

5-7-2013

# Best Practices and Barriers of Government Performance Measures: A Fire/EMS Case Study of the City of Bloomington Fire Department

Nancy Ouedraogo  
*Illinois State University*

Follow this and additional works at: <http://ir.library.illinoisstate.edu/cppg>

 Part of the [Political Science Commons](#)

---

## Recommended Citation

Ouedraogo, Nancy, "Best Practices and Barriers of Government Performance Measures: A Fire/EMS Case Study of the City of Bloomington Fire Department" (2013). *Capstone Projects – Politics and Government*. Paper 10.  
<http://ir.library.illinoisstate.edu/cppg/10>

This Article is brought to you for free and open access by the Politics and Government at ISU ReD: Research and eData. It has been accepted for inclusion in Capstone Projects – Politics and Government by an authorized administrator of ISU ReD: Research and eData. For more information, please contact [ISURed@ilstu.edu](mailto:ISURed@ilstu.edu).



**Best Practices and Barriers of Government Performance Measures:**  
**A Fire/EMS Case Study of the City of Bloomington Fire Department**

**By: Nancy Esarey Ouedraogo**

This material is based upon work supported by the United States AmeriCorps, Illinois State University Stevenson Center for Community and Economic Development, Illinois State University Department of Politics and Government, and the City of Bloomington, IL. However, any opinions, findings, conclusions or recommendations expressed in this material are those of the author and do not reflect the views of the AmeriCorps, Illinois State University, or the City of Bloomington.

## Table of Contents

<b>Acknowledgements</b> .....	<b>3</b>
<b>Abstract</b> .....	<b>4</b>
<b>Introduction</b> .....	<b>5</b>
Description of Professional Practice .....	5
Research Purpose .....	7
Overview .....	8
<b>Literature Review</b> .....	<b>9</b>
American Public Administration and Organizational Theory.....	11
Public Management for Higher Performance.....	24
Fire/EMS Industry .....	36
Case Study.....	52
Summary .....	60
Delimitations .....	62
<b>Methods</b> .....	<b>63</b>
Tailoring a Performance Measurement System to the Case Organization.....	64
Data Analysis for Fire/EMS Benchmarking .....	66
Reporting Performance .....	72
<b>Findings</b> .....	<b>73</b>
Barriers to Performance Measurement Implementation .....	75
Best Practices .....	77
<b>Discussion</b> .....	<b>80</b>
Wilson and White’s Politics-Administration Dichotomy .....	80
Institutional Bottlenecks.....	82
Problem Review .....	87
<b>Recommendations</b> .....	<b>88</b>
<b>Conclusion</b> .....	<b>92</b>
<b>Bibliography</b> .....	<b>95</b>
<b>Appendix A: Glossary</b> .....	<b>99</b>
<b>Appendix B: Performance Measure Matrix</b> .....	<b>102</b>
<b>Appendix C: BFD Performance Measure Matrix</b> .....	<b>107</b>
<b>Appendix D: BFD Performance Measuring Procedures</b> .....	<b>108</b>
<b>Appendix E: Action Plan</b> .....	<b>118</b>

## Acknowledgements

*I dedicate this Capstone to:*

*My mother, Sharron K. Santure, for her love, support, discipline, insight, and all her sacrifices;*

*My husband, Bourema Ouedraogo, for being a very responsible, loving husband and father, and for his wisdom, encouragement, and humor.*

---

I am pleased to make the following acknowledgements to:

Joan (Esarey) Cox: For her friendship, her considerable support, and encouragement.

Duane Esarey, my sisters, and all of my grandparents: For their love and encouragement.

ISU Dept. of Politics and Government, Dr. Ali Riaz, and Dr. Nancy S. Lind: for their support in scholarship, as well as their consideration. A special thanks to Dr. Nancy S. Lind, for her guidance as an advisor and as an instructor, for her clear communication, her dedication to educating me and others, and for her encouragement.

ISU Stevenson Center of Community and Economic Development, Director Frank D. Beck, Asst. Directors Beverly A. Beyer and Rebecca M. Rossi, Dr. Bob Hunt, and Martha Boudeman: For supporting an excellent program, and for being all around warm and positive people.

City of Bloomington and the Bloomington Fire Department: For creating the opportunity for a practicum in public service and performance measurement, and for my professional development in a department full of hard-working, expressive, and good-hearted individuals.

Kerri Calvert: For her mentorship as an RPCV-HCN-wife, mother, and professional.

Dr. Osaore Aideyan: For holding me to high expectations, causing me to further develop my ideas and knowledge on institutional change.

To all those who collaborated with me in prior and current research/practicum: Thank you for your collaboration, your ideas and/or tools, and your encouragement and camaraderie.

To all family and friends: Thank you for your support.

To the Women of Burkina Faso and Mali: You have helped me run the course of graduate school and motherhood bravely and happily, in working by your example and for the hope of impacting the lives of our children.

## **Abstract**

*This study focuses on performance measurement implementation with the Bloomington Fire Department, who hosted the researcher during an 11-month internship as graduate practicum with the Illinois State University Department of Politics and Government and with the Stevenson Center for Community and Economic Development. With the internship goal of identifying performance indicators and their industry benchmarks and establishing a process for performance measurement of those indicators, this research addresses the perceivable barriers and best practices of performance measurement implementation in a local government agency on the part of the analyst, the agency, and the municipality, specifically in regards to the Fire/EMS sector. This study is relevant to the discipline of public management (the study of efficiency and effectiveness in public administration) and organizational theory. Through the examination of informational and organizational barriers within the theoretical framework of bureaucratic and post-bureaucratic paradigms, best practices and recommendations for performance reporting are formulated.*

## **Introduction**

As a Peace Corps Fellow in Politics and Government (in the Applied Community Development sequence), my second academic year of graduate work consisted of professional practice and research. The aim of the research was to explore best practices and barriers of performance measurement in local government, as well as in the Fire/EMS industry. The purpose of the research was inclusive to the assignment for the 11-month internship, which was to accomplish the goal of expanding and operationalizing performance measures for the host organization – the Fire Department of the City of Bloomington.

### *Description of Professional Practice*

The internship involved research into a number of sources regarding national fire standards, accreditation standards, fire service history, and standards on performance measures in municipal government. The understanding of the department's monthly reporting to the City Manager, as well as an examination of a Fire/EMS database where monthly performance indicators were derived were included in the research process. Here, procedures and tools were developed to organize the available data into a performance measure matrix to gauge annual, quarterly, and monthly performance in regards to specific benchmarks. Developing the matrix helped establish the benchmark, the standard from which it is derived, how it is operationalized, and what the organization's current performance is in regards to the benchmark. It also is essential for understanding the dynamics of the present performance reporting.

The research used to establish the matrix on the performance measures is important for formulating an approach to quantitative performance reporting and data management, as well as to identify best practices in treatment and analysis of Fire/EMS data, the operationalization of

performance measures, and the communication style of performance ratings to the organization. The implication that performance reporting leads to data-driven decisions in local government is enough of a motivator for using not only industry standards, but also academic and professional sources regarding performance reporting in municipal government and public management. In potentially impacting public policies and budgets, it is essential to keep in mind not only *who* the performance data represent, but also *to whom* the performance data are delivered. This is necessary, in large part, to help define what performance measures entail, how performance measures will be used, and how they should safely be reported. The justification for this research is to contribute to robust, responsible procedures in regards to implementation and reporting of performance measures for Bloomington's Fire/EMS services. The products that stem from the research and internship will help support what fire chiefs and officers already know intuitively, to some degree, from their field experiences, thus giving them the quantitative support to justify operational changes and other requests or explanations to the City.

Meetings with fire/EMS personnel on incident reporting, incident management systems (database), and performance reporting all took place to gain insight and information to advance this project. The open collaboration and availability of fire department staff was a key factor for substantial qualitative progress. This facilitated the compilation of organizational benchmarks and the formulation of an action plan to refine data sets, troubleshoot barriers, and establish quantitative procedures for monthly reporting (aka. a fixed methodology for extracting, cleaning, developing, and running data to produce the descriptive statistics necessary for gaining monthly performance insight).

While the first two months (September-October 2012) consisted of learning about the industry as well as the specific organization, the second two months (November-December)

consisted of exploring barriers to effective data analysis, assessment of the capability of available tools, and testing analytical models to understand the potentials of the data. Formulas were employed and lookups were produced to either create new variables to facilitate data analysis, or compensate for issues in the data that needed correction. A survey was also developed to start measuring effectiveness operationalized by citizen satisfaction. At the beginning of 2013, presentation techniques, issues on interpretation, and troubleshooting ways to communicate Fire/EMS data to stakeholders were the main endeavors to advance the overall goal of performance reporting and data-driven operations.

During the internship, there was an ongoing discussion with colleagues on processes needed for a change of performance measures (i.e., reporting the 90<sup>th</sup> percentile of emergency response times in place of average response time), as well as explaining what variables most affect response time and making a benchmark for these relationships in regards to the overall emergency response time objective. This was useful in the preparation of methods and data sets for analyses of response times, unit utilization, and current coverage issues for Fire/EMS in the City.

### *Research Purpose*

The goal of the professional practice has been to identify benchmarks and set forth a process for performance measuring for the Bloomington Fire Department. The research is aimed at learning the best practices of performance measurement as well as identifying the barriers to performance measurement in local government, specifically in the Fire/EMS industry. In regards to barriers, understanding the *informational, data-related* barriers of performance measuring was just one aspect of the process of attaining the overall internship goal. Addressing problems in



the numbers was a matter of time, patience, and diligence, but overcoming other barriers related to bureaucratic characteristics and organizational culture proved much more abstract and complicated. From an intern position, there is not much opportunity for implementation along the lines of institutional change. However, the explanation of how certain types of problems can be solved from a managerial position is recommended. The research thus explains the processes of how barriers *can* be resolved. For example, real methodological tools are presented within this study to possibly aid any analyst who ventures to properly measure and report performance in the Fire/EMS industry. The best practices for data analysis in Fire/EMS are reviewed as well. Aside from methodological solutions, theory-laden premises and case-specific observations will direct recommendations of how organizational leaders can facilitate performance reporting for their respective departments, specifically fire suppression, rescue, and emergency medical service agencies.

### *Overview*

A literature review section will first cover a definition of terms and ideas within public administration literature, organizational theory, specific GPM (government performance management) literature, and fire/EMS industry sources. To, then, give a layout of the background of the case study, the review will also cover the history and characteristics of the Bloomington Fire Department and the City of Bloomington, the standards and ongoing challenges of emergency services and the standards and ongoing challenges of city managers and municipalities. Finally, a review of these organizational, management, and industry-specific concepts will be laid out as a theoretical framework for later analysis of barriers and best practices in performance measurement implementation in local government. After this literature review, a methodological section will cover the processes followed in the identification of

organizational benchmarks, the formulation of specific indicators to measure the larger benchmarks, the actual measurement techniques used to report performance, and the identification and examination of barriers to performance measures. The methods section will examine how to measure performance and how to report it in accordance with industry standards. A findings section will identify the barriers and best practices of performance measure implementation within the theoretical framework established in the literature review. A discussion section will examine and analyze observations that led to the findings and further describe problems manifested as barriers and effective best practices. Lastly, a recommendation section will attempt to determine possible solutions and settle on an action plan against any barriers of performance reporting while addressing different members of the case organization.

### **Literature Review**

Performance measures are quantitative evaluations of an organization's activities in comparison with established benchmarks. Often called performance metrics, they are key components to government performance management (GPM) in that they represent the analysis and reporting portions needed to evaluate current planning and budgeting (Brown 2006). In looking at performance management in municipal government, the objective is to see what potential exists for adoption and continued use of performance measurement in a public agency, and integrating those benchmarks into citywide assessments and budgetary planning.

Local government administration today needs performance measurement as a form of accountability. However, the process of establishing standards, measuring an organization's performance against these standards, and communicating the status of performance to the public has many barriers. The actual process of measurement is complex within itself. Problems

encountered during performance measurement illustrate already existing issues with the organization, whether informational/technological, behavioral, structural/systemic, or environmental. In looking at the discipline of public administration and the specific case industry, and unique issues regarding the barriers, one can additionally understand why and how we need performance measurement in local government, but also the gains and consequences resulting from measurement from an employee-standpoint, an organizational standpoint, a managerial standpoint, a legal standpoint, and a taxpayer standpoint.

Performance measurement entails the introduction and use of a new tool or idea. It is a type of innovation that facilitates quality assurance of organizational products and information, as well as operational improvement and accountability.

This study focuses on the barriers and best practices of performance measurement with the belief that in the absence of performance measurement, public agencies cannot reach their maximum potential and their most efficient means of delivering goods and services. Given this, one should reference the discipline of public administration, apply organizational theory, and understand the challenges of public management and the case industry of the fire service. A glossary of terms is available in Appendix A for each domain's frequently used terms. In laying this base information from these domains, one can begin to understand the conditions needed for performance measurement and improvement to occur in local government, at the city-level and agency-level. This literature review will discuss American public administration, organizational theory, public management, and the Fire/EMS industry to establish a testing ground for the presence of barriers to and possibilities of best practices for Fire/EMS performance measurement.

## *American Public Administration and Organizational Theory*

American government started out centralized, with a limited number of bureaus. In the late 1800s, constitution building was a main focus in governance, and public administration was rarely spoken of (Wilson 1887). Therefore, government was self-centered, with a concise legal framework, organized hierarchically, and fixed on elitist deliberation and the making of rules. We can regard this as the *bureaucratic era*. During this era, fire services were taken out of the domain of buildings and insurance companies and established under government (circa 1860).

In the beginning of the fire service, all fire personnel were volunteers. However, when the decision to pay department heads and engineers occurred, the regulation of wages sparked bottom-up participation in government affairs. It was exemplary of a larger ‘spread of democracy’ that came with higher amounts of political participation, wherein more and more demands correlated with more implementation of policy. As the number of agencies increased (due to the increasing demands on government), there were changes in administrative approaches to public service.

With an increasing complexity of issues came an increased need for *efficiency* in public administration. Luther Gulick’s POSDCORB Orthodoxy was instructional for non-elected officials in running government agencies. It included the key components of planning, organizing, staffing, developing/directing, coordinating, reporting, and budgeting (Gulick 1937). This orthodoxy oriented public administration towards efficiency (within the historical context of the Great Depression and World War II). With the problems of inefficient governance, bureaucracy had become suspect as the likely barrier.

Within a closed-systems approach (looking at the internalities of the bureau), administrators and academics started to wonder what should change to make public agencies even more efficient. Max Weber had already established that hierarchy was the best vehicle for succinct assignments within public agencies (1946). This hierarchy, along with a legal-rational form of authority, was said to be a formula for success of the organization. A system of clear rules, a merit-based selection of workers, and an expertise-based selection of leaders were all likely to produce optimal results. It was with this emphasis on elites that Woodrow Wilson also favored a strong central government. This was the framework in which our bureaucracies were established. Hierarchy, authority, rationality, efficiency, and specialization were intertwined concepts that built the bureaucratic approach to public administration (Weber 1946, Wilson 1887).

The growing demands on government presented a new problem in the field of public administration. The private needs of citizens created a demand for more responsibility and accountability within government. The question of how to keep the science of public administration focused on service delivery rather than on the developing political climates of popular democracy became not only a more pressing issue at the time, but also one that continues to presently riddle officials today.

The evolution of the American government, of its constitution, and of its democracy affected the science of public administration. Where the government needed to properly continue public service at the least possible cost, popular control was overtaking a previously and solely constitutionally-driven administrative state. The overall questions of how separated or combined politics and government were supposed to be were best addressed by two main experts – Woodrow Wilson in his contributions in the 1887 article “The Study of

Administration” and Leonard D. White in his 1955 textbook chapter “Introduction to the Study of Public Administration.”

Wilson ascertained that public administration was now doing more than public service, they were testing policies within their bureaus, and needing skills not only in the specialization of the services they were rendering, but also in interpreting and delegating policy. They were to report to the central government on how the policies were affecting operations and customers, so that policy could continue to evolve. Departmental policy was also to be established by department heads, who in learning the science of their administrative side of service providing, understood that increasing establishment of rules would help guide the organization to keep efficiently providing services in an increasingly complex environment. For this reason, Wilson prescribed an educated, informed public opinion to operate local governments and departments (1887).

Fifty years later, White replied to this in saying that the idea did not account for personnel’s tendency of having a lack of initiative, confidence, coordination, fiscal authority, and leadership to carry out administrative policy (during this time, he was speaking of local and state levels of government). He states that to do what Wilson describes, civil service needed tenure, training, and state allegiance (suggesting that civil servants buy into the policies of the state, which reflect public will). With the cost of governance increasing, along with taxes, the continued need for efficiency to maintain production of public services increased – all while profit remained steady. Thus, since resources were not infinite, good governance stagnated (White 1955).

While both Wilson and White agreed that politics affected governance, White thought that the effect of this relationship yielded unfavorable results for the cost of governance. Likewise to what White observed, the increase in agencies in response to increasing public demands spurred a discrepancy between these demands and the supply (being the approach to public management). These discrepancies manifested themselves, not only in temporal lagging, but also as waves or eras of criticisms that helped to develop new public administrative approaches. During the first era, there was a lack of effectiveness and a prevalence of impersonality in our bureaucratic approaches. Luther Gulick's 1937 POSDCORB geared public administration towards accomplishing tasks more efficiently, and output was to be maximized at the lowest cost to yield higher production. This quickly became an obvious tradeoff to good quality public service.

This downside in regards to effectiveness, combined with the prevalence of impersonality, served to shift public administration away from the assembly-line-like uniformity of working conditions (the classification of a person by their position rather than their traits and needs) to the idea of human relations. The human relations element would be identified (through the Hawthorne experiments) as concurrent with productivity. The feeling of being understood appeared conducive to higher employee satisfaction and higher organizational productivity (Mayo 1945). Thus, the shift towards giving more attention to quality was made, and effectiveness caught up with efficiency. A consideration of customer satisfaction was conceived. Customer relations would be incorporated more and more as citizens participated democratically, voicing entitlement to quality public services.

