tenure and cumulative experience is associated with better EMS performance

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- To focus on EMS incidents where time to definitive care is most likely to be important, the investigators analyzed EMS incidents between 1991 and 2005 for which the initial call was related to trauma (defined as motor vehicle crashes, motorcycle crashes, pedestrian injuries, stabbings, assaults, gunshots, or falls). They excluded cases of death on arrival and limited the study to patients transported to hospitals by ground transportation.
- They assessed performance using two key markers of EMS trauma care: total out-of- hospital time and time spent at the scene.
- Detailed data on procedures performed on scene were available only for the 2001-2005 period. The analysis of the effects of
 paramedic experience on outcomes covered only those years, but the investigators used data for all years (1991-2005) to
 construct the history of paramedics' experiences.
- The study included about 175,000 incidents in the later period, involving 1,728 paramedics with a cumulative experience of about 613,000 trauma-related ambulance runs.
- The investigators controlled for other factors that could affect EMS performance, including type of trauma, geographic location, time of day, day of week, month and year, patient characteristics, procedures performed, number of victims, certification level of EMTs, type of agency that employs them and the municipality they operate in.
 - Overall, total out-of-hospital time averaged 36 minutes, with about 8 minutes of response time, nearly 15 minutes of onscene time and 13 minutes of transport time. Paramedics had an average of nearly 18 trauma runs in the previous three months, 409 lifetime trauma runs, and an average tenure of 6.5 years since completion of training.
- Controlling for other factors, the results indicate that greater individual experience (as measured by accumulated volume of trauma runs) is associated with reduced total out-of-hospital time and on-scene time. Twenty additional EMS runs per quarter are associated with a one minute reduction in total out-of-hospital time.
- Recent experience appears to be more strongly associated with performance than past experience. Furthermore, experience was more strongly associated with performance among paramedics with more than six years of service.
- To illustrate the value of personnel retention, the investigators translated their results into a hypothetical situation in which a paramedic with average experience is replaced by a new one. They estimate that this substitution would add four minutes of total out-of-hospital time, and two minutes of on-scene time, in the first three months after replacement. This difference is slowly reduced over time, as the new paramedic gains experience, and amounts to about one minute by 36 months.

These results have policy implications for EMS agencies, local governments that are charged with EMS delivery, and for researchers who investigate health disparities.

• Given the positive relationship between trauma experience and outcomes, policies designed to expose paramedics to greater volume

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should be considered. Of course, reducing the number of paramedics will result in more runs for each paramedic, but would likely result in longer waiting times and burnout. The more promising route

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POLICY IMPLICATIONS Continued

would be strategies to increase the career duration for paramedics, thereby concentrating volume in the hands of paramedics who have already accumulated experience.

The absence of racial disparities in the process of EMS care for cardiac patients is reassuring, especially in a state in the deep South with a history of segregation. The results highlight the importance of carefully considering and controlling for underlying factors that may drive race-related outcomes. Such consideration will contribute to

an understanding of health disparities and help avoid erroneous inferences as to their extent and causes.

The finding of a significantly higher rate of DOA at the scene for African Americans than whites needs further study. It could reflect differences in severity not captured in the data, less prevalent assistance to victims prior to EMS arrival, or a longer time between the onset of symptoms and the call for EMS.

This Issue Brief is based on the following articles: G. David and S.E. Harrington. Population density and racial differences in the performance of emergency medical services. Journal of Health Economics, July 2010, vol. 29, pp. 603-615; G. David and T. Brachet. Retention, learning by doing, and performance in emergency medical services. Health Services Research, June 2009, vol. 44, pp. 902-925.

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Issue Brief

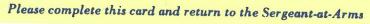
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