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THE CHALLENGE: New Orleans, like many local governments, has experienced a significant increase in Emergency Medical Services (EMS) calls from residents and visitors, which has challenged the City's ability to meet its target response times and provide approximately the same EMS response time service to all parts of the city.



January 5, 2018

THE APPROACH: The New Orleans <u>Mayor's Office of Performance and</u> <u>Accountability</u> used advanced analytics, open source software, and a partnership with Louisiana State University (LSU) students to integrate the City's administrative data with the operational expertise of <u>New Orleans</u> <u>EMS</u> staff to decrease overall EMS response times and provide equitable service to all neighborhoods.

THE RESULTS: This effort has led to the development of two simple-touse printable maps—one for daytime use and the other for nighttime use—indicating optimal EMS ambulance posting locations. Since EMS implementation of these new maps, New Orleans has experienced: 1) an overall decrease in EMS response times across the city during the night shift; 2) enhanced equity in EMS response times across neighborhoods; 3) a greater use of data by New Orleans EMS; and 4) the use of this data in other city agencies on other city projects.

INTRODUCTION

Since 2011, the New Orleans <u>Mayor's Office of</u> <u>Performance and Accountability</u> has led citywide efforts to use data analytics to help address important city issues such as blight remediation, fire prevention services, and health care access.

In 2015, the Mayor's Office of Performance and Accountability engaged in a new project with the City's Emergency Medical Services (EMS). Like many other local governments, New Orleans started experiencing an increase in EMS calls for service which, in turn, challenged its ability to meet its target response times and provide the same level of EMS response time service to all parts of the city. The increase in demand for Emergency Medical Services is not unique to New Orleans; it is a national trend. Experts continue to debate what is driving the national increase, but two of the more common theories suggest that the overall growth of the population and the longer lifespan of the citizenry are contributing factors.1

Adding to the complexity of providing equitable and timely ambulance services, the New Orleans EMS vehicles do not return to the same fire department or public safety location after returning from a call. Instead, their waiting location varies on a daily basis and can include public locations such as hospitals, fire stations, parking lots near major intersections, and other similar public facilities.

Without immediate new funds to help address the rising demand for EMS services, the City leveraged its strong analytics capacity to help deliver better results to New Orleans residents. This initiative was led by Oliver Wise, the Office's former Director and former Results for America Local Government Fellow, in partnership with five EMS and Office of Performance and Accountability staff members. Since 2010, equity and inclusion for all has remained a top priority for this administration because we understand that the only way for New Orleans to move forward is together. Through the hard work of our Office of Performance and Accountability, we are continuing to enhance the capacity and performance of City government and making sure we make decisions that are evidencebased and make sense for the people of New Orleans.

> — MITCH LANDRIEU Mayor of New Orleans



THE CHALLENGE

Performance metrics in New Orleans indicated that EMS ambulance response times had fallen from 80% of the most urgent calls being addressed in under 12 minutes in 2014 to 72% in 2016. During this same timeframe, the demand for services had increased by 12%.

In addition, data highlighted a geographic disparity. The response times in the outer reaches of the city, especially in the 4th district (Algiers) and 7th district (New Orleans East), were faring worse due to being located further from the urban core.

Meanwhile, addressing the increased demand for emergency services in a budget-constrained environment required staff to consider what, aside from increased staffing and overtime, could be done. Ultimately, the availability of relevant administrative data together with an EMS staff that was open to sharing their operational expertise allowed the Mayor's Office of Performance and Accountability to use data analytics to improve two key metrics: overall response times during the night shift and increased equity in response times across geographic locations.

THE APPROACH

To improve response times and decrease geographic disparity, the Office of Performance and Accountability team focused on two variables: how EMS ambulances were selected to address a 911 call and where they were stationed after responding to this call to wait for the next one.

Initial conversations between Louisiana State University Masters of Science and Analytics Program students and EMS staff in 2015 uncovered that the ambulance waiting locations were chosen largely based on the historical collective experience of EMS ambulance staff. The Office of Performance and Accountability is thrilled to have the support of Results for America. By using data and analytics, we are improving City services and making better decisions to ensure EMS is able to get to people in need in a timely, efficient manner.