These environmental factors of employee conditions and citizen demands can be taken into account as coming into direct conflict with hierarchical order (bureaucracy). To attain

quality, context-appropriate decision-making, and discretion needed to be granted to lower levels of civil servants to handle increasing demands. Otherwise, a long line of approvals and authorizations would slow the government machine down and create dissatisfaction. This shift resulted in the actual disciplinary formation of public management, where the central value(s), once having been efficiency, were now efficiency *and* effectiveness. This didn't just change the approach structurally, but ethically. In the days where efficiency was central to administrative success, no one but the head of the organization could be held accountable to the public, for he was the one commanding the operation, and through authority, his operations were to attain certain production outcomes. Accountability was the ability to deliver economic efficiency during trying times. However, as efficiency soon led to ineffectiveness – where both employees and customers alike were, at times, having poor experiences with government – accountability was again drawn into question. Officials could no longer hide behind policy. Administrative ethics served to decrease the distance between the actor and his actions, with the preoccupation of holding public officials accountable for their actions, albeit regulation. Within the new ethical guidelines, more discretion started to trickle down the hierarchy. Thus, the conventional theory and practice of obedience towards superiors was called into question under the validation of discretion. Authority, decision-making, and accountability trickled down. Superiors were no longer punished for lower-level civil servants' actions – policy enabled them to pass down discretion, as well as accountability. This was, in effect, a win-win situation. Lower level civil servants were allowed to do their job without constant waiting for approval, and supervisors could focus on management and larger performance outcomes instead of the daily details of public service.



By this time, public management was well into the second generation of public administration, Social Science Heterodoxy (Stillman 2006), which focused on state building and public opinion. As it was a prosperous time (1947-1967), the government accommodated increasing political participation, fostering consensus and institutional effectiveness. This was the period that saw the creation of many new departments (Defense, Health and Human Services, Transportation, Housing) and agencies (CIA, National Science Foundation, U.S. Commission on Civil Rights, Equal Employment Opportunity Commission, etc.). By this time, the bureaucracy of the federal government had considerably opened up in terms of public opinion. Here, the political approach emerged with the recognition of the public's role in electing representatives who then appoint officials that head respective departments (Rosenbloom 1983). These new departments and agencies gained more discretion in their initial establishment, as dealing with the public was crucial to most all of their respective missions. The overall centralized hierarchy is forced to flatten out to localities. This was when the local fire services started seeing some autonomy, despite retaining deep structural roots in the bureaucratic era.

This political decentralization affected accountability for employees, stakeholders, clients, and the larger community environment. In this regard, organizational knowledge of the outside environment was suddenly useful in determining how much and what kind of product or services could be rendered (Gaus 1947). Furthermore, cooperation and the general need for local connections during day-to-day logistics of the operation of these entities inevitably opened up the organization to receive further public demands (Gaus 1947). The establishment of these organizations, during an era that had already shifted away from the bureaucratic paradigm, opened public administration up to a changing environment. In the 1970s, Americans saw the creation of new Departments of Energy, Education, Veterans Affairs, as well as consumer safety,

environmental protection, election commission, nuclear regulation, and personnel management agencies. This third era, the Reassertion of Democratic Idealism (approximately 1968-1988) was characterized by bureaucratic fear (mainly due to Vietnam and Watergate), which led public choice theorists to want a decentralization of traditional government authority (Stillman 2006). The question of accountability came back into play to help shift the paradigm of public administration once more, this time (due to corruption), with *legitimacy* valued as the main concern. Here we see ethical and legal issues take stronger hold during a rapid growth of public administration, technological changes, and as increasing external forces come into play. While more discretion was given to individual public administrators on their interpretation of policy, the focus on legal and ethical issues caused an even greater increase of popular control of government.

Since highly complex technological, global, and economic forces of the post-Cold War era call scholars of public administration to study problems differently, the focus was shifted to more horizontal modes of operation. The discipline of public administration, as well as the prescriptions for organizational approaches to management, expanded theoretically in time with decentralization, democratic expansion, political participation, and globalization. From the 1990s to present day, public administration scholars are calling this the Re-founding Movement (Stillman 2006). Officials know that solutions will most likely not be a repeat of what may have worked in the past. Administrators and officials must honor the objectives of efficiency, effectiveness, legitimacy, and accountability simultaneously while dealing with day-to-day complex issues.

The link between accountability transformations within the evolution of public administration and performance measurement is very clear. Performance metrics are used to

report how input (resources) affects output. The input is always approved by elected officials that promise the public certain outcomes, the performance reporting enables these officials to gauge how well they're keeping their promise. With performance measurement fueling accountability, government is able to see tax dollars are being used efficiently and effectively.

It is useful to see where the case agency and its potential for performance management sit from an administrative evolutionary perspective (where the characteristics of the agency exist among bureaucratic and post bureaucratic paradigms). Likewise, the need to measure performance in local government is also relevant to organizational theory, because departmental production is now, as an accountability rule, being standardized, scrutinized, and quantified. The ability of the organization to self-assess through performance measurement and implement improvement activities rests on the capacities of the individuals, the structure of the organization itself from a human relations standpoint, and managerial characteristics therein.

Organizational theory is the study of organizations by examining common themes that maximize performance. The theorists cited below attempt to see what structural, individual, and managerial characteristics align with successful and high performing organizations.

Abraham Maslow, a psychologist, developed a theory of motivation based upon human needs. He first established that 1) human needs are never completely satisfied, 2) that human behavior is purposeful and is motivated by need for satisfaction, and 3) these needs can be classified according to a hierarchical structure of importance (1943). Each need had potential to lead to the attainment of the next:

Physiological needs → Safety needs → Belongingness → Esteem needs/self-confidence → Self-actualization/Reaching your full potential

Maslow explained that this prioritizing would, on the part of the manager; help to spur motivation in the organization leading to higher production. This led Douglas McGregor to lay out Theory X and Theory Y assumptions, where both bureaucracy (Theory X) and a more flattened (Theory Y) type of organization could address employee motivation. Within Theory X, it is assumed that the workers must be forced to comply, follow rules, and need supervision. Workers are expected to do a minimum on their own, and so they continue to do the minimum. McGregor assumes that this assumption must change to increase productivity. He noticed that during this time period, people were actually very physically active (sports leagues and other outside leisurely activities, where everyone has a turn or everyone goes to bat), and wanted to bring the participatory aspect into the workplace. If employees take more leadership roles in the organization, the more likely they'll take responsibility for the organization and direct activities towards production. This idea falls in line with the demand for accountability at lower levels of government. Ownership of performance outcomes would help improve the outcomes themselves. Here, leaders of the organization believe in employees' high level of ability, and the worker will push their own bar up in response to this voice of confidence (1957).

Frederick Herzberg believed that this was still insufficient for motivation. With a focus on job satisfaction, he emphasized that only when someone is satisfied, will they start to be motivated and benefit the organization. He explains that if a good personal situation, salary, and proper working conditions are not present, the employee is dissatisfied. However, if an employee does not experience achievement, recognition, responsibility, advancement in the organization, and personal growth (expanding one's horizon), while they are not dissatisfied, they aren't satisfied either (Herzberg 1959). Thus Theory Y, in the belief that under the right working conditions, people will work well, is still missing some key elements.

In 1981, William Ouchi wrote about Theory Z. Within this theory, the manager believes that workers seek opportunities to participate in management and are motivated by teamwork and responsibility sharing. While Theory X was authoritarian, and Theory Y was paternalistic, Theory Z was truly participative. With the belief that workers can take their own initiatives, leadership enabled employees to feel more self-sufficient and accomplished, and identify with the goals of the group. Here, natural leaders emerged within the organization and were able to champion certain purposes or visions, convincing their groups to develop and pursue a common goal (Ouchi 1981). It is around this point in time where hierarchy has waned and mission-oriented organizations start to wax.

Today, organizational/motivational theory on productivity, the increasing number of departments and agencies, and further decentralization all start working against a government hierarchical structure. Due to an increasingly complex society with urban migration and suburban sprawl, the need for public services experienced shifts in demand, locality and quantity. Physical and social technologies, ideas, catastrophes, and personalities also play into administrative outcomes. Given these factors, a post-bureaucratic approach, with its less hierarchical and more integrative work ethic, seems to better advocate increasing communication and collaboration on the inside (employees) with the outside (customers) of the organization. The need for democratic legitimacy in government now demands the assurance that the public will be supported in their common interests, and that elected officials will do what they are elected to do. Performance measuring and monthly reporting of the measures alongside benchmarks are meant to provide proof of that effort.

However, due to the fixed term offices, shifting party controls, and limited resources, along with cutbacks and opportunistic federalism leading intergovernmental actors to *compete*

for “their immediate interests with little regard for the institutional or collective consequences,” – responsibility and accountability are again, undermined (Conlan 2006). A combination of innovative thinking and a re-visitation of basic principles of public administration are in demand by contemporary public management.

In the 1990s, Peter Senge recommended that government agencies establish a *learning organization*. Here, the organization starts by setting conditions where people progress through Maslow’s hierarchy of needs and continue to strive for self-actualization, maximizing their abilities. Each individual must decide what to accomplish and what still needs to be gained (1990). Where public management aims for efficiency and effectiveness, Senge insists this is not true-to-life in that it cannot easily be incorporated into individual-level interests. This is simply because dictated visions are naturally counterproductive. Instead, the leader needs the input of the individuals in the organization to transform the once imposed vision into a shared one, fostering buy in, learning, and excellence rather than compliance as forefront. This should solve the dissatisfaction problem for employees who enter the organization hoping to make a difference. This overall attention to realistic visions makes government employees feel connected and encourages them to work collectively with one another. If employees are progressing, then the organization naturally progresses (1990).

It is important to note that within this approach of the learning organization, the overall goals of the government do not change, but the means to these ends are rearranged to attain higher commitments. The government still decides *what* is given to the public. The input on the part of employees on *how* to better serve the public gives the employees more responsibility and more recognition (Senge 1990).

According to Michael Barzelay, professor of public management and member of The Public Strategies Group, the post-bureaucratic paradigm asserts two main themes: 1) coming up with a way to get work done through something other than a top-down process, and 2) making the organization more mission-oriented and less authoritative. Without looking at the organization itself and the needs therein, the focus is on customer needs and employee input to improve the organization. The employees, using tools for customer evaluation and performance measurement and with their shared mission, engage in decision-making, setting goals for the short and long term, and identifying ways to reach these goals (1992). In other words, in the current democratic government where elected officials make public service decisions, a shift from public opinion to expert opinion is needed to find out from employees (often, the *experts*) what improvement in their service domain is needed. With this, a horizontal, post-bureaucratic framework fosters clear communication instead of messages that are transformed when traveling up and down a hierarchy. Employees are not only empowered, but also more responsible for organizational outcomes through this natural decentralization, and therefore bear a share of the accountability in public management. Additionally outcomes-based assessments replace cost-based assessments, to see if the public is really benefiting from the service (Barzelay 1992).

Through a more participative system, ideas can come to the surface on how best to achieve organizational missions and maintain efficiency and effectiveness. The introduction and acceptance of new ideas and tools among a more integrative and interconnected group to achieve increasing efficiency and effectiveness embodies the concept of performance improvement.

To sum up barriers and best practices covered in this section, some variables that could foster a performance measurement program within the case organization are as follows:

- Participative environment
- Theory Y and Z characteristics
- Clear mission
- Motivation
- Decentralized discretion
- Post-bureaucratic characteristics
- High levels of communication and collaboration

It is possible that performance measurement will foster some of these characteristics as well, so the possibility of a cyclical relationship could arise.

The study of public administration and organizational theory helps to frame the context to discuss best practices and barriers to performance measurement and implementation (performance improvement) from a public organizational perspective. However, when an organization reaches the point that performance measuring is possible and performance outcomes are in sight and clarified, it is up to public management to enable advancement and planning initiatives to enable agencies to use their measures in testing new policies/new resources given (through policy making or the establishment of standards for the capital/resource allocation necessary for satisfactory performance levels and changing city characteristics). The information gained from performance measuring does not contribute to accountability unless this process happens. Therefore it is necessary to look at best models of public management for higher performance of local government and for performance measurement and improvement at the agency-level, to see not only barriers and best practices from a public administration and organizational perspective, but also a management perspective.



## *Public Management for Higher Performance*

In regards to increasing accountability sharing between employees, departments, and public managers, it was mentioned that outcomes-based assessments should replace cost-based assessments (Barzelay 1992) to test public benefit of the service changes (Wilson, 1887). The outcomes-based assessment can be done through performance measurement, which quantifies outcomes of performance in comparison with desired outcomes, or benchmarks (Flynn 2009).

In an overview and subsequent prescription for performance management, Jacob Klerman, who has done extensive research on government performance measures, examines four concepts: *1) net versus gross performance, (2) the precision of measurement, (3) which outcomes to reward, and (4) the subversion of measurement.* Before going into these important notions, he points out that while performance measurement provides the organization a means for improvement through remediation, selection, and incentives, the actual act of performance measurement presupposes that there is an operationally useful definition of performance. This is a common barrier in performance measurement in many types of organizations, where measurement of successful outcomes against the established standard is supposedly reflecting actual behavioral inputs (performance of employees). The barrier arises when sources of input are only partially controllable on the part of the employees or the organization, and therefore no amount of remediation, selection (or de-selection), or incentive will improve performance as the missed benchmark is due to uncontrollable inputs (Goldsmith 2005).

When performance measures are operationally reflective of internal performance of the organization, one can then express goals for performance management in explaining the real definition of performance (what goes into the outcomes). The translation of mission goals into

standardized measures and how these measures are operationalized, reveal the output that must be attained to reach the standard, bringing the organization closer to obtaining the mission and being able to reflect this success very clearly (Goldsmith 2005).

The first concept explains that net performance is the ability to measure individual performance holding other variables constant. Therefore, even for measures where the inputs are often uncontrollable, measuring performance within strict parameters reflects solely upon behavioral inputs (thus giving the organization an idea of employee performance). When performance managers want an unbiased way of measuring employee performance (other than through evaluations given by supervisors), the assessment of net performance is a suitable process to see variation in service levels based solely on employee inputs (Goldsmith 2005).

Another reason for net performance, based on all controllable inputs on the part of the organization, is to minimize the unfavorable effects of gross performance measurement. Klerman explains that gross performance measurement can go wrong in (a) misidentifying best practices, (b) misidentifying best workers, (c) incentives to migrate, and (d) incentives to choose certain clients or certain types of assignments. To specify, gross performance measurement can cause the organization to misinterpret outcomes that did not spur from a certain organizational practice, but instead went well due to the unique circumstances of the service-user. Another mistake that can be made is identifying best workers that just happen to be lucky enough to be dealing with the best clients or easiest assignments, not only establishing misplaced selection of personnel, but also providing incentive for workers to migrate to these types of situations, further neglecting the more difficult tasks or service-users. Lastly, gross performance measurement may give the organization the overall incentive of only servicing best clients by establishing service parameters from what produces best overall organizational performance (Goldsmith 2005).

Secondly, Klerman advises analysts and performance managers to undergo performance measurement precision. He bases his suggestions not just on what will keep the actual job of performance measurement transparent and robust, but also cost-efficient. He proposes several different methods of attaining performance measure precision. One method of improving the precision of performance measurement is to increase collection of measurements – not just in existing administrative data, but also through separate data collection (surveys, community profiles, environmental consistencies, etc.). This can complement the administrative data to show outcomes and trends on a larger scale. Another improvement method is to increase the quality of measurement via computer-aided testing, matrix sampling, longer periods of testing, comparative analysis, or establishing a scoring system. This would add robustness to the established trends being reported. A third method is to increasing precision of performance measurement by simply changing the measure – having multiple measures that reflect the same performance outcome. This further legitimizes the organization, and also serves as a systematic review and evaluation of tests and outcomes (Goldsmith 2005). This may also serve the analyst in choosing one method over another based on the way outcomes are illustrated – perhaps one is better for performance budgeting, while another may be better in reflecting attainment of a national standard, while again another is better for strategic deployment.

Other suggestions to increase quality performance measuring are to increase sample size, to switch from measuring inputs (descriptive statistics) to measuring outcomes (descriptive statistics and correlations), and to measure performance over longer periods of time. A final suggestion emphasizes that quality management should not be based on improvement in work performance but based on public outcomes (Goldsmith 2005).

Another performance management specialist, Mark Popovich, in *Performance Management - Creating High-Performance Government Organizations: A Practical Guide for Public Managers* (1998), emphasizes that in performance measuring, one has to take into account the dependence of agencies on central components of local government, such as human resources, finance, and procurement (perhaps IT would be included if the publication was more recent). Popovich maintains that these central departments control the means of production, performance measurement, and communication tools needed to facilitate accountability sharing. The actual performance of these centralities set a foundation for the performance of peripheral departments. If central departments are strong, then performance measurement in peripheral departments is more meaningful in that their outcomes can reflect actual inputs on the part of their specific personnel and internal operations. Given this, the characteristics of high performance departments are the presence of (1) self-assessments, (2) increased human relations and changing relationships among colleagues, and (3) changing relationship between the organization and the outside (Popovich 1998).

Budget structures (as budgets are essentially planning documents) needed to incorporate assessments/performance measures are along the same line as strategic response to predictable occurrences through data driven decision-making. According to Popovich, the most critical system that drives behavior the most powerfully is the budget. He highlights three budgeting systems, focusing on each system's potential for performance measuring and improvement. The three types of budgeting systems are outlined in the table below (1998).

<b><u>Budget Type</u></b>	<b><u>Strengths</u></b>	<b><u>Limitations</u></b>
<b>Line-Item Budgeting</b>	Expenditure accountability, scheduled spending/fiscal control, straightforward auditing, monitoring, and enforcement.	Short-term, no performance/policy accountability, no flexibility, no strategic insights, budget estimates under this system are not meaningful, limited utility as a management tool.
<b>Performance Budgeting</b>	Management approach, outcome-based, introduce operational analysis, improved performance accountability, flexibility, strategic insights; Lessens bad policy decisions.	Lacks the means to compare with alternative spending plans.
<b>Investment Budgeting</b>	Supports efforts to improve performance, clarifies problems or opportunities that the public expects government to address, and promises better rates of returns, illustrates spending patterns and the interests that defend them, improves citizen participation as it is a prerequisite for this type of budgeting.	Projects future loss in the absence of proposed actions; It is more information-intensive than other budgeting types. Must quantify outcomes achieved by the investments; Takes more time and energy to accomplish.

In performance and investment budget systems, an expense line item would also include the expected returns (services, goods, revenues, performance improvement) and the risks (potential losses and liabilities) (Popovich 1998). Popovich also mentions characteristics of high-performing HR and procurement systems. On the HR side, he explains that strong characteristics include 1) investments in training, cooperative relationships, adaptable policies through deregulation, decentralization of authority, and policies that are responsive across workplaces/workforces; 2) investment sharing with actual employees to build their human competence; 3) active recruitment methods to compete for best talents (not open job that takes in applicants); 4) gain-sharing (which is said to provide high performance incentives and saves the

organization an average of 29 percent in labor costs); 5) compensation tied to performance, and 6) other employee appraisal and incentives policies.

On the procurement side, Popovich explains that time-consuming “piece-meal” solutions have accumulated over decades to protect taxpayer dollars from corruption in procurement. This has made procurement very cumbersome, disabling it from supporting other high-performance departments. Strong characteristics include: 1) emphasis on quality in procurement decisions; 2) increasing trust, discretion, and accountability; 3) streamlining processes; 4) decentralization of authority, supporting the inner functions of procurement services through training and innovative opportunities for personnel; 5) improvement of conflict resolution and appeal processes, and 6) increased consequences against fraud, and reduced incentives for economizing on surplus (end of year procurement funds lost to the agency if not spent) by not taking back surplus (letting funds roll over – goes back to increasing trust, accountability, and consequences) (National Academy of Public Administration 1995, 1991, U.S. General Accounting Office 1994, National Performance Review 1993, National Commission on State and Local Public Service 1993).

According to Popovich, because of policy, politics, technological needs, communications, employee contracts, collaboration, and competition, the actual performance of these central departments sets a foundation for the performance of peripheral departments. If central departments are strong, then performance measurement in peripheral departments is more meaningful in that their outcomes can reflect actual inputs on the part of their particular personnel and internal operations free of external pressures. Given this, characteristics of high performance departments include (1) self-assessments, (2) increased human relations and changing relationships among colleagues, and (3) changing relationships between the organization and the outside (1998).

In the 1990s, the National Performance Review focused on increasing productivity, decreasing costs, and better serving the American people. Later called the National Partnership for Reinventing Government, it was implemented to support government agencies in their reinvention efforts to streamline processes, reduce red tape and eliminate regulations that prevented employees from working together to solve problems. According to Bob Stone, who was involved in the reform efforts, there was a lot of talk in the beginning of the initiative about the supposed tension between the goals of making government work better and making it cost less. Stone explains that many people saw it as politicians who wanted to cut 250,000 federal employees, when in reality civil servant interests were taken into account, as middle management was cut. At that time, 660,000 of the two million federal employees were middle management, whose daily activities consisted of second guessing lower level civil servants, thus keeping them from getting their jobs done. These middle managers were seen as part of the red tape. The reform served to transform organizational culture. By empowering people on the front line, who happened to have experience in the field, NPR helped to redesign organizational procedures and research performance measurement possibilities and best practices (Popovich 1998). The redesigning of organizational procedures, especially in the domain of governance, is closely related to the subject of institutional change. The theories behind making effective institutional changes not only lie in rule changing, but the establishment of reinforcements for the changes to spur actual changes in organizational culture and organizational behavior. Inke Mathauer, a decentralization and institutional design theorist, explains that institutional design is fundamental for performance (the attainment of objectives), and to make a design, one must be able to identify the strengths and weaknesses of the institution for this goal. For our cases, bottlenecks exist because rules are not automatically implemented and complied with due to the

weight given to individual interests that already naturally exist within the organization. Similar to linking barriers to best practices, the strengths can be identified and formulated by inverting bottleneck factors into positive action plans. To find the reasons for low performance, one has to understand the prevailing incentive environment within that government agency – in many cases, job security and revenue. It is important to dispel the fears before changing the rules. Equally important is dispelling the claims behind the centralist argument (that lower level civil servants need a lot of oversight and lack expertise) as these perspectives fuel second guessing and productivity blocking, and making sure that dispelling these claims are encompassed in the changes as well. The rules will eventually affect a performance indicator, the objective of each specific department. To start, one should establish all areas of service that the department encompasses, the respective rules, and the rule aspects. A brief table on general functions of a department, loosely adapted to Mathauer’s “Rules and Rule Aspects,” is as follows:



<b><u>Function</u></b>	<b><u>Rule</u></b>	<b><u>Rule Aspects</u></b>
<i>Revenue Collection</i>	Service Fees	Services requiring payment, payment schedules, ceilings, fee exemptions/waivers criteria and procedures
<i>Resource Allocation</i>	Spending	Mandated level of public spending, historical, needs-oriented, pro-rated on local incomes, aligned with growth, inflation, and depreciation; allocation criteria for decentralized financing schemes, budget formulations procedures, budgeting formulas, line items, programs, data collection, inventory, methods of record-keeping and expenditure.
<i>Internal Procurement</i>	Purchasing and Provision	Purchasing structure for competitive markets, eligibility and accreditation of providers/vendors/contractors, level of autonomy given to contractors and purchasers, transfer procedures, payment regulations, coverage/guarantees.
	Provider payment	Remuneration rates (uniformity for type of service or good procured / regional differentiation per local economic conditions), price setting, utilization review
<i>Financial Management</i>	Funds and Accounts	Auditing and other accountability activities, public reporting, performance management, building up reserves for internalization/externalization of surplus/deficit.
<i>Work Policy</i>	Communication	Rule monitoring, rule enforcement, penalties for non-compliance, data/information management, impact monitoring, training (ethical, technical). Revision committees on procedure and policy manuals, rewards schedules, penalty schedules.

The absence or inadequacy of rules, as well as other “bottlenecks”, stands in the way of performance. The rules should be directly tied to the objective. For example, the health sector may measure performance on the amount of vaccinations provided, or a decrease in citizen needs for a certain service. The education sector may measure performance based on test scores, graduation rates or student retention. So, the constant review of allocation procedures would be carried out along side the indicator fluctuation. The “bottlenecks” in the rule set remain until the

indicator is positively impacted by the set of rules (the institutional change). Mathauer describes the “bottlenecks” as follows:

1. Rule Absence – If a function is not specified by a rule, organizations operate without regulation or may not undertake certain tasks to ensure efficient/effective accomplishment of the function due to lack of incentives. This works against the larger objective. (i.e.: procurement, choosing a vendor without collecting quotes and evaluating all products on the market).

2. Inadequate Rule – A prevailing rule may not represent the best design to achieve the objective, meaning it is not logically linked to the objective and therefore the environment does not contribute incentives to comply with the rule. Even if the objective is desired, the means (the procedures) may be socially unacceptable if created to serve interests of those who have bargaining power. (i.e.: paying more for a service than another customer to expedite the public function).

3. Contradictory Rule – even if a rule is well designed and strongly linked to the objective, it may conflict with other rules – spurring non-compliance to keep in line with existing incentives (i.e.: cultural norms or administrative capacities).

4. Weak Rule Enforcement – no or little enforcement strength, thus giving weak incentive to comply.

5. Weak Organizational Capacity for Rule enforcement, monitoring, and implementation – lack of leadership, skill, resources, infrastructure, or appropriate procedural documentation, organization, and communication.

6. Dysfunctional inter-organizational relationships – A varying incentive environment due to mistrust, insecurity, low informational circulation due to tension and possessiveness, conflicts, and lack of communication and collaboration. All of these issues can affect rule implementation and enforcement.

Each of the bottlenecks above can easily be formulated into an action plan. This requires an assessment and analysis of regulatory provisions, definitions, purpose, and the effects of rules. Mathauer prescribes interviews with stakeholders to understand their interests and motivations (the symptoms of the incentive environment), and subsequent rule-setting in alignment with objectives, strengthening enforcement and incentives, enhancing leadership, technical improvements, and engaging in collaboration trainings and conflict management. He also states that prioritizing the objectives to set rules to optimize performance is an important aspect of

successful institutional change. With this change, the improvement of indicators and processes in attaining these indicators will inherently promote accountability in local governance (WHR 2010).

Institutional change must take place for performance measurement to work, in that the adoption of standards must be undergone. Robert Klitgaard in his essay, “Choosing and Using Performance Criteria,” explains that choosing and using performance measures has four general effects: (1) Allocation efficiency, (2) Distributional effects, (3) Incentive effects, and (4) Fundraising effects. By measuring the inefficiencies in these four areas, performance measurement identifies areas of improvement for the organization. In choosing and using performance measures (rule-making), the organization should look at the four effects to weigh choices (2005).

From a management perspective, best practices or barriers to performance measurement are as follows:

Barriers:

- Uncontrollable, external inputs, i.e. *gross performance measurement*
- Gross performance measurement implicating actions which in turn produce incorrect performance indicators (can funnel into performance degradation) – misidentification of best practices, misidentification of best employees, incentives to migrate, incentives to choose certain clients or certain assignments
- Misinterpretation of performance measures due to lack of translation procedures as well as continuity

- Dependence on central departments for higher performance, and lack of understanding and communicating these larger, but somewhat controllable, inputs
- Bottlenecks (lack of rules or lack of enforcement of rules, even rules that entail reporting data needed for effective performance measurement)

Best Practices:

- Fix for uncontrollable, external inputs (holding gross variables constant); i.e. calculating *net performance*
- Communication with organization so that implications from gross performance don't happen, and that gross performance is contrasted with net performance to communicate understanding to personnel
- Performance measurement precision through collection of additional information, comparative analysis, having multiple measures for one outcome, deciding what method of measurement achieves best illustration of performance for interpretive reasons
- Identifying collaborative departmental performance vis-à-vis internal performance indicators and taking necessary measures to improve or correct for these inputs
- Look at departmental budget to use in performance measurement in justifying or pinpointing a lack of necessary resources
- Have a performance or investment budget to use outcomes to track improvement in performance due to budgetary decisions and test allocations, as well as track increasing returns and diminishing risks

- Dispel fears that come with institutional changes that occur with performance measurement implementation
- Understand rule aspects and performance measures that go with them
- Chart allocation efficiency, distributional effects, incentive effects, and fundraising effects

The heads of departments have no small task in weighing the outcomes of implementation with the use of performance measures. Decision-making is shared with city managers that must obtain clear information from department heads to layout the choices and consequences in a concise and robust way. The responsibilities of department heads, as already illustrated in the public management literature, are the municipality-related objectives as well as the public service objectives that they were trained to be experts on.

In addition to understanding and taking into account these barriers and best practices of performance measurement from a public administration discipline, organizational theory, and public management perspective, the applications of these practices to the case agency must entail what has already been established as a best practice within the Fire/EMS industry.

Understanding not only the ideas of performance measurement within the industry are necessary but also background into the reality of the industry to put into context the daily performance necessary to provide fire and medical services to a community.

### *Fire/EMS Industry*

In addition to primary functions of preventing and suppressing fires (to preserve life and property), many fire departments provide EMS (emergency medical services), HazMat (hazardous materials) response, rescue, other types of emergency and nonemergency calls, fire

prevention inspections, review plans, and collaborate with other departments for code enforcement (NFPA 2009).

The interval-related fire service functions that play out as emergency calls are received are illustrated below, with a subsequent description on the five main response time intervals that are tracked by computer-aided dispatch (CAD):



Transfer Time – The time interval from Call creation to Dispatch to the fire department. It is also referred to as alarm handling time.

Turnout Time – Time interval between Dispatch to the moment where vehicles are rolling out of the doors. This time interval begins with the alarm, notification, or dispatch of the emergency response facilities (ERF's) and emergency response units (ERU's) by either an automatic alarm or visual annunciation or both, and ends at the beginning point of travel time (as the ERU rolls out of the station).

Travel Time – This begins when a unit is en route to the emergency incidents and ends when the unit arrives at the scene (also called en route time).

Response Time – A combination of turnout and travel times. Defined as Dispatch to Arrival in most cases. Some organizations choose Notification to Arrival or Alarm to Arrival. Other ways that response time is calculated, per decision of administration, is from call creation to when personnel are in contact with the patient (patient contact) or when fire suppression is initiated (control). The response time is the interval from the receipt of the alarm/notification/dispatch at the primary public safety answering point (PSAP) to when the first emergency response unit is arriving, initiating action, or intervening to control the incident.

Committed Time – The time interval from when the emergency unit picks up a dispatched call to when the unit goes back into service and becomes available for the next call.

Many citizens assume that the costs of fire entail property loss alone. John R. Hall of the NFPA (National Fire Protection Association), defines the real cost of fire nation-wide as not just property loss or damage, but also money spent through prevention, detection, and suppression against worse losses. He explains that in an estimated \$317 billion in total costs in 2006, the loss represented 5% in property, 6% in insurance coverage, 11% in career fire department budgets, 16% in building costs under fire protection codes, 13% in other economic costs, 38% in donated volunteer firefighter time, and 14% in deaths and injuries due to fire. He firmly asserts that fire has a tremendous impact on the way the U.S. uses its limited resources, stating that the total fire costs in any given year represent nearly 3% of the U.S. gross domestic product. He insists that Americans must seek ways to achieve equivalent fire safety at lower costs, since the growth in total cost of fire has been led not by the fire losses but by the other cost components. The fact that the other cost components are heavier indicate the need for innovations and programs that can improve fire safety at lower costs, as well as improved methods and models for calculating fire performance and costs so that the consequences of different managerial decisions can be considered comprehensively (2009). Through past decades, fire experts are outlining challenges in the Fire/EMS industry and recommending alternative approaches to operations. Amongst the recommendations is the frequent mentioning of the need for data-driven decision making.

Although fire departments stress fire prevention, they are structured to respond to all types of crises promptly to protect the community. In a 1970 article from the RAND Institute, Edward Blum describes problems that occur in larger departments, who, he explains, have their own unique set of problems because they are tied to other main problems associated with the larger and growing communities they serve. Within the department, he says, "...traditions of

fraternity, reliability, dedication, heroism and self-sacrifice are being threatened by increasing technological problems and increasing [public] demands that reflect symptoms of ever-deepening social ills.” In 1970 and still today, increasingly entitled public attitudes, stagnant relations with low socioeconomic communities, union resolve, and the continuing trend of bureaucracy “dim the luster of the job and transform the firefighter’s self-image.” In other words, the original fire service culture is no longer appropriate in regards to current social contexts in the communities that they serve. The daily activities, which mainly involved rescue and fire fighting at one time, now consist of a small percentage of actual fire suppression and rescue, while more often providing treatment in service to social ills. This erosion of tradition and values underlies several problems that the fire service still encounters today.

Firstly, costs continue to rise, while voter resistance to tax and budget increases remains constant. Secondly, the habit of rescue is such that the men who are eligible to manage the organization actually prefer field command rather than top administrative positions, which hold the responsibility of dealing with what is now populist-driven local government. Thirdly, the performance of the ‘system’ can wrongfully reflect performance of the fire service. The system may include (a) overhaul, which at times, can be carried out by partner organizations (b) those who administer and formulate codes, (c) building contractors and architects, (d) insurance companies whose ratings affect sprinkler systems and detectors, (e) private alarm services, (f) equipment manufacturers, and (g) collaborating organizations/entities. When any of these parts of the ‘system’ perform poorly, it affects the outcomes of performance measurement for the fire service. Fourthly, fire service inspections and code enforcements fuel the official establishment of blighted areas, which cause further negligence and fire hazards. Finally, service calls, false



alarms, non-emergencies, and calls representing social ills are taking over what used to be the *raison d'être* of the fire service (1970).

Blum explains that for the fire service to strongly meet these challenges, personnel should be trained not just in rescue, but also in basic management and operations principles to hone individual talents towards addressing the larger task of dealing with the overall environment of labor relations, rising costs, community relations, and performance factors. The increase in educational and personal development will give more attractive career patterns to the fire service, benefitting the organization as well as its members. This, Blum insists, is what is needed, as the spirit of tradition and paramilitary discipline can no longer solely assure optimal performance of the fire service.

Blum explains that one important set of management issues concerns the allocation of fire-fighting units: how many units to have, and how to deploy them. How these issues are resolved affects both fire protection effectiveness and the cost of providing it (efficiency). Most departments now follow the insurance grading schedule as a minimum staffing standard. They have, for example, the same number of men and units on duty around the clock though in larger cities, the demand in the afternoon-evening peak period is several times greater than demand during early morning hours. Both experience and analysis show that in matching resources to demand, departments can operate more effectively and efficiently. Blum specifies this matching of resources to demand as the instituting of overlapping or variable shifts, deploying tactical control units during peak hours, and deploying certain types of units (based on historical incident data) as adaptive responses to certain locations during certain times of day. He says that departments who employed these changes, at the time, saved anywhere from 5-10 million dollars annually (1970).

According to a 2009 NFPA report on Fire Service deployment, department leaders and community officials must decide (1) what resources to commit to risk management (prevention, pre-planning, and preparation), (2) what resources to commit to response/mitigation, and (3) the acceptable level of risk. This report also outlines the amount of resources that would match up with certain policy decisions. For example, within the staffing specifications of the performance measure matrix, it is reasonable to assume that a certain level of response should be expected. An example of the adopted policy is provided: “When staffing is at said level, for “x”% of all incidents, the first-due unit shall arrive on scene within a four-minute travel time. The first due unit shall be capable of providing advanced life support for medical incidents.”

The report also states that to make quality decision making as a community leader, fire service leaders must continue to collect, analyze, and use real incident data when working with decision makers to assess the impact that resource deployment decisions have on community risk levels. In doing so, leaders can understand how changes to resources will affect community outcomes. In assessing risks and how well equipped the fire service is able to meet these risks, the following should be quantified: types of incidents, staffing levels on each incident, mobile asset configurations, response time performance, frequency and manner of personnel training, and fire prevention programs. The following recommendations on behalf of the NFPA Research and Analysis Division (2009) and in other NFPA reports describe how fire department leaders should follow transparent reporting of information to decision makers:

1. Assess Fire Hazards and Associated Risks in the Community – probabilities, consequences/losses
2. Collect Response Data – structure fires and EMS response data descriptions on resource deployment
3. Analyze Response Data – determine capability/capacity and identify deficiencies
4. Summarize Emergency Response System Status – Capability, Capacity, Availability, and Overall operations linked to recommendations and resource allocations’ anticipated outcomes

5. Report to Decision Makers – capabilities, capacities, and projected vulnerabilities if proposed resource cuts take place

The need for analytical approaches in the Fire/EMS industry is not just the demand that operational analysis be implemented to measure statistics of the fire service and of what community issues are pertaining to the service, but also the comparison of fire service performance with established national and state standards. Today, fire departments are providing some sort of emergency medical support along with suppression and rescue in the field. The two main fire standards, concerning response times and confinement of fire spread, are related to one another. Other performance standards are in regards to training, occupational safety, staffing, unit availability and coverage, and EMS benchmarks concerning procedures for different types of medical incidents. The complete matrix of benchmarks found during this research is attached in Appendix B.

According to a USFA report, “Structure Fire Response Times,” 51% of structure fires confined to room of origin and floor of origin had response times of less than five minutes, and 54% of fires that were confined to building had response times of less than six minutes. Likewise, EMS incidents, such as heart attacks that escalated into cardiac arrest, could be stabilized to survival outcomes when response times to the scene were less than six minutes (the point where the patient would then have irreversible brain damage).

The above benchmarks, as well as many others, are in accordance with three brands of fire standards – Insurance Services Offices, Inc. (ISO), the National Fire Protection Association (NFPA), and the Center for Public Safety Excellence (CPSE).

ISO (Insurance Services Offices, Inc.) was formed with the merging of the National Board of Fire Underwriters and the American Insurance Association in 1971. They currently

look at federal, state, and local regulations and community needs to make minimum assessments of property risk and costs of loss. They look at training and staffing of a community's fire department, as well as the community's water supply, hydrant distribution, alarms, fighting equipment condition and capacity, and fire company (station) locations. ISO grades communities on a scale of one to ten, called a Public Protection Classification Rating. In assigning these ratings, they look at three aspects: the fire department (which weighs 50% of the ISO rating), water supply (which weighs 40% of the ISO rating), and communications (how alarms are handled and transferred, which weighs 10% of the ISO rating). Within the rating system, a ten is the worst and a one is the best. The ISO rating directly affects insurance rates on property within the city. The lower the rating, the lower the insurance rate on one's property. According to Illinois Fire Chief's Association in a 2010 report, this grade is political. If the public knows they pay the lower rate, they will not always pressure their municipality or fire department to be cost effective, because they understand that there is a return on property insurance rates. The ISO manual, called the Fire Suppression Rating Schedule Handbook (FSRS), provides material to improve Fire Chiefs' and municipal administrators' understanding of the ISO evaluation in gauging their capabilities to suppress structure fires (Flynn 2009).

The NFPA (National Fire Protection Association) has origins back to 1896 when their business was to standardize sprinkler systems, and later on, electrical systems in buildings, building design, and construction. The NFPA accepted fire department membership into the association by 1904, a precursor to the now 6000 participants who work to develop safety and performance standards in consensus. While the standards are mostly used as self-regulation for fire departments nation-wide, there are some that have been adopted into federal regulation, specifically within Occupational Safety and Health codes (OSHA). While NFPA currently has

around 300 different standards to minimize risks of fire, the lack of regulation affords municipalities and departments the freedom from litigation (NFPA 2012).

CPSE (Center for Public Safety Excellence) promotes outcome-based performance standards of best practices, and formed from deliberations of the International Association of Fire Chiefs (executive board) and the ICMA. (The ICMA (International City Managers Association) is an almost 100-year old association (though it went through name changes) that has the mission of professionally developing local government management. The organization provides technical and management assistance, training, and information resources in the areas of performance measurement, ethics education and training, community and economic development, and other topics to its city manager members. These management decisions made by ICMA's nearly 9,000 members affect nearly 185 million individuals in thousands of communities. The idea of reinforcing performance measures in local government is forefront in the work they do with city managers. ICMA and their public safety performance measures (through CPSE) help departments through their evaluation standards. ICMA helps develop risk assessments, deployment reviews, performance measurement guidelines, performance management, continuing performance improvement and accreditation. CPSE is the ultimate guideline for meeting industry and public management standards.

CPSE assists fire departments in their transition to strategic response (data-driven decision-making), in assisting with the institutional changes necessary, self-assessments, evaluations, performance management training, performance measurement training, sustainability programs (benchmarks for changes in leadership), and helping them to develop Standards of Cover (SOC). Standard of Response Coverage is defined as “those written policies and procedures that establish the distribution and concentration of fixed and mobile resources of

an organization” (NFPA 2009). Developing Standards of Cover, in the Fire/EMS industry, are the establishment service capacities (called LOS, levels of service) that equivocate to findings in basic community risk assessments (CPSE CFAI 2006). As LOS must meet objectives laid out in the standards of cover, they do not measure effectiveness or performance. They instead focus on potential and capability. Standards of cover are the actual establishment of standards that are to be measured - the statistical operationalization of benchmarks. If LOS and SOC are established, measurement of response to predictable emergencies can be done and improved.

According to Jennifer Flynn, of the NFPA Research and Analysis Division, once the intended goals of performance measurement are established, the department must identify the function or actions that are taken to achieve said goal. They must also consider available resources, whether monetary, equipment, or person-hours, and be able to quantify how these resources translate into outcomes in their community. The formulation of LOS is what can help define SOC.

Within this set of rules, it is clear to see how line item budgets can more naturally shift to performance budgets. While standards exist, it is the commitment and resources of the city that must be evaluated against the threat of city risks. Those risks are then minimized, while returns (in comparison with historical property loss) are also projected. Once the assessment process of risks and capabilities are clear, there are three concepts within the decision-making process of establishing local standards that the City has to define – *adequacy* (what funding can they invest in achieving and maintaining a level of adequate fire protection), *reasonable cost* (the cost of fire vs. cost of fire losses), and *acceptable risk* (what economic and political losses are ‘acceptable’) (2009).

One of the major issues that fire departments struggles with is defining an SOC, since it is essential to determine how they can provide services that adequately meet existing risks. In a recent 2009 report by the NFPA, called “Fire Service Deployment: Assessing Community Vulnerability,” defining and implementing SOC is a best practice. Herein, establishing indicators that define reliability against risk/vulnerability should include assessments of the probability that a particular event will occur. Reliability, or resource availability explains the department’s capability and overall operational effectiveness. This entails the measurement of the degree to which the resources are ready and available to respond to and manage an incident (unit duration on different types of incidents, frequency of these incidents, multi-unit and staffing statistics for structure fires, et cetera). The probability of any given unit’s availability (or unavailability) is one indicator of the fire departments’ response reliability. Response reliability is “the probability that the required number of competently prepared staff and properly equipped apparatus will be available when a fire or emergency call is received” (2009). As the number of emergency calls per day increases, the probability that a needed piece of apparatus will be busy when a call is received also increases. To measure response reliability, all types of calls for service must be taken into account. Today, EMS calls have an impact on the availability of fire department resource and should be measured with the overall evaluation of department reliability. Response reliability can be determined from historical run data and is typically expressed as “per company statistic” as well as a departmental statistic.

Assessing statistics on durations of calls, response times, call type frequency, demands from different station service areas, and so forth gives a final estimate on the capability and reliability of a fire department. More precisely, a percentage can be yielded on how often the department is capable, with resources that are available to respond (which can also be expressed

as the inverse of how often a department is occupied with emergency or nonemergency calls). Operational effectiveness is, historically, the outcome achieved by the deployed resources – the idea is to not just measure performance and ensure that this performance is logged alongside what resources were used to achieve said performance. The idea of understanding “capability” is performance measurement and workload measurement. The NFPA insists that this must continue to be done in concurrence. The measuring of performance without understanding input is a loss to management. Capability is “a measure of the ability of firefighters to respond, mitigate and recover from each emergency call, [and] often depends on the time of dispatch, arrival of first responders and the assembly of an effective response force in relation to the magnitude of the risk event when they arrive.” To give an example, some fires will be at an early state and others may already have spread throughout an entire building before computer-aided dispatch (CAD) is notified. This can depend on the alarm system in place, the presence of individuals who will make the emergency calls in a timely fashion, the contents of the structure and whether there are fire accelerants, and other factors. Therefore, when determining fire station location, apparatus placement and staffing levels, fire service leaders target a particular point of a fire’s growth that marks a significant shift in its threat to life and property. That particular point is called *flashover*. This is the point in time of a structure fire that survival of occupants, if still inside, becomes much less likely, the fire spreads more rapidly, temperature rises, and a greater number of staff and equipment is then required to control the fire. This can happen anywhere between four to ten minutes from the time the fire starts. To avoid having to fight a fire at the point of flashover, if the fire department is notified early, emergency units must arrive quickly (NFPA 2009).



The same idea holds for emergencies requiring medical services. Early intervention is necessary to stop escalation of cardiac or traumatic medical emergencies. In regards to a heart attack that progresses to cardiac arrest (where pulse ceases and breathing stops), there is a six-minute window of opportunity to save the patient before brain damage ensues. As discussed previously, fire department response capability and capacity is a function of the community's resource allocation and is a significant determinant in the degree of vulnerability of a community to emergencies. Naturally, a community with an effective firefighting force would be less vulnerable than a community with fewer resources allocated. There are clear best practices for recognizing unwanted emergencies in a community by matching the allocation of resources to the risk assessed.

According to CPSE accreditation guidelines, a formation of a performance measure matrix is the first step to establishing benchmarks and performance measurement in an organization. Within the Performance measure matrix (Appendix B) there are two types of categories – industry categories (Fire, EMS, Hazmat, Other) and management categories (Workforce, Efficiency, Effectiveness, Equity). These categories have been established in accordance with Fire/EMS standards and public management goals. The management goals, according to the NFPA Research and Analysis Division (Flynn 2009), are as follows:

Workload – describes community demand and community risks; helps define LOS

Effectiveness – capability, reliability, and performance measurement; the basic reason for providing the service (the measures that see whether the mission of the organization is being met; i.e. protecting life and property)

Efficiency – how well resources are used in providing the service; describes capacity

Equity – relationship between those who pay for services and those who benefit. Equity measures look at fairness in levels of service provided over population (i.e.: mapping response times).

Flynn especially emphasizes that, according to RAND Fire projects (which are funded by ICMA), efficiency, effectiveness, and equity must be measured in any public service. This is because, in measuring fire deployment and response times to see if fire station location and resource levels are sufficient, a systems analysis provides applications for public policy issues that affect future deployment (2009).

The Governmental Accounting Standards Board (GASB) and the NFPA Research and Analysis division suggests that supplementary forms of performance measurement, namely, comparative analysis, advising fire departments to find comparable U.S. municipalities based on population, climate, and geographic size to see how their inputs and outcomes are also measuring up to popular industry standards. However, Flynn cautions that comparison of an organization's current performance with its own historical data is a stronger method of performance measurement than through performance comparisons with other municipalities. This is because there is a plethora of precautions involved with comparative performance measurement, mainly boiling down to the fact that the performance outcomes are divorced from their context when being compared with other municipalities. In this, there is truly no single characteristic (climate, geographic size, etc.) that is the standard identifier in judging what constitutes a comparable municipality. One can also consider property values, commercial revenues, income statistics, demographics, growth rates, revenues, infrastructures, age of the municipality, and so on, finding that no one single identifier can work to ensure that the comparison or performances on the part of two different municipalities is *all things constant*. It is impossible to hold all things constant – the individuals in the respective organizations count as real input into the performance outcomes as well. The systems are too complex. ISO ratings, water flow, department size, budget

constraints are among additional reasons why comparative analysis will produce ever-disputable findings.

Performance measurement within an organization relies on the evaluation of achieved outcomes compared to desired outcomes. Clearly identifying the goals and purpose of the fire department and fire service functions is the first step to evaluating performance. The easiest and best way of measuring the achievement of goal statements is to specifically identify target rates or percentages for each goal. These target ratings should be included in the general matrix of performance measures. In addition to the targets, current performance should be compared to past performance - seasonally, quarterly, or annually. Benchmarks vary and can be based on technical standards, historical data, comparisons from similar departments, or specific organizational priorities. Few of the national standards are mandated. Assumptions must be made in using benchmarks and it is critical that these assumptions and their limitations be identified so they can be researched and improved upon, while serving to communicate the nuances to decision-makers in the meantime. If the means can be measured as well as the ends, then continuous levels of performance to standard (whether in reality the performance missed, met, or exceeded benchmark) can be illustrated as a continuous LOS varying by environmental factors. In other words, giving the department an “A for effort” in situations that were “lost causes” from the initial point of notification. A fire department can be very efficient at performing the necessary procedures to achieve the desired outcome, or not efficient and still achieve the desired outcome due to favorable environmental factors. This needs to be remembered when evaluating the effectiveness and efficiency of the department in general. The performance measure matrix helps to introduce the concept and fundamentals behind performance measurement. The environmental factors are also useful in influencing public

education and impacting future training and community outreach initiatives within the fire prevention portion of each department's mission. The use of this information for future activities is telling of continued performance measurement and proactive programs used to impact factors affecting said performance (Flynn 2009).

From the Fire/EMS perspective barriers to and best practices for performance measuring in the fire service are as follows:

Barriers:

- Costs of fire
- Populist management replacing expert management
- Environmental variables that affect performance

Best Practices:

- Access community risks
- Collect and analyze response data for fire-related and EMS incidents
- Treat Structure Fires, Cardiac Arrests, and Trauma incidents with their own response analysis, as they have specific benchmarks
- Summarize Capability, Capacity, Reliability, and Overall Operations – by analyzing staffing, shifts, stations, unit deployment, peak hours, and incident type frequencies
- Calculate statistics on Turnout, Travel, Response, and Committed times
- Document all cost components to troubleshoot programs that employ models for calculating fire performance and associated costs

- Create a performance measure matrix (Appendix B) with
  - management categories (Workforce, Efficiency, Effectiveness, Equity)
  - industry categories (Fire, EMS, HazMat, Other)
  - Benchmarks or target ratings (NFPA, case organization)
  - Current and historical performance ratings (within the case organization)
  - Internal/external inputs (NFIRS variables, environmental variables, behavioral variables, organizational variables)
- Create a case-specific performance measure matrix (Appendix C)
- Use portions of the CPSE accreditation process as a model for the performance measurement program
- Develop a Standard of Cover from results of performance measurement and workload.

### Case Study

The City of Bloomington has an official, unanimously-adopted mission – “...to be financially responsible, providing quality, basic municipal services at the best value, to engage residents and partner with others for community benefit,” (City of Bloomington Strategic Plan 2010). In 2012, the city decided to bring in a contracted analyst intern from the Illinois State University Stevenson Center for Community and Economic Development. The goal of the contract was to look at the city’s fire/EMS services, help establish benchmarks, and measure performance against industry standards.

The Bloomington Fire Department, with a mission to protect life and property, functions to perform fire suppression, emergency medical services (basic and advanced life support), specialized disaster relief (hazardous materials mitigation, water and technical rescue), fire

prevention (through inspection and code enforcement), and fire safety education for the city of Bloomington, IL. All of these functions have an impact on safety and security, and affect risk directly and indirectly.

The Bloomington Fire Department was officially founded in 1868, establishing one chief engineer, one assistant engineer, and one driver to, on a full-time basis, serve a growing city population of over 2,000. The volunteers consisted of 20 men to pull their sole fire apparatus (though they quickly moved to hitching up horses) and eight men to man the hose. They moved to a lighter, two-horse apparatus in 1871, had 18 FTE's (full time employees) by 1888, and finally a motorized apparatus in 1916 (saving them abundant expenses for purchasing and keeping up horses). In 1933, the department went from having all promotions and appointments made by the mayor to adopting civil service regulations. From the 1930s to the 1980s, evaluations on departmental needs always proceeded periodically, and usually following devastating experiences in fire fighting. The idea of national standards based on community profiles, scientific study, and predictive models was not yet developed to properly plan deployment and resources for adequate and effective fire rescue. Losses of life and property were often the only justification for city expenditure. Where this can sometimes still be the case today, there are other mechanisms that are available to establish performance benchmarks for the department to push the resource allocation necessary to be ready for all potential hazards and emergencies. Policies establishing periodical training, maintenance, inspection, testing, clerical, and managerial tasks are such that the administrative and operative side of fire service are now, from a regulator's standpoint, saturated.

The relationship between the city and the department are typical of most American municipalities, where the pull between elected officials and public experts illustrates the politics-

public service dichotomy that Wilson and White establish in the public administration literature very well. The fire department wants nothing to do with the politics driving the municipality and is governed by the general belief that basic public services are more important than certain other public functions (parks and recreation, beautification). While the department is in competition with other departments for resources, there is a general sense of collaboration and interdependency with a number of peripheral and central departments (i.e. water, informational services, police). The city is going through database changes that are set to improve finance, procurement, and overall efficiencies of central departments this year. Additionally, organizational members of the fire department mentioned that central departments of procurement, finance, human resources, and informational services have improved in means of support to peripheral departments like them over the past few years.

The Bloomington Fire Department is amongst the 32% of other comparable municipalities (in means of population) that provide EMS service with advanced life support to their community. They are amongst the 15% of fire departments nation-wide that are made solely of career firefighters (no volunteers). They now strictly hire firefighters that have additional paramedic certification, as EMS calls make up around 80% of the demand on the department. They have 24-hour shifts that cycle through every three days (A-Shift, B-Shift, and C-Shift), and currently staff at a maximum of 34 and a minimum of 28 personnel on any given day (depending on leave due to vacation, sickness, injury, or Kelly day). They have five stations in operation that are to provide effective coverage of the municipality. Minimum staffing per shift (and along NFPA standard) is distributed to the five stations, with nine personnel at Headquarters (including at least 1 assistant chief), six personnel at Station 2, five personnel at Station 3, five personnel at Station 4, and four personnel at Station 6. Station 5 was recently

built in anticipation of city sprawl that ended up stifled due to economic recession, leaving the new station empty. Within the existing station formation, the overall department must have three frontline engines, three trucks, and three medic units (ambulances) in service at minimum staffing. If staffing increases to 31 or 32, another medic unit is put into service.

When CAD is notified of an emergency or nonemergency through the dialing of 911, they are provided the location in one of two ways. For cellular calls, the address is populated by a telecommunications company, called MetCom, and for landline calls, addresses are automatically populated through the community's "enhanced 911" system. The address is then able to be viewed on screens in each responding unit, and turnout is possible in either case within seconds.

The Bloomington Fire Department, like other fire departments, uses the NFIRS (National Fire Incident Reporting System) reporting module. Their database software of choice for this is called FireHouse, developed by Xerox. Incident data date back to 1993. They've since upgraded to NEMSIS (National Emergency Medical Services Information System) in late April of 2011, which caused a separation of databases (the old database is made up of all NFIRS modules, and the new database is the updated NFIRS modules combined with NEMSIS). Therefore, run data dating pre-NEMSIS are comprised of fire-related incidents only. To have comparable analyses of historical performance, the analyst intern has primarily used the recent database, which allows for two years of aggregate incident statistics. Among the concerns of the organization was the frustration with a lack of continuity in reporting within the database. There were many categories to report incidents in regarding type and how each incident unfolded. The men in the fire service are hard working, and more naturally apt to carry out their immediate duties than to report about fulfilling those duties. Personnel have expressed that when they



return from calls, they are often tired and not focused. If they have several back-to-back calls, the reports are often completed at the end peak hours (late at night), and some of the information may not be fully recollected. Quality assurance of reporting requirements go through their supervisors as well as clerical staff, however, completion versus accurate completion (due to varying definitions of incident terms amongst personnel) causes discontinuity within the data, despite fulfilling reporting requirements. Other data issues have included CAD discrepancies with the FireHouse software, the assignments of station service areas to new addresses due to city sprawl, parameter changes within incident reporting where analysis over long periods of time would be problematic, and other factors that would eventually be corrected in the data sets or through administrative adjustments with the software.

The department reported a list of concerns to the city in 2011. Among the concerns that were thought to be implicative to performance measurement implementation were the following: increasing call volume, increasing service area, increasing population, decreasing staffing and minimal resources due to budget constraints, meeting expectations of public for level of emergency service provided (including response time), number of adequately trained personnel to handle calls, the availability of appropriate resources and improved technologies, enabled utilization of data and reporting, the incorporation of CAD technologies for internal response time calculations, and optimal routing for responses and future station location analysis functions.

Within the current reporting present upon arrival of the intern, staff was partially relying on informational services and the police department to produce basic performance statistics on average response times for Fire and EMS calls (ignoring large groups of outliers, standard deviation from the mean, and correlations), as well as fire confinement ratings based on call type

(not actions taken, nor in calculation for comparison to industry standard). The majority of statistics were manually produced in the category of workload. There was little analysis and more generating totals from the database to synthesize departmental operations in regards to *demand* (not performance outcomes). Most visuals were in the form of pie charts explaining workload only. The production of statistical graphs was limited, and the only statistical reporting of response time (internal and external) was in regards to averages. The extent of workload and performance reporting, according to 2012 City of Bloomington City Manager Monthly reports has been as follows:

<b>Description</b>	<b>Quantity</b>
Total Call Volume	10341
False Alarms	786
Fires	262
EMS	8291
Excessive Heat	9
Hazardous Conditions	312
Service Calls	217
Good Intent Calls	455
Severe Weather Calls	9
Total Fire Responses	2,017
12 Month Fire Response Average	164
Total Structure Fires	114
12 Month Structure Fire Average	9
EMS Responses	8,286
12 Month EMS Response Average	681
Total Patients	10,251
12 Month EMS Total Patient Average	868
Total Transported	7,024
12 Month Total Transported Average	571
Fire & Life Safety Events Held	155
Fire & Life Safety Event Participants	6,103
Total # Hours Training	23,831
# Hours Administrative Training	3,917
# Hours ARFF Training	2,140
# Hours Driver/Operator Training	1,289
# Hours EMS Training	4,870
# Hours Fire/Rescue Training	8,868
# Hours Hazardous Materials Training	2,747
Total Fire Incidents per 1,000 Population	0.80
Structural Fires per 1,000 Population	1.49
Number of Firefighters per 1,000 Population	1.40
False Alarms per 1,000 Population	0.85
EMS Responses per 1,000 Population	9.02
Hours of Firefighter Training per FTE	18
Total Estimated Dollar Loss (Property & Contents)	\$1,280,315
Total Estimated Dollar Loss (Property & Contents) 12 Mo. Average	\$252,492
Average Fire Response Time	0:05:25
Average EMS Response Time	0:05:54
Percent Fire Spread Confined to Area of Origin	82%

According to Robert Behn, “neither the act of measuring performance nor the resulting data accomplishes anything itself, only when someone uses these measures in some way do they accomplish something,” (2003). City managers want to measure performance to show

accountability and improve performance, through evaluation, control, budgeting, motivation, promotion, and learning. The CFAI's CPSE accreditation goals outline guidelines for performance measurement and the establishment of Standards of Cover. Each step has models that are available to use as templates within the manual they provide to fire departments. The steps to accreditation are as follows:

Step 1: Complete a review of current deployment

Description of the community served

Review of services provided with the existing deployment and baseline performance

Review of community expectations

Step 2: Complete a risk assessment of the area served

Step 3: Measure the system performance using historical data

Step 4: Adopt draft performance measures

Step 5: Develop or validate a methodology for complying with the performance measures

Step 6: Complete an overall evaluation of the delivery system including any recommendations for changes to deployment or policies within the agencies.

Step 7: Adopt and execute the SOC

Step 8: Evaluate and update the SOC in accordance with the adopted plan

Some of the steps in the accreditation process were naturally attempted at within the performance measurement implementation process, namely in the production of methods for performance reporting and best practices. Through the methods of measuring system performance with comparison to historical data and established benchmarks, best practices and barriers to the performance measurement process will surface through the application of guidelines set out by experts in the actual context of the Bloomington Fire Department and the data system available. While institutional changes (rule adoption) will be made in how this public entity operates, the movement towards to a more post-bureaucratic organization is

evident, as well. As changes towards improvement embody the objective of performance management, any performance improvement in a public service that is currently not on the roundtable can be due to lack of technological or logistical administrative resources, or because the “roundtable” is nonexistent, unoccupied, or inaccessible to certain key members of the network. The actual corrections and organization necessary to compute performance outcomes is only a portion of the necessary components to effective performance measurement. There is also a human relation, investigative and collaborative component that is key to the success of measurement as well as implementation.

Aside from the informational barriers, it has been contemplated that barriers to performance improvement in older public service organizations are due to bureaucratic structure, two-party political systems, or individuals within the organization. The hypothesis of this study is that the barriers are not due to any type of behavioral resistance to performance improvement; rather, the hypothesis is that barriers to performance measures are manifested as resistance to *conflicting or inadequate rules* (Mathauer 2010) that come from solutions that may not have taken into account all of the complexities of the public service entity in question. These rules encompass bureaucratic characteristics. Robust performance indicators, with informational linkages included in the reporting of these indicators, can build the trust necessary for effective rule making.

### Summary

The objective of the internship was to ascertain which industry benchmarks will be used in direct or adjusted application by the case organization, to carry out current and historical performance measurement using the selected benchmarks, to formally adopt performance

measures and methods needed to report these measures in continuity, and to create an evaluation of the organization with proposed changes in regards to the relationship between performance ratings, workload (community demand), and their related inputs (resource allocation and deployment). In this regard, the research endeavor of identifying best practices and barriers will clarify what organizational, industry specific, or case-specific variables must be present for said objectives to be attained.

This research is significant in a number of ways. First, it is politically significant because of the accountability concerns stated in the public administration / public management literature. It is believed that testing these organizational, management, and industry-specific variables produce suggestions regarding the arrangement and performance characteristics of an organization. Furthermore, this research question is legally significant because of the ethical concerns for the public administrator (which would switch from deontological accountability (following the rules) to a consequential accountability (taking responsibility for performance outcomes)). As this is already present today to an extent through decentralization and heightened discretionary duties, the consequential responsibility (and recognition) may be more prominent in post-bureaucratic systems. Thirdly, this research question is administratively significant for the Bloomington Fire Department because the implications of the research could hypothetically change the role of different actors in the case agency, and have subsequent consequences for authority figures, intergovernmental and inter-organizational communication, reporting, and an overall administrative environment. Additionally, this study is important because it is relevant to the public good. It could serve to inform a council or a public group of the nuances existing within the systems of the fire service or further establish that all agencies have nuances that affect performance reporting, and inform public managers of the barriers to accountability and

legitimacy in explaining at what point there is a trade off between accountability missions and public service missions. It could establish where the case organization can apply improvement programs and affect public service in this way as well.

### Delimitations

The identification of barriers and best practices within the case agency selected is based on a self-reported collection of information and is subject to misperception. Findings are taken from the internship period and from the perspective of the intern/researcher, in using public sources of information, such as monthly reviews that are published for public view.

Another delimitation is the premises on which the research question rests – namely, the claim that introducing the performance measuring agent naturally moves the organization towards post-bureaucratic characteristics, in that horizontal characteristics are introduced through informational advantage from the bottom up. It has been established through prior research that post-bureaucratic traits in organizational structure open up possibilities for performance improvement in public management, therefore the researcher, as a participant in the organization, does not want to mistake performance measurement programs as increasing post-bureaucratic characteristics of the organization for this already documented phenomenon. The researcher does not want in the event that the phenomenon does play out, to reject the possibility that there are bureaucratic traits that may actually foster performance improvement. One cannot prematurely claim that performance measurement implementation causes an increase in post-bureaucratic characteristics, but perhaps the process of the individuals trying to implement and make changes within the organization to foster performance measurement may, instead, be responsible for the opening up of the organizational structure. It could be concluded that not only

does the presence of post-bureaucratic characteristics foster performance measurement, but also there is a bidirectional relationship between the institutional change necessary for performance management and post-bureaucratic characteristics.

This research does not aim to prematurely establish that the farther away an organization moves from bureaucracy, the more likely for, in our case, public managers to be more open to performance improvement. It is possible that bureaucratic structure is needed to a certain extent to assure efficiency and effectiveness at a more basic, foundational level. It cannot be assumed that certain organizational structure is key for achieving efficiency and effectiveness in governance, because this assumption would confine this research to state that changes in the internal dynamics of the organization are sufficient to ameliorate outcomes. Instead the testing of performance measurement implementation within the case organization will outline what measures actually reflect effective performance, and further incorporate these methods into best practices.

### **Methods**

Methods used in identifying best practices and barriers were applied during the performance measure implementation process, which was comprised of five main objectives set out to enable performance measurement in the case organization. To summarize, the objectives were to (1) research industry benchmarks, (2) find data sources that best contribute to representations of performance indicators, (3) develop procedures of analysis of performance data in continuity, (4) operationalize the results to reflect interpretable performance ratings, and (5) present performance in a clear way that reinforces the organization's mission (effectiveness-oriented), as well as the overall municipality's goals of efficiency. Through employment of these general objectives, best practices and barriers were recorded from an industry,



organizational, and management perspective. In understanding what best practices and barriers exist within these perspectives, procedures and recommendations can be prescribed in a very literal way. Herein, an evaluation of the organization after implementation of the proposed changes can be conducted in regards to the performance indicators and their related inputs. Performance reviews will help to establish rules, either in office procedures or work policy.

The methods of this case study explain how performance measurement was carried out, pinpoint when during this process did certain barriers did surface or best practices did work, and test the organizational, management, and industry perspectives in identification of these barriers and best practices. The findings of this study therefore outline what barriers and best practices were encountered during the implementation of performance measurement. Discussion and analysis of these barriers and best practices will address causality, symptoms, manifestations, and implications, while recommendations to different actors at different levels of the organization will address solutions and action plans concerning elimination of barriers and employment of best practices.

#### *Tailoring a Performance Measurement System to the Case Organization*

The first objective was to research industry standards and to compile all possible performance measures with respective benchmarks, using NFPA (National Fire Protection Association), CPSE (Center for Public Safety Excellence), ISO (Insurance Services Office), and ICMA (International City Managers Association) sources. The tasks consisted of obtaining and reviewing all relevant manuals, articles, handbooks, and consultant reports, meeting with key staff members and city management and learning information about current reporting, organizational culture, available tools and training, and information on emergency response

incident reporting. Observing personnel during the reporting process, discussing benchmarks, environmental factors, ways of reporting their incident activities, and recording all discussions and meetings as extra sources of information on industry benchmarks proved useful. Compiling the information in a performance measure matrix (Appendix B) was also done. With the matrix, it was necessary to include categories that explained (1) whether the measure is efficiency-related, effectiveness-related, or workload-related, (2) what the performance measure is, (3) what standards cited benchmarks for these measures, (4) what the actual benchmark was (be it an industry standard or an internally-created benchmark, as most industry standards include disclaimers in giving department heads override discretion due to specific community contexts), (5) the actual performance rating of the case organization, (6) a discussion of the contributing factors from the inside and the outside of the organization that affect the outcome of the performance indicator, as well as information on how the performance should be analyzed or reported, and (7) NFIRS variable information that directs the analyst to queries and codes in the database that are extracted into data sets for performance analysis. The creation and maintenance of the performance measure matrix was ongoing as knowledge of the organization, awareness of the entry behaviors into the database, the familiarity with the incident management software, and training on specific analytical procedures for Fire/EMS increased.

In collaboration with staff, the selection of benchmarks in regards to contextual relevancy and reliability was carried out to tailor a case-specific performance measure matrix (Appendix C) for the case organization. The master performance measure matrix is to be kept as the data environment improves (through rectification of discrepancies or errors in the database) to foster more performance measures in a reliable way.

The second objective was to obtain system information and accurate data sets to enable analysis of data that would contribute to eventual illustration of performance outcomes. This entailed identifying areas where incident reporting lacked continuity (with personnel on the data entry side), meeting with key staff members who could help eliminate indicators that are either not reliant on sound information or not applicable to their work environment, identifying informational or organizational barriers and defining symptoms and causes of these barriers, collaborating with colleagues to create action plans for addressing the barriers (solutions included extra query installations, establishing internally designated thresholds, lookups, and logic statements into templates that enabled better analysis of exported performance data, as well as recording projected changes to data entry behaviors on the part of personnel), and making sure all necessary players are present for discussions to improve the data environment to foster performance measurement. These tasks helped facilitate the creation of a list of best practices.

The creation of templates and analytical procedure reports was also a product that sprung from this phase of the program. The identification and modification of database queries, instructions on exporting, preparing, and using a pre-modeled template served to not only institutionalize the analysis and reporting, but also served to reduce time for staff members who had been manually calculating performance to report simple frequencies and averages.

#### *Data Analysis for Fire/EMS Benchmarking*

The third objective in reaching the goal of performance measurement within the organization was to measure historical and current performance based on the adopted measures and their respective organizational benchmarks. In doing this, it was possible to establish drafts of procedures for annual and monthly performance measurement. Tasks involved extracting data

that can be accurately used to reflect performance in comparison to the industry standard or the internally established benchmark. Here, working against gross performance measurement is essential, as the establishment of net performance is applicable for most performance measures in Fire/EMS. Other tasks involved developing and recording further analytical procedures in compliance with the case organization's performance measure matrix, creating all necessary documentation of procedures used to calculate performance ratings, creating user-friendly templates and their respective reporting formats, making sure all components of the process were logically linked together and clearly referenced (to reflect the interpretable outcome), and making sure the processes were understandable and usable by the organization as well as collaboratively interpreted as performance manifested in the work environment. To give an example, in producing emergency call volume on the hour as an aggregated statistic reflecting a full year of run data, showing response activity on "any given day" to the organization resulted in compilation of a list of the reasons why certain calls happen at certain times of day in the specific case community (rush hour, annual festivities, nursing home bed checks, etc.).

Reflecting workload alongside performance is equally important, as heavy workload relates strongly to longer response times to emergency calls. This was especially important, as response times are the primary performance indicator in Fire/EMS agencies.

In carrying out tasks involving analytical processes, interpretations, troubleshooting, and overall collaboration, the operationalization of the performance indicators was possible. To take raw data and translate them into performance ratings, this operationalization was necessary. Where calculations could not be explained textually in a comprehensive way, they were built into excel templates (with graphs that could refresh upon the methodical pasting of new monthly run data) for organizational use and were functional so long as instructions accompanying these

templates were followed. The availability of templates for all future analyses on any system query that the department desired was also advertised to the department. Since there are baseline modifications that have to be done to every exported query (due to past institutional changes, and due to the fact that the output had to be expressed in an understandable way that very much exceeded the capability of the software), the idea was to establish useful ways to pull historical performance from the database. The idea behind accessing historical run data as well as current information was to track changes in workload inputs and performance outputs (performance improvement or performance degradation) due to relatively recent resource allocation, changes in community demand, to see how workload and performance relate to one another, and to put into practice that historical performance should continually be used in the overall performance management program. Likewise, tracing the performance data back to groups and individuals in the organization is possible, thus giving the organization the option of performance ratings per employee to accompany work evaluations that come with human bias.

The presentation of results from the analyses was useful in showing staff the myriad of information that could be pulled from the data and in different combinations, furthering their understanding of the many ways the results can be presented, interpreted or misinterpreted. The manipulation of the data set with pivot tables and graphs gave them an idea of the whole analysis process, which helped to establish trust and buy-in for understanding the means to producing performance statistics. It was also useful to compare the results against the innate experiences of the field experts. Discrepancies did arise and troubleshooting ensued. Solutions often took many days of scrutiny, as problems lay anywhere from entry, to coding, to selection of variables (as the database has over 3,000 different variables, or NFIRS codes, to choose from). Based on staff feedback and troubleshooting analytical processes, more tools and procedures were created,

which served to be key building blocks of an increasing ability to work with the data. The troubleshooting and examination of errors increased confidence in maintaining transparency in performance analyses as well as establishing continuity in the processes. Additionally, where the software could produce simple analytics on an indicator, manually calculating the same results from raw data and crosschecking these with the software's methods proved a useful application of performance measurement precision (Goldsmith 2005).

As a performance measure is a quantitative representation of activities and resources that evaluate whether a benchmark is attained, it is necessary to apply quantitative performance measures to qualitative goal statements. In other words, one must specifically identify target rates, or percentages of each indicator's total output that attained benchmark performance levels. The performance measure matrix illustrates this in specifying, for example, that a certain percentage of all emergency calls should be met with a response time of six minutes or less, or, in another example, that trauma emergencies have an on-scene time (the time from when personnel arrive to when they transport the patient) of under ten minutes 75% of the time. In stating the current activity level, one must include the target information. To say that the confinement of fire spread in a structure fire was contained to the room of origin for 82% of structure fire incidents, one must include that this performance exceeds the ISO benchmark of 66% as well as the internal organizational benchmark of 75%. One must state if the benchmark is also a national standard or an accreditation standard giving more value to the attained performance indicator. Additionally, stating that an improvement took place from months or years prior is another way to further validate the effectiveness of the organization. It is also a way to show increases in workload and changing community characteristics.

While each workload indicator is expressed as a number or a percentage of the total call load, each performance measure is operationalized as a rating, or percentage. The measures selected by the organization for their specific performance management program were used to pull a fixed group of variables from the data into a set that would encompass as many measures as possible, to reduce work hours spent on analysis. The implementation of the program would be better digested if the amount of time invested on the part of employees were minimized. The processes for the selection of the variables, exportation, cleaning and arranging the data set for analysis, the use of pivot tables, and the formulation of performance ratings are laid out in a procedure manual (Appendix D). The manual gives instructions without justification; meaning that it is to be followed to execute performance measurement, not necessarily understand it. The italicized portions of the manual are additions for the purpose of case study explanation.

Once procedures were established, it was important to test them. In other words, tailoring them to each member's reporting habits to not only reduce work time in calculating figures that are already being reported, but also incorporate the benchmark information, add other performance calculations, and format changes. This process, in contrast with all other methods up to this point, was an organizational process, not an informational one. Providing ready-made database queries, analytical processes, templates, and actual language to staff reporting processes was not a mechanical task. Navigating schedules, being aware of apprehension on the part of members who could not embrace change quickly, avoiding blatant situations where a low-grade temporary hire "improves" a senior officer's work style, or simply affronting the lack of trust in the informational system used to produce the performance outcomes – were all situations that were anticipated during this process. Planning a sensitive and collaborative approach was necessary. Accepting to not move forward with the implementation

if all members were not in consensus was also necessary. It was necessary to understand that implementation will not work unless it is truly accepted as a desired, clear, and integrative process. Often, the question of availability and priority were the main barriers standing in the way of progress for performance measurement. It was not a surprise to find that not only did personnel and staff have an overload of work to do, but that civil servants put actual performance in priority versus performance measurement. The recurring insistence of “working rather than reporting work” was not easily refuted. Most organizational barriers could be solved with organizational solutions, but some could be navigated with informational solutions. One example was in trying to gain accurate data output from the dispatch center that automatically populates variable information into the organization’s database. The issue of priority and availability were frontline barriers, while later, additional barriers continued to deter solutions. These additional barriers included apprehension, whether it may have been in regards to the security of the call center database or to the idea of more work, despite the willingness of the program implementer to provide labor. Another possibility could have been fear of disrupting the system that the community so much relies on to work every second of every day, as it is more pertinent to protect the public safety environment than to facilitate the data environment. Researching other community information as well as historical information allowed rule-building within the data sets to circumvent the need for the additional information required from the call center. Building these rules in as a combination of logic statements (“if-then” formulas), lookups, and thresholds proved to give enough information for the analyst to move forward in explaining the workload-performance correlation with minimal disclaimer on the data source. This informational solution allowed the project to continue, despite the remaining, unbroken organizational barriers.



The fourth objective was to finalize performance measurement implementation and to continue to evaluate processes and make improvements. The idea of finalizing the implementation came into conflict with continual evaluation. The revised objective was to continue implementation in the form of evaluative tasks in regards to the current performance measurement system. These tasks included reporting to staff on a regular basis to establish further continuity, and testing the soundness of results with other field experts. The internal reporting to staff was facilitated by regular staff meetings and meeting with personnel on their conception of the performance outcome, the performance rating, and their feedback upon learning of potential measuring processes. The exchanges benefitted entry behavior on the part of personnel as well as analytical behavior on the part of the analyst. This process supports the idea of collaborative rule-making during institutional design that is necessary for program implementation.

### *Reporting Performance*

The final objective was to be able to send performance reviews as educational outreach to staff and decision-makers. This phase was initiated after successful consumption of performance ratings and performance statistics was taking place at the departmental level. This was partially done through presentations to staff members, where interpretations were discussed in a round-table fashion and helped to see if the performance rating reflected what is often known intuitively on the part of field experts. The tasks involved in reporting performance were the presenting of methods and results to show how the information was obtained, thus creating trust of the performance ratings. Through presentation of these phases and collaborative interpretation, recommendations were often formed in these meetings to enable staff to make

administrative changes to incident reporting, training, and deployment. Performance reporting and collaboration at the departmental level proved to be very feasible.

The quantity, quality, and utilization trends of resources are all a part of strategic deployment. The department, as well as the municipality, jointly agrees on these levels of service. Therefore, reporting performance to the department as well as the municipality is crucial. Reporting to the department proved useful, as it permitted the analyst to understand how, beyond ratings, field experts want to see their performance and how they want it to be reported to them. Attempts were made to report to the municipality, and proved to be more complex. This process contributed to the findings of this study in regards to barriers and best practices (either tested or potential).

### **Findings**

The ability to comparably report to both the department and the municipality on performance was very problematic, and served as the largest barrier to program implementation (due to absence of necessary feedback from all stakeholders). The structure of the internship proved to further support the barrier as well. The municipality assigned the project to be overseen by the department head. This was a very logical action, but didn't take into account that the department and the municipality had different expectations of the project. The municipality's expectations centered on the justification of tax dollar expenses through quantitative proof of efficiency and effectiveness (accountability). The departmental expectations centered on their public service mission.

From the departmental point of view, the data and performance ratings as well as workload correlations were to be used internally to improve service to the public through the

formulation of deployment strategies, not be ‘misconstrued’ to the general public on behalf of the municipality. Therefore, consensus on how the performance measurement was to be used was not established from the beginning. The use of the performance ratings did not impact the actual work of the analyst who was more concerned with the implementation process of accurate performance measurement. However, during the reporting phase of the project, the analyst held the complete performance rating results at the departmental level, reporting only partially to the municipality, per direction of the direct supervisor.

This served to be an intriguing illustration of what Wilson and White describe as an administration and politics dichotomy. The analyst intern chose the public service side of the dichotomy in alignment with rules specified in the work contract. This proved to foster the performance measurement implementation for the case organization. The establishment of trust and orientation towards the public service goal, in alignment with all other members of the organization as well as the organizational mission, helped the continual progress of performance measure implementation. However, because the analyst held the belief that the department should share information to show accountability to the municipality, suggestions were made on how to integrate the information into reports, budget narratives, and committee meetings on a regular basis. Likewise, progress reports were sent to the department head with a request to send to the municipality per internship guidelines, and these reports were modified, and then approved. The municipality was, in effect, given “bread crumbs” on current and historical performance of the case organization. The passing of controlled information was able to happen at infrequent intervals.

The consequence of this was, to a certain degree, an inflammation of the already dysfunctional relationship between the department and the municipality. The analyst did address

the idea that in concealing performance ratings, the possibility to gain help through budgetary decisions was minimal, however the department indicated that reporting all performance ratings would still not get them the resources needed due to cutbacks, and due to the fact that the municipality caters to an uninformed and non-participative public.

The connection between the objectives of the municipality and the department are weak due to lack of communication and collaboration. The department feels that the municipality does not respect them or understand their service environment, and the municipality suspects that the department wastes resources because of the lack of accountability. The performance information is not in circulation outside the department due to what is seen as prior irresponsibility on the part of the municipality to properly diffuse the information (i.e. releasing information on performance without explaining the environmental factors that go into performance, the correlation with the performance rating and the increasing workload, and the informational and organizational shortcomings that affect the quantitative expression of a performance outcome). An illustration of this is the municipality's reporting structure. Once the department sends in reports, the performance figures are stripped from the textual portions of the report and entered into a master spreadsheet that is linked to a general report format for the municipality. The department expresses displeasure towards the municipal reports. So in addition to believing nothing will be given back in return for reporting the new performance ratings, the department also believes the information will be inaccurately diffused once leaving the departmental level.

#### *Barriers to Performance Measurement Implementation*

The barriers that came up during the internship can be categorized into two types: informational and organizational. Informational barriers were numerous. The discrepancies that

existed due to lack of continuity in data entry, with conflict of terms (in how to define or code an item in a report) on the part of personnel were such that extensive training classes on NFIRS reporting as well as on fostering the data environment (with avoidance of rule conflicts) have been projected within the department. The repertoire of models and templates used to fix data issues are also extensive, not only due to the already vast array of variable selection and the lack of analytics present within the software, but also due to the need for changes that have already taken place in the organization and to rectify inaccuracies in the database due to entry by personnel (manual entry) or by CAD (automated entry). Likewise, the need for geographic simulation of current workload and performance is great.

The organizational barriers were also numerous, ranging from lack of communication between the department and the municipality to lack of communication within the organization. The workload of the municipality and the organization was also such that it was difficult to justify the small steps and tasks within program implementation as taking priority over direct service. According to the Department of Labor and Statistics, the government sector in Bloomington, IL has experienced a loss of around 1,000 jobs during the past three years. Additionally, barriers due to hierarchy, fear of institutional change, and fear of job loss were also present.

Another possibility was also introduced to the analyst as a barrier to performance measurement implementation as an institutional design (rule adoption, rule implementation, rule enforcement). The idea of moving forward with the process on a municipal level involves policy-making and liability, or litigation. Within budgets and resolutions, management and city council may equate line items and allocation to performance outcomes (as in simple objective statements, one states the activity and projected outcome as justification for the input being

provided). It is possible that some actors in the organization want to discourage the establishment of benchmarks, especially if they are not state-required, to avoid the possibility of litigation, in knowing that there is underperformance along the standard and not addressing the details of the problem, especially in knowing the portion of the public that the problem affects. Here is an example of legality and regulation that is acting as a barrier to effective performance management, and moreover, effective governance. Due to the simple fact that one cannot break a rule that does not exist, there is no legal responsibility to provide effective services to excellence standards within respective departmental policy, therefore protecting the municipality or organization from liability. With conflicts like this, local government needs individual and regulatory capacity for the establishment, measurement, communication, budgeting, implementation, evaluation, and improvement to effectively serve, maximize the returns (net efficiency), and minimize the risks. The presence of informed decision makers with established processes to weigh returns and risks on departmental deficiencies and make decisions is essential. In this regard, performance measurement seems to be mandated without sufficient organizational capacity to meet the requirements. In other words, if rule making is being avoided while departments remain under-empowered to implement accountability practices, then tools/skills needed to continue performance improvement towards standards are not given due to absence of standards. This idea was also offered as one of the reasons that the analyst could not share performance ratings at the municipal level.

### *Best Practices*

Best practices vis-à-vis an organizational perspective, management perspective, and industry perspective were also supported by the case study. From an organizational perspective, a participative environment, Theory Y and Z characteristics, post-bureaucratic characteristics,

high levels of communication, high levels of collaboration, the presence of motivation (morale), and dispelling fear of institutional change are all applicable to the case study in regards to successful implementation of a performance measurement program.

From a management perspective, gross performance management, as well as the misinterpretation of performance ratings due to disconnect from the performance context must be avoided. Additionally, due to the dependence on the central departments of the municipality for inputs into the performance environment, strong communication and information sharing is necessary. Likewise, collaboration during rule implementation and enforcement, as well as what is the best illustration of performance for interpretive reasons is necessary. The openness with a performance budget can closer align departmental objectives with the municipality to more easily justify resource allocation as well as allow the municipality to measure allocation efficiency.

From an industry perspective, it is important to match workload/demand to performance to justify resource allocation and continue data-driven decision-making (this includes citing the distributional effects through the inclusion of committed times, as well as the correlation between workload and longer response time). It is also necessary to cite all costs of fire and projected savings from the data-driven allocations, thus justifying the retention of the analytical aspects of performance measurement as well as the analyst. It is also important to report thoroughly on the environmental variables that affect performance. In addition to performance reporting, it is necessary to represent community demands and performance geographically to pinpoint community risks (where the input of demand and the output of performance do not match up). Finally, it is essential to design and use a context-specific performance measure matrix to eventually develop a Standard of Cover (CPSE).

Additional findings revealed that informational solutions could fix organizational barriers (which supports the need for further research on whether the use of technology can address organizational issues of motivation, communication, and collaboration). Characteristics discussed in the organizational literature were also observed as barriers to implementation, such as the transformation of messages as they travel up and down the hierarchy (Barzelay), the politics-administration dichotomy as also played out as elitist vs. public opinion in affecting budget decisions, a lower-motivation and lower employee satisfaction environment, conflicts of interests at a city level, a departmental level, and an individual level with respect to organizational goals (Senge), and institutional bottlenecks (Mathauer).

Finally, it was found that the reduction of work time for members of the organization is a good tradeoff for implementing additional tasks to these members. Streamlining current reporting processes while building in additional tasks that foster the performance measurement process should be done whenever possible (so as to keep the information coming from the same members that were in charge of it from the beginning – ensuring continued job security for these members).

Other notable findings were that the organization, while highly hierarchical and compliance-oriented (due to the culture of discipline), did have characteristics that exhibit potential for post-bureaucratic variables that foster productivity and positive change. There is a high amount of associational activity within the department. Members are involved in sports leagues (i.e. a firefighter hockey team that plays against a police team in tournaments known as “Guns and Hoses”), community service events during holidays, participation in honor guard and regional events, several committees, and social circles (co-workers know each other’s wives and children). There is a high amount of solidarity and fraternity, as well as dedication to one



another. These are characteristics that McGregor, in his Theory Y formulations, identified as precursors for responsibility sharing and highly participatory environments (1957). This type of belongingness and common values are what can enable responsibility sharing within the organization, leading to accountability at lower levels, where ownership of performance outcomes is shared and taken on as a group.

### **Discussion**

As findings established what barriers and best practices came into question in regards to the case organization, a discussion of observation, analysis, and definition in regards to these findings is necessary to identify problem-solving plans to foster not only the continued use of performance measures in the case organization, but also the proper usage of these measures (for performance management, operations, and accountability).

#### *Wilson and White's Politics-Administration Dichotomy*

As Wilson ascertained that good governance meant not only having the skills in the specialization of the services one is rendering, but also in interpreting and improving policy, all with an educated, informed public opinion in demand towards local governments and departments, White's reply was that these functions are highly difficult due to lack of coordination, fiscal authority, and leadership to carry out policy. White's reply to Wilson's prescriptions in resolution of the dichotomy-driven dilemma is no longer applicable due to decentralization, tenure, training, and a developed democratic environment. Therefore, a "back to basics" description of Wilson's conception of the politics-administration dichotomy seems applicable with the case organization. This is because the dichotomy is manifested as misaligned views on the part of the municipality and the department in how to use performance

measures in regards to each entity's manifestation of their responsibility to the public. While the responsibility that the elected officials (the decision makers that affect the public service entity) have is showing accountability for their promises made to public during elections and the responsibility that the public service leaders (department heads that hold the most responsibility for the performance of their organization) have in meeting public service goals, performance measurement is the savviest and most effective way to justify the efforts of either party. It can quantitatively explain how planning/budgetary decisions improve efficiency and effectiveness, and it can likewise advise deployment and flag community risks. Naturally, the preferences in regards to the function of performance measurement by the political municipality and the departmental administration will come into conflict, not because one cannot accomplish both functions at the same time, but because the outcomes of performance measurement may cause conflict regarding optimal operations and community safety. If the department is seeing real need and can prove it statistically, the need may go unnoticed if the municipality is tracking improvement in performance ratings. This is because the municipality is measuring performance and the department is measuring capability and reliability through further measurements reflecting unit coverage, availability and utilization. The department knows its weaknesses and wants to fix for them before real problems occur. In currently operating in the leanest way possible, no cushion leaves a feeling of insecurity. The municipality is keeping its promise of balancing the budget and is able to say problems are minimized (not occurring). However, it is important to remember that neither side discounts the urgencies of the other. The municipality is concerned with having a working department that is meeting its mission, and the department head does aim to deliver public goods and services efficiently and effectively. All in all, this characteristic of unaligned preferences of use for performance measurement counts as a modern

manifestation of the politics-administration dichotomy, which fuels institutional bottlenecks, such as communication issues, within and beyond the organization.

### *Institutional Bottlenecks*

The observed institutional bottlenecks – which have been described as a lack of communication between the department and the municipality as well as within the organization, the unavailability of colleagues due to workload, hierarchy that distorts communication, a general fear of change and of disseminating information, distrust of technology, lack of morale and motivation, a conflict of objectives between the municipality, the department, and the employees, lack of participation and responsibility sharing, lack of collaboration due to rigid job descriptions, and a presence of conflicting and inadequate rules – are all interrelated.

### Communication Issues

Employees are experiencing communication issues due to either the lack of a clear avenue of communication, unavailability or unresponsiveness of colleagues, missed meetings, not answering emails out of fear of putting things in writing, or not getting all key players at the table. Furthermore, due to dissatisfaction with the municipality's budget decisions, there is a 'choosing of sides' and somewhat of a departmental pressure to not cooperate beyond the minimum with the municipality. Sometimes communication is not even attempted due to past experiences of having communication badly interpreted, 'stepping on someone's toes' addressing an issue that jeopardizes someone's work, or concealment of information. Additionally, communication is subdued due to the lagging or nonexistent response in either requests to meet, the idea that some people cannot be spoken to directly, or that lower-level employees should not take more than a few minutes of higher level employees' time to either

obtain approval, get advice, get an expert interpretation, share progress, explain work issues, or get direction. These experiences are being faced by a number of people within the Bloomington Fire Department and in the City of Bloomington.

### Employee Morale

Employees are experiencing dissatisfaction with their jobs, a lack of technology-related training, a disconnection with the mission of city, a feeling of being overworked, and some are not being rewarded or given recognition. There are limited participatory or responsibility-sharing opportunities due not only to the sharply defined job descriptions but also to the lack of collaboration due to the unavailability of others. The heavy workload and unavailability is suspected to be related to a wrong kind of recent downsizing – which was not due to reform, but recession, not due to a decrease in middle management and streamlining, but a decrease in valuable human capital. Not only has human capital decreased, but also those who are left are fearful of sharing information to aid collaborative efforts towards organizational goals, therefore leaving a very slow pace of work and little sense of accomplishment. This general dissatisfaction affects motivation, which affects performance.

### Hierarchical Issues

There is not only a tight control of information, but also a lack of fluency in communication across hierarchical levels. This static is most likely due to possessiveness of role or job description, where fear that loss of control of information could result in job loss or a bad public image of the department or the municipality. There is also a disconnection of interests and objectives between individuals on different levels of the hierarchy, and as Senge points out, this is due to dictated goals from the top down, with an emphasis on compliance. This, as what

Ouchi establishes as mission disorientation, is due to lack of leadership opportunity within the organization, which would otherwise allow members to focus on the mission and feel a sense of accomplishment. The mentioning of the incongruence of the goals in using performance measurement objectives between the accountability-oriented municipality and the service-oriented department is a good example of this inasmuch as the department feels the municipality is not treating its information accurately since there is a misinterpretation once the information goes out of the experts' reach, as Barzelay suggests.

### Participation/Collaboration

The hierarchical and communication issues overlap with the lack of participation and collaboration between the organization and the municipality, as well as within the organization in regards to performance measurement implementation. It is important to note that members of the organization did express regret in not being able to collaborate (whether due to lack of authority or lack of knowledge in regards to the specific endeavor). Other factors include a resistance to reveal that one is undertrained or under-informed out of fear of losing their job or their authority over a function, resulting in one doing their job poorly and trying to 'cover up the tracks.' Another factor is the idea that there cannot be a crossing over into other job areas – each employee has a set role and any crossover is seen as “stepping on toes” instead of working as a whole towards a common goal. One example is the process by which the organization does monthly reports. Despite the fact that several employees in the organization could compile all necessary components, synthesize, and send, instead these employees wait for high-ranking officers who insist they statistically report on their own activities or operations that they oversee despite the fact that they lack the time and technological skill of getting the tasks done in a timely fashion, as well as, on occasion, in respect to accuracy. Suggestions to produce the

reports and obtain approval from these officials have proven unsuccessful, according to one employee. Deadlines are missed anywhere from one week to one month out. Attempts to bring discrepancies to light have been met with warnings or cynical comments, according to another employee in the organization. Thus, little participation and collaboration happen to get monthly reports (the department's main accountability practice) sent to the municipality in a timely way. This adds to the strain on the relationship between the municipality and the department.

### More Institutional Bottlenecks

Of the institutional bottlenecks that Mathauer identifies, all exist in some form in the case organization. One can find examples of rule absence, inadequate rules, conflicting rules, weak rule enforcement, weak organizational capacity, and dysfunctional relationships. The most prominent example of a conflicting rule has been in regards to the internship guidelines for the performance analyst. The department and the municipality had conflicting ideas on what the analyst should do with the new information, as the municipality wanted the analyst to facilitate the collection of performance ratings and other statistical performance information for a incorporation into a set of performance measurements for the entire municipality (for them to reflect their tracking and accountability and eventually obtain accreditation). The department however wanted the new information for their organizational effectiveness in service to their mission of protecting life and property, and often expressed the need for the data to be used for valuable purposes and to be kept internal. Rule absences, in regards to issues that exist that necessitate behavioral changes to find resolution, were illustrated by the need for changing data entry behavior to foster performance measurement. In regards to the enforcement of deadlines or administrative performance, weak rule enforcement exists between high ranking officers due to the many years they've worked together and their friendship or mutual respect.

One example of an inadequate rule was in regards to administrative preferences in how reports are processed on a daily basis. Personnel had been selecting the station where the incident report should be reviewed based on the fact that a call was serviced by a unit from that station with a firefighter/paramedic from that station. This administrative behavior served the order of discipline where supervisors' daily review of personnel activity was fostered by the way the station information was entered into the incident report, spurring the reports to be accessed by that station the next day. This was problematic because the incident didn't necessarily occur in the station's service area (called district), therefore skewing the data in terms of knowing a certain service area's incident type frequency as well as identifying how often units are going out of their service areas and getting longer response times due to distance of travel (which happens frequently for communities that have several stations as it is necessary to cover one another's service areas if incidents are happening simultaneously). It was necessary to change the idea that a station "owns" a call for quality assurance purposes to having that station better know their service area by having incident statistics generated for total call volumes that are properly identified as occurring in their area, whether units from that station serviced the call or not. The analyst did get approval for the change, but was hesitant to execute it technologically and in a short amount of time (meaning there would have been little organizational deliberation and 'buy-in'). Instead, the analyst decided to correct for this in the data (by using proxy variables in place of station and station service area, namely unit name and GPS coordinates). This is another example of breaching an organizational barrier through informational (or technological) means. It was also a way to check if the results would be substantial before changing administrative habits. By using unit activity with latitudinal and longitudinal threshold coordinates, the 'going out of district' statistics could still be generated. However, to be able to get the data entered in

congruence with this now remains a goal of the department so that entry behavior is an essential rule-changing site. That is one of many pieces of evidence showing signs of openness and desire on the part of the organization to foster the environment necessary for performance measure implementation. In regards to the specific rule change, it is unclear whether the change would be more of a tradeoff between being an ‘inadequate rule’ to becoming a ‘conflicting rule.’ To change this particular quality assurance habit, when the data can be obtained otherwise, could create confusion on who is reporting to whom on a daily basis as the emphasis shifts from station to unit. This possible change is regarded as a large one, and the willingness to make the change shows that the organization wants to shift from looking at the station as the work environment to looking at the station service area (as workload is, in effect, community demand).

#### *Problem Review*

The communication, collaboration, motivation issues, as well as the hierarchical and institutional bottlenecks are all problems that overlap. These problems have been described in so much as the symptoms have been discussed. As the issues laid out can be defined as institutional bottlenecks, Mathauer encourages a transformation of these bottlenecks into positive action plans. To transform bottlenecks, one cannot only identify, define and describe the issues, but also understand the factors behind the bottlenecks. In other words, it cannot suffice to see whether the bottleneck is due to absences of rules, conflicting rules, inadequate rules, et cetera. One needs to also look at *why* there is a rule absence, a rule conflict, and so on.

What is important to remember about the institutional bottlenecks observed during this study is that on a micro-level, solutions seem very attainable, due to the affable personalities of the individuals involved. The symptoms occurring in administration could be due to a number of



circumstances, such as recession and cutbacks, or structural characteristics within the organization. These circumstances seem to be wearing down the members of the organization. Increased communication and collaboration can proactively build a sense of trust and security in the work environment, and education, on the inside as well as the outside of the organization can also help ease apprehension and build confidence.

The control of the dissemination of information (i.e., performance ratings) is stifling the formal adoption of performance measures for accreditation purposes and disabling possible justification of resource allocation on the part of the municipality. While this has been discussed, it is also possible that fear of public or legal backlash is also a cause of the problem. If the information is disseminated and strategic plans and policies are adopted, a liability is created and the inner workings of the organization are exposed before the department has a chance to spearhead operational gaps or behavioral inputs. In holding the municipality or the organization to standard, falling short of that standard contains risk of litigation by unsatisfied customers. This, as well as job loss and a smeared public image, may fuel the fear driving the control of information. The idea of protecting the public safety system from outside hands could be a justification for the control of information as well. Financial burdens, resignations, and negative press usually impede public service entities.

### **Recommendations**

The department and the municipality should remember that top-down, compliance-oriented initiatives are not feasible due to the structure of authority and discretion already in place today (where fire chiefs have jurisdiction and decision-making rights in regards to departmental management). There are, therefore, solutions that can help dispel said fears in the

organization. The fears that drive the control of information and lack of cooperation between the municipality and the department in regards to the performance measurement program also fuel the conflict of objectives they both hold for the use of the performance rating and how it affects performance measurement implementation. As this perpetuates the administration-politics dichotomy, Wilsonian prescriptions come into question.

Prescriptions to resolve the dichotomy can be introduced through rule-making (institutional change). In transforming bottlenecks into action plans, a number of recommendations for performance measure adoption are necessary. As experts tend to get frustrated with uninformed persons who have a hand in decision-making that affect their service domain, the department head needs to quell frustration when there is a misinterpretation of information on the part of the municipality. Instead, he should try and hone, with the help of colleagues and employees, the information necessary to launch an educational campaign aimed towards educating decisionmakers in local government, as well as their constituents on the performance environment and the nuances that affect performance outcomes. Under the pretext of public education, which is solidly traced within the mission of the organization, an educational initiative that involves city officials could work nicely. Because environmental factors that affect performance of Fire/EMS personnel are often actions or inactions of the public (early notification of fire or medical emergencies, crowds, diversions, yielding for emergency vehicles in traffic, preventative tasks against fire in the home), it would be an easy task to overlap the public education goals of the organization with efforts to also keep performance reporting in context when disseminated out to the city. For the analyst, it is recommended that information on environmental factors affecting performance be quantitatively collected and reported to accompany performance ratings through illustration of the relationship. Thus, additional

measurements can be added in and reported as performance-related statistics. It is also recommended that the analyst use other technological methods to circulate said educational material that is an alternative to report format – perhaps through audiovisual means, through narrated Power Points and institutional videos for the organization on performance measurement, methods, and specific departmental performance contexts (which would also address the lack of time officials have to read reports). It is recommended the municipality accept invitations to learn about the nuances that exist within the Fire/EMS work environment and how those nuances affect performance measurement. It is important that they engage themselves more openly with lower level employees who have been immersed in the workings of the department and can suggest what is needed for accountability sharing and accountability practices to work. It is also recommended to the municipality that suggestions be asked of the department more often on how performance can be reported safely and in what format it is preferred by the department to keep the performance ratings in context as to be more accurately understood by officials and their constituents. The analyst needs to insist on increased collaboration from the department and the municipality to produce performance ratings that are deemed publicly consumable and explainable, to frame a question of whether current ratings are acceptable as well as changeable, and what is needed to affect the improvement of ratings based on historical, context-specific evidence. To all parties, it is important to openly and respectfully criticize and self-criticize, communicate to educate, and increase communication in general amongst each other. It is important to collaborate during decision making, to discourage oneself from imposing compliance (which dispels possibilities of accountability sharing). If the recommendations are considered, the eventual decrease of fear and increase of information sharing will help develop a

more informed public and a more informed council to gauge whether the departmental performance ratings are acceptable or indicate a need for support.

How can the organization and the municipality, together, play down the administration-politics dichotomy? The recommendation is to (1) emphasize and solidify common objectives and (2) establish negotiation on public service objectives vs. political objectives (“I’ll do this for your accountability if you do this for our operations”). So long as the city has a working democratic model in local government, the politics-administration dichotomy can never be fully dispelled, but instead can be incorporated as an unavoidable and integral part of the negotiation rounds of aligning common interests and objectives and trying to balance the conflicting items on the table. The identification of clashing interests precedes a give and take on the negotiation table – it will help identify the problem and take the focus off of the actual actors, hopefully suspending some of the resentment. The frustration, to date, has been due to the fact that when giving the municipality the accountability information it needs, the department has not seen them use the information to help get the resources necessary for performance improvement – whether it be through a sustainable systems analysis mechanism or person in the organization to foster data-driven deployment, or actual equipment or personnel necessary to meeting industry standard. The recommendations put forth represent a compromise in collaboration to establish the identification of objectives, the alignment of common objectives, the negotiation, increased communication, and enhanced education. Another recommendation is to, in considering all recommendations thus far, assess what the rewards would be for the municipality, the department, and the individuals to take these steps towards collaboration. Keeping the reward in mind can sustain motivation at higher levels during this process. The municipality will emphasize the need for timely reporting of performance ratings and further support for

accreditation objectives. This will lead to discussions on what additional training and resources are necessary for sustainable performance measurement, whether it be gaining a systems analyst on a full-time basis, giving employees development and leadership opportunities, or discussing how the new performance information will be packaged, circulated, and managed responsibly on all levels. These recommendations can be seen as the organizational side of solutions for the bottlenecks. Along with logical analytical procedures, these best practices could foster performance measurement and the rewards that come along with it (accreditation, grant management and support, higher performance, better public service).

### **Conclusion**

Best practices can be employed through techniques (procedures, action plans, meeting schedules) to increase communication within the organization. Employing this offense against these organizational barriers is complementary to continuing optimization of the data environment within limits traced out in regards to preservation of the public service environment. Addressing discrepancies in data systems due to lack of continuity in data entry (conflict of terms due to high volume of codes and contingencies), building in templates to fix data issues, geographically simulating of current workload and performance are all best practices in regards to informational barriers of performance measurement in the case organization. Furthermore, encouraging the adoption of benchmarks on a municipal level can facilitate performance improvement towards standards, which can positively impact the department not only to benefit implementation, but also so that the municipality is obliged to give attention to establishing the acceptable risk in regards to departmental performance and public safety standards. The best practice of increasing communication on issues directly or indirectly relating to performance measurement is essential, whether to address fears of job insecurity or to ameliorate the

municipality's capacity to correctly interpret performance ratings. The practice could put other information-sharing and responsibility-sharing issues into dialogue, or be useful in designing and using a context-specific performance measurement system to eventually develop a community-specific standard (such as a Standard of Cover, CPSE) which enables accreditation and further community benefits.

Although the department has already begun benchmarking by employing many of these best practices that alleviate barriers and bottlenecks, it still needs to open up to the city and attempt to better explain performance in context, for educational purposes and for the aim of getting further support. The accomplishment of this will mark substantial institutional change, as well as show movement towards a more post-bureaucratic mode of organizational life. This will benefit the entire municipality, as it will show that government is more perceptive to changes in society seeing as how those changes manifest themselves as tracked demands on municipal services alongside concurrent performance ratings. The public entity will be perceived as quickly responding to community changes due to their constant assessments of workload and performance, and be able to make adaptable changes as such. This would move public service organizations closer to being "open government."

As changes towards performance improvement embody the objective of performance management, any performance improvement needed in a public service that is currently not on the roundtable can be due to either the lack of detection by analytical tools or persons, or due to the "roundtable" being nonexistent, under-occupied, or inaccessible to certain key members of the decision-making network. The actual data corrections and attention to detail necessary to compute performance outcomes is only a portion of the necessary components to effective

performance measurement, there is also a human relation, investigative and collaborative component that is key to the success of implementation.

All of the recommendations suggested to foster the performance measurement system can be established as analytical procedures, organizational procedures or habits, and public education or training programs for the municipality and the department. Data driven operations based on the dissemination and collaborative interpretation of performance ratings and community demand can help foster not only performance management, but accountability, financial stability, legitimacy and the overall public service mission.

## Bibliography

- Barzelay, Michael, and Babak J. Armajani. 1992. *Breaking Through Bureaucracy*. University of California Press. Pp. 3-9; 115-133.
- Behn, Robert D. 2003. "Why Measure Performance? Different Purposes Require Different Measures." *Public Administration Review*. September/October, Vol. 63, No. 5. Harvard University.
- Bloomington (Illinois). City Manager Monthly Report. January-December 2012.  
[www.cityblm.org](http://www.cityblm.org)
- Blum, Edward H. 1970. "Fire Service: Challenge to Modern Management." *Public Management*. November 1970. The New York City-RAND Institute. New York, New York.
- Commission on Fire Accreditation International. 2008. "Standards of Cover," 5<sup>th</sup> Edition. The Center for Public Safety Excellence. Chantilly, VA.
- Conlan, Tim. 2006. "From Cooperative to Opportunistic Federalism: Reflections on the Half-Century Anniversary of the Commission on Intergovernmental Relations," *The Public Administration Review*. Pp. 663-676.
- Downs, Anthony. 1967. *Inside Bureaucracy*. RAND Corporation.
- Gaus, John M. 1947. *Reflections on Public Administration*. University of Alabama Press.
- Goldsmith, Stephan, ed. and Donald F Kettl, ed. 2009. *Unlocking the Power of Networks: Keys to High Performance Government*. Ash Institute for Democratic Governance and



- Innovation. John F. Kennedy School of Government. Harvard University. Brookings Institute Press. Washington D.C.
- Gulick, Luther. 1937. "Notes on the Theory of Organization," *Papers on the Science of Administration* pp. 1-14. Institute of Public Administration. New York.
- Hall, John R. 2009. "Total Cost of Fire in the United States," National Fire Protection Association Fire Analysis and Research Division. Quincy, MA.
- Herzberg, Frederick. 1959. *The Motivation to Work*. New York: John Wiley and Sons.
- Insurance Services Office. 2012. "ISO Community Fire Suppression," Fire Suppression Rating Schedule.
- Klitgaard, Robert, and Paul C. Wright. 2005. *High Performance Government: Structure, Leadership, Incentives*. RAND Corporation. Santa Monica, CA.
- Flynn, Jennifer D. 2009. "Fire Service Performance Measures," National Fire Protection Association Analysis and Research Division. Quincy, MA.
- Maslow, Abraham. 1970. *Motivation and Personality*, 2<sup>nd</sup> edition. New York: Harper and Row.
- Mathauer, Inke, and Guy Carrin. 2010. "The Role of Institutional Design and Organizational Practice for Health Financing Performance and Universal Coverage," *World Health Report 36*. World Health Organization.
- Mayo, Elton. 1945. *The Social Problems of an Industrial Civilization*. Division of Research. Harvard Business School. Boston, MA.