 MELISSA SCHIGODA
 New Orleans Office of Performance and Accountability Director

The ambulance waiting locations included constraints such as not parking in front of residential homes, and instead parking in or near public places such as hospitals, fire stations, or other similar public facilities. There was also limited ambulance availability if several were on call at the same time. Finding the balance between optimal waiting locations and EMS ambulance availability could mean the difference between life and death for the city's residents.

With these constraints in mind, the Office of Performance and Accountability plotted every 911 call for the past five years using ESRI's ArcGIS²—a mapping and analytics platform and identified over 100 potential waiting locations that would create eight minute drive-time polygons for high- and low-traffic conditions. Using the open source programming language R³, they ran multiple simulations based on several locations, available ambulance constraints, and 10,000 randomly selected combinations of points to identify where they could cover the greatest number of calls most effectively.

THE APPROACH (CONTINUED)

The first few attempts at revised EMS ambulance placement location recommendations proved infeasible to implement. Some recommended locations were in completely residential or otherwise hard-to-access areas of the city. Also, initially the Office of Performance and Accountability had created separate lists of recommended locations, which differed based on how many ambulances were available at any given time. For example, the location suggestions under the scenario with four ambulances available were different from the scenario with five ambulances available: there was no location that appeared on both lists. Using that system of lists would require a constant reshuffling of ambulances, something that was both impractical and undesirable from the perspective of the paramedics. It was only after repeated follow-up conversations and site visits with emergency medical technicians (EMTs) and paramedics that the Office of Performance and Accountability gained enough insight to develop better solutions.

TIPS FOR REPLICATION

• **Practitioner Knowledge is Essential:** The people who are doing the work can provide key insights into how services happen and



what proposed changes are feasible. In this case, EMS staff's openness to work with the Office of Performance and Accountability allowed the team to develop a data-driven solution that could be easily implemented across all EMS staff, such as recommending placement locations that were in or near public facilities rather than in front of a private residence or more inaccessible locations.

- Be Agile and Continue to Iterate: Test your solutions with operations staff and be prepared to review, revise, and repeat multiple times before finding a solution. The first few attempts at EMS ambulance location recommendations did not maximize effectiveness and did not suit the nature of operations. At first, the Office of Performance and Accountability developed a single map of optimal locations with different versions based on the number of vehicles on call. Upon further review and testing with EMS staff, two separate mapsone for day and another for night-were created, each with three primary locations, to respond to the differences in traffic patterns, EMS staffing, and public request demands during different times of day.
- Equity and Efficiency Need Not Be a Zero-Sum Game: There is a commonly accepted tension between efficiency and equity. This project is an example of how data and evidence can be used to enhance both simultaneously.
- Build the Project Foundation: One project can lead to another. By building the foundation for evaluation, New Orleans identified new opportunities for evaluation of efficiency and impact of other projects. For example, the data from this project allowed the City to identify the best locations for cooling stations for residents most in need during summer heat spikes, often children and the elderly.

These maps are the final product of the **EMS ambulance location collaboration** between the Office of Performance and Accountability and EMS. They indicate, in priority order, the optimal locations for EMS vehicles to post



between calls, taking into account the different daytime and nighttime traffic and demand. EMTs and paramedics are now instructed to park at the locations listed, in priority order, in between responding to EMS calls



SOURCE: NEW ORLEANS OFFICE OF PERFORMANCE AND ACCOUNTABILITY, JULY 2017

THE RESULTS

These efforts resulted in the development of two simple to use, printable maps indicating optimal placement locations for EMS ambulances while waiting for their next call: one for the day shift and another for the night shift. These maps are scalable based on the number of EMS ambulance teams operating during any given shift. This model can also be updated for the future needs of city demographic changes.

One of the key components of the maps that the Office of Performance and Accountability ultimately produced was the idea of a "primary" location. Spots one, two, and three on the maps are called "primary" locations for two reasons: 1) most (more than 85%) of the city's historical calls are within 10 minutes of these primary locations, and 2) if one of those spots becomes vacant it should be replaced by a vehicle in a non-primary location (those labeled four and above on the maps), if there is one available. This approach keeps the most central locations staffed with minimal reshuffling, considering that the only time in which an ambulance would move to another posting location is when there are four or more ambulances posted.

The largest impact of the new EMS ambulance placement locations was the enhanced equity achieved: Algiers (4th district) and New Orleans East (7th district), which were the historically poorest served districts, benefited the most under the new placement location maps. Fourth district response time compliance improved 20% and the seventh district response time compliance improved 9% under the new ambulance placement protocol.⁴

Analysis of the initiative also showed modest, but statistically significant improvement in overall response time compliance during the night shift. During the day shift, when there is higher demand and higher levels of traffic, response time compliance remain unchanged. Importantly, the new placement location maps demonstrated that the City could enhance equity in service across locations without sacrificing efficiency during the busy daytime shift.



THE RESULTS (CONTINUED)

Due to the success of this initiative, using data in operations has become a greater aspect of the New Orleans EMS culture. For example, the Office of Performance and Accountability team is currently creating a dashboard of metrics such as unit hour utilization, which is the proportion of time EMS ambulances are on a call or otherwise unavailable, to identify areas for improved efficiency and effectiveness. The success of this project has also impacted new projects. The EMS data from this work allowed the Office of Performance and Accountability to work with the Health Department to identify the best locations for cooling stations for residents most in need during summer heat spikes, often children and the elderly. This initiative is important for resilience in facing a warmer and more volatile climate. Through the integration of data and EMS staff expertise, New Orleans delivers more timely and equitable life-saving services to city residents.



RESULTS OF NEW EMS PLACEMENT LOCATIONS FOR ALGIERS AND NEW ORLEANS EAST DISTRICTS

SOURCE: NEW ORLEANS OFFICE OF PERFORMANCE AND ACCOUNTABILITY, JULY 2017

ABOUT RESULTS FOR AMERICA'S LOCAL GOVERNMENT FELLOWSHIP PROGRAM

Results for America's Local Government Fellows program was founded in September 2014 to provide an advanced group of local government leaders in diverse and influential cities and counties across the country the knowledge and support to implement strategies that consistently use data and evidence to drive policy and budget decisions on major policy challenges.

With the support and guidance of Results for America, the Local Government Fellows lead their governments toward advanced stages of data-driven and evidence-based policymaking in order to address major policy challenges in their communities. The **16 cities** and counties represented in the Fellowship collectively represent more than **28 million** people and **\$148 billion** in local government spending.

RFA engages its Local Government Fellows in:

- Defining short- and long-term policy goals;
- Developing research partnerships with academics;
- Sharing best practices and demonstration projects;
- Problem solving among peers;
- Receiving individual feedback and coaching; and
- Participating in a national network and peer cohort.

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- Melissa Schigoda, Director of the Office of Performance and Accountability
- Oliver Wise, Former Director of the Office of Performance and Accountability

ADDITIONAL RESOURCES

- Visit the New Orleans Office of Performance and Analytics <u>NOLAlytics</u> site to explore city metrics through graphs and visuals
- Read more about the national trend of increasing 911 medical calls in, "<u>No one quite</u> <u>sure why 911 medical calls are surging</u>", by Matt Rocheleau in the Boston Globe (2015)
- Explore the <u>R Code</u> used for analysis in New Orleans analytics projects.
- Learn more about Results for America's
 Local Government Fellowship at
 http://results4america.org

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PHOTOS

Cover Photo: Sami Centikaya—Creative Commons Page 2: City of New Orleans. Page 4: Photo by Scott Webb on Unsplash. Page 6: City of New Orleans.

ABOUT THE INVEST IN WHAT WORKS POLICY SERIES

This report is part of Results for America's Invest in What Works Policy Series, which provides ideas and supporting research to policymakers to drive public funds toward evidence-based, results-driven solutions. Results for America is committed to improving outcomes for young people, their families, and communities by shifting public resources toward programs and practices that use evidence and data to improve quality and get better results.



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