McGregor, Douglas Murray, 1957. "The Human Side of Enterprise." *American Management Association, Inc. Management Review*.

National Commission of Fire Prevention and Control. 1973. *America Burning*. Government Printing Office. Washington D.C.

NFPA's Metropolitan Fire Chiefs and Urban Fire Form. 2011. "Fire Service Deployment Assessing Community Vulnerability," National Fire Protection Association, Quincy, MA.

National Fire Protection Association. 2010. *NFPA 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*. Quincy, Washington D.C. Government Printing Office.

National Fire Protection Association. 2010. *NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*. Quincy, Washington D.C. Government Printing Office.

Ouchi, William G. 1981. *Theory Z*. New York: Avon Books.

Popovich, Mark, ed. David Osborne, Jack A. Brizius. 1998. *Creating High-Performance Government Organizations: A Practical Guide for Public Managers*. Alliance for Redesigning Government. Jossey-Bass Inc. Publishers. San Francisco.

Bloomington (Illinois). Public Safety Committee meeting presentation of Illinois Fire Chief Association consultation report on Bloomington Fire Department 2011 Assessment. 2/14/2013.

Rosenbloom, David H. 1983. "Public Administration: Theory and Separation of Powers," *American Society for Public Administration*. Washington, D.C.

Senge, Peter M. 1990. *The Fifth Discipline*. London. Century Business.

Stillman, Richard J. II, 1996. *Inside Public Bureaucracy*. Nelson Hall Publishers.

Tomes, William E. 2007. "The Correlation of Fire Dept. Performance as to Improved Public Protection Classification Ratings," *Public Policy and Practice*. Institute for Public Service and Policy Research. University of South Carolina.

Weber, Max. 1946. *Bureaucracy*. Oxford University Press, Inc.

White, Leonard D. 1955. "Introduction of the Study of Public Administration." The Macmillan Company.

Wilson, Woodrow. 1887. "The Study of Administration." *Political Science Quarterly* 2.

## **Glossary of Terms**

Benchmark – A quantitative representation of a target performance rating; an adopted quota for organizational production or performance.

CAD – Computer-aided dispatch; a call center that serves as a public safety answering point (PSAP) for all emergency situations.

Data Environment – the sphere of factors that affect the reliability of data for performance measurement.

GPM – Government Performance Management – the use of performance measurement for accountability practices and data-driven decision making in local government.

HazMat - Hazardous material; any material that is “an air-reactive material, flammable or combustible liquid, flammable gas, corrosive material, explosive material, organic peroxide, oxidizing material, radioactive material, toxic material, unstable material, or water reactive material. Any substance or mixture of substances that is an irritant or a strong sensitizer that generates pressure through exposure to heat, decomposition or other means” (NFIRS).

Industry Perspective – Theoretical frameworks developed by field experts.

Institutional Design – The practice of implementing institutional change, which is the creation and enforcement of rules within government entities.

Logic Statement – An “if-then” formula used in data analysis to flag one or more occurrences within one field or variable. These are used to enable further statistical operations in creating variables that answer additional questions about the cases in the data set.

Management Perspective – Theoretical frameworks developed by public management experts.

NEMSIS – National Emergency Medical Services Information System; reporting modules for data entry that are one of two components of database used to store Fire/EMS incident reports.

NFIRS – National Fire Incident Reporting System; reporting modules for data entry that are one of two components of database used to store Fire/EMS incident reports.

Organizational Perspective – Theoretical frameworks developed by organizational theorists.

Organizational Theory – The study of organizational approaches that maximize production.

Performance Indicator – a variable or field that must be measured to calculate performance outcomes; an action or event outcome on the part of the performing entity that is focused on in deciding level of performance.

Performance Measure – a rule in which states a condition for performance, based on industry standard, which has a corresponding benchmark.

Public Administration – The study of public policies and services within the executive branch of government.

Public Management – a sub-discipline of Public Administration; the study of efficiency and effectiveness in public administration.

Target Benchmark – A secondary benchmark that exceeds a threshold benchmark, and signals that an organization is performing to excellence.

Template – a file (an excel file in the case study) which is fully developed with formulas, pivot tables, and refreshable graphs, despite absence or presence of data, so that results are

immediately produced upon the dumping of new data into the spreadsheet; templates are useful for streamlining data analysis processes, in establishing continuity for monthly, quarterly, or annual reports so that performance can be comparable over time, and in reducing the workload of the analyst and others.

Threshold – a value that marks a benchmark within a data set. The threshold is used in application of a logic statement to a performance indicator field/variable in which compliant values are flagged as meeting benchmark. The combination of a threshold and a logic statement allow the calculation of a performance rating in using the count of compliant cases divided by the count of total cases.

Threshold Benchmark – a primary benchmark as defined by industry standards, which, if adopted, reflects compliance of the entity being assessed.

## Appendix B Fire/EMS Performance Measure Matrix

Fire / EMS Performance Measure Matrix - Master Matrix provided to Bloomington Fire Department						
<u>CATEGORY</u>	<u>MEASURE</u>	<u>STANDARD</u>	<u>BENCHMARK</u>	<u>2012</u>	<u>DISCUSSION / INPUT</u>	<u>NIFRS Variable</u>
Workload	Fire & EMS Expenditures	n/a	n/a	\$13,565,801	\$15,221,156.00 per City Budget in Brief	Accrued
Workload	Actual Fire & EMS FTE's - stratify by FF only, FF/paramedic, paramedic only	5.2.3.1.2 - In jurisdictions with tactical hazards, high-hazard occupancies, high incident frequencies, geographical restrictions, or other pertinent factors as identified by the AHJ, these companies shall be staffed with a minimum of 5 or 6 on duty members.	5-6 per station	109 Minimum on duty per Station 1 - 8 Station 2 - 6 Station 3 - 5 Station 4 - 5 Station 6 - 4 Plus 1 Asst. Chief. Min 29 Max 34	The actual minimum staffing at BFD meets NFPA Standards for personnel quantity for all emergency response situations.	n/a
Workload	Budgeted Fire & EMS Staff	n/a	n/a	109	n/a	n/a
Workload	Budgeted Volunteer and Paid On-Call Fire & EMS Staff	per AHJ command 5.3.2.2.2, NFPA 1710	n/a	0	n/a	n/a
Workload	Minimum Staffing per In Service Pumper / Engine	NFPA 1710 - 5.2.3.1.2 / 5.3.3.2.2.1 Units that provide emergency medical care shall be staffed at a minimum with personnel trained to the first responder / AED level.	Minimum per ISO reference	Fire/EMS FTEs= 109. Minimum on-duty per Station 1 - 8. Station 2 - 6. Station 3 - 5. Station 4 - 5. Station 6 - 4. Station 5-closed. Plus 1 Asst. Chief/Chief on duty. Minimum 29 staff on duty per shift.	The actual minimum staffing at BFD meets NFPA Standards. / EQUIPMENT. Staffing for BFD is at minimum due to cutbacks and maximum scheduled is due to account for vacation and/or sick leave, injury, and Kelly days.	n/a
Workload	High Hazard Occupancies	5.2.3.1.2 - In jurisdictions with tactical hazards, high-hazard occupancies, high incident frequencies, geographical restrictions, or other pertinent factors as identified by the AHJ, these companies shall be staffed with a minimum of 5 or 6 on duty members (in other words, 5-6 personnel should respond to these emergencies at a certain % of time per AHJ designation).	internal	NR	Figures are averages as of August and off due to continuous rounding up per month. See Fire Propagation Curve. Shows rapid increase in property loss during the 8-10 minute marks. 5.2.2.2.1 interior attack on working fire should reduce loss of lives and property if confined to room of origin. On average 0.05% of lives are lost when confined to room of origin; on average \$300 loss. When confined to floor, 1.7% of lives are lost and \$34,000 loss. Beyond floor of origin, average 2.7% of lives/\$59k property loss. // Early notification, unit availability, other emergencies or calls ongoing, resources, distance, diversion, directions, traffic, depends on if arrival before flashover, if hazardous materials are associated with incident as well as EMS needs (so complexity of the call), contents of the interior of the structure, the age of the building and code compliance, accessibility of the location to fire suppression resources (cuddesacs, etc.) also call handling, type of alarm, turnout, time of day (night vs. day). Whether the incident is mutual aid or not (goes with direction	Once occupancy information is populated over from PACE, NIFRS Basic query provides personnel quantity for different property types/incident types. Information is not yet accessible in the module as of 2013.
Workload	Medium Hazard Occupancies		internal	NR		
Workload	One- and Two-Family Residential Structure Fire Incidents		internal	NR		
Effectiveness	% Confined to Object of Origin	5.2.2.2.1 Fire Propagation curve states that fire extends beyond room of origin around 8 minutes. 5.2.3.1.2 - In jurisdictions with tactical hazards, high-hazard occupancies, high incident frequencies, geographical restrictions, or other pertinent factors as identified by the AHJ, these companies shall be staffed with a minimum of 5 or 6 on duty members. Confinement to Area of origin is per AHJ designation. ISO Designates 66% benchmark, while BFD has internal benchmark of 70%		34%	Limit analysis to incident type 100-199 in the NIFRS Basic module for fire-related calls. Stratify categories. Fire confinement should be measured within the subcategory of structure fires (providing measures on vehicle fires, outside and other fires is optional).	
	% Confined to Room of Origin			49%		
	% Confined to Building of Origin			18%		
	% Confined to Area of Origin		<70%	82%		
	% 1- or 2-Family Dwellings with Fire Spread Confined to Area of Origin			NR		
Workload	Total Incidents	n/a	n/a	10,310	Useful in calculating trends in demand for Fire/EMS services within the community.	n/a
Workload	Total Runs	n/a	n/a	15,089	Better illustrates unit utilization as multiple units are deployed in response to any certain incident.	n/a
Workload	Total Fire Incidents	n/a	n/a	262	These measures can be used as an aggregate for the demand for Fire or EMS services within the community and further stratified by incident type as well as seeing what EMS demands occur from fire incidents, among other specific stats in call or run volume. The tracking of volume allows the department to see increases overtime and implicates capacity assessments.	See below
Workload	Total EMS Incidents	n/a	n/a	8,291		See below
Workload	Total Hazmat Incidents	n/a	n/a	312		See below
Workload	Total "Other" Incidents	n/a	n/a	1,476		See below
Workload	Total Emergencies	n/a	n/a	6,837	Stratify by type and frequency	n/a
Workload	Total Non-emergencies	n/a	n/a	3,473	Stratify by type and frequency	n/a

CATEGORY	MEASURE	STANDARD	BENCHMARK	2012	DISCUSSION / INPUT	NIFRS Variable
Workload	Total Fire Incidents per 1,000 population	These measures can be used as an aggregate for the demand for Fire or EMS service within the community and EMS can be broken down further to see what portion of EMS recuse result from fire incidents.	N/A	0.60	Fire prevention is an important function of fire departments would want to measure how many fires have been prevented, but that is not possible. Instead, fire departments can use fire rate measures of reported fires by population or by buildings. These measures can be used as an aggregate for the demand fire and EMS calls within the community. It could be used as a partial indicator of whether public education or inspections are impacting the community as well as influence training and operational decisions. These rates are analyzed over time to see that inspections are generating 'returns' in reducing fires within the community, of if there seems to be an increase in education, awareness, safety precautions.	NIFRS incident type 100-199 in the basic module captures structure fires, vehicle fires, and outside and other fires. Departments should use totals and stratify fire rates by category - structure fire, vehicle, outside. This stratification should be used with every measure related to fire incident calls.
	# reported fires / 1,000 population			NR		
	# reported fires / 1,000 buildings			NR		
	# Firefighters per 1,000 population			0.00		
	# Paramedics per 1,000 population			NR		
	# False Alarms per 1,000 Population			0.55		
	# EMS Responses per 1,000 Population			6.03		
	# Fire calls requiring EMS / 1,000 population			NR		
	#fire calls requiring EMS / 1,000 fires			NR		
	# Hazmat calls / 1,000 popuhion			NR		
Effectiveness	Fire Pre-Plan Inspections Conducted per FTE	per AHJ command 5.3.2.2.2, NFPA 1710	internal	NR	n/a	n/a
	Public Education: Fire & Life Safety Events Held	per AHJ command 5.3.2.2.2, NFPA 1710	n/a	155	Ranges from 5 to 12 per month in 2012, and are arranged per request for events.	Independently tracked by Public Education Officer
	Participants (consider diversifying this between public/private or commercial/residential vis-à-vis benchmark specifications).	per AHJ command 5.3.2.2.2, NFPA 1710	n/a	6,103	NFPA Research and Analysis Division advises departments to consider diversifying this between public/private or commercial/residential vis-à-vis internal benchmark specifications.	Independently tracked by Public Education Officer
Effectiveness	% Population Trained (fire/life/CPR)	NFPA 1710 Annex B, Figure B.1.2	n/a	NR	Could help address risk factors in the community	Independently tracked by Public Education Officer
Effectiveness	Administrative Training Classes	5.3.2.2.1 The minimal level of training for all fire fighters that respond to emergency incidents shall be to the first responder / AED level. 5.3.2.2.2 The AHJ (Chief) shall determine if further training is required.	n/a	810	No Benchmark for number of training classes, however number of hours per employee has a benchmark of 20 hours per month.	
	ARFF Training Classes			300		
	Driver/Operator Training Classes			372		
	EMS Training Classes			428		
	Fire/Rescue Training Classes			1,379		
	Haz-Mat Training Classes			244		
	Administrative Training Hours	per AHJ command 5.3.2.2.2, NFPA 1710	Internal Benchmark of 20 Hours of Training per FTE per month	3917.33	Internal goal: 20 hours per person per month (Source: Asst. Chief Vaughn) // Availability of training classes and participants. Call loads high and training during business hours often a conflict, must bring resources to train with but must keep them properly distributed to be ready for emergency occurrences, and often training gets cut short due to a call.	Training query in FireHouse Tools
	ARFF Training Hours	per AHJ command 5.3.2.2.2, NFPA 1710		2139.5		
	Driver / Operator Training Hours	per AHJ command 5.3.2.2.2, NFPA 1710		1289.08		
	EMS Training Hours	per AHJ command 5.3.2.2.2, NFPA 1710		4870.47		
	Fire/Rescue Training Hours	per AHJ command 5.3.2.2.2, NFPA 1710		8867.82		
	Haz-Mat Training Hours	per AHJ command 5.3.2.2.2, NFPA 1710		2746.5		
	Total Training Hours	per AHJ command 5.3.2.2.2, NFPA 1710		23830.7		
	Average Hours of Firefighter Training per FTE	per AHJ command 5.3.2.2.2, NFPA 1710		20		
% firefighters with completed, up-to-date training	(NIFRS Standard) NFPA 1001: Standard for Fire Fighter Professional Qualifications provides qualification guidelines for Fire Fighter I and II.	100%	NR	This measure is a proxy for quality of service provided. It is assumed that a high percentage of responders with completed training and certification are providing high quality service when responding to calls. The measure should be stratified by response type and certification or training queried by responder for that response. Requirements for training and certification are intended to keep responders up to date on techniques.	Training query in FireHouse Tools	
% firefighters that are certified		100%	NR			



CATEGORY	MEASURE	STANDARD	BENCHMARK	2012	DISCUSSION / INPUT	NIFRS Variable
Effectiveness	% of Hazmat responders with completed, up-to-date training	NFPA 472 Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents identifies the minimum levels of competence required by responders to emergencies involving hazardous materials/weapons of mass destruction (WMD). NFPA 473: Standard for Competencies for EMS Personnel Responding to Hazardous Materials/Weapons of Mass Destruction Incidents identifies the levels of competence required of emergency medical services (EMS) personnel who respond to incidents involving hazardous materials or weapons of mass destruction (WMD). It specifically covers the requirements for basic life support and advanced life support personnel in the pre-hospital setting.	100%	NR	Requirements for training and certification are intended to keep responders up to date on techniques. It is assumed that a high percentage of responder with completed training and certification are providing high quality service when responding to calls.	400-499
	% Hazmat responders that are fully certified		100%	NR		400-499
Effectiveness	Stations per Square Mile	per AHJ command 5.3.2.2.2, NFPA 1710	internal	.19 (Station service areas are approximately 5.45 square miles per station)	ISO rating and ESRI reports - dependent on municipality resources and budgeting constraints; per internal reviews and assessments	n/a
Effectiveness	Stations per Community Need	per AHJ command 5.3.2.2.2, NFPA 1710	internal	5	ISO rating and ESRI reports - dependent on municipality resources and budgeting constraints; per internal reviews and assessments	n/a
Efficiency	Grants Funded per Grants Applied For	ICMA	n/a	n/a	n/a	n/a
Effectiveness	% Alarm Handling Time <60 seconds	NFPA 1221 Alarm handling and dispatch time should take <1min 95% of the time	95%	NR	Incorporate Day and Night statistics for these response times (re: BFD Chief Recommendation). It is important to clearly define arrival time when using this measure. Looking at both arrival to scene and arrival to patient are necessary. Environmental factors that affect performance in this regard are early notification, and type of alarm (911 used or not or automatic alarm, first person or third person), time of day, whether other incidents are being handled in concurrence, traffic conditions, location of the incident, and the weather. Additional environmental factors on fire suppression success rates are: whether hazardous materials present or not, accelerants, internal contents of fire and flammability, age of structure, code compliance of structure, response time factors (traffic, distance, direction, crowds, etc.), type of property. Therefore, the length of the elapse time from fire start until fire suppression depends on several factors that may or may not be controllable by fire departments. A faster response time results in less loss, all other things constant. A large part of the fire service contribution to reducing loss can be measured by combining response time measure with measures of fire spread confinement after arrival of the fire department. NFPA Analysis and Research division suggest analyzing the crash rate en route to fires to indicate if response times are being achieved at the expense of increased en route traffic, vehicle or road property damage, and casualties.	Variables include: Alarm time, dispatch time, roll out time, arrival time, fire control time, patient contact time (all found in basic module). EMS calls specify 300-399, and stratify by type of category. Time of arrival to patient and time of patient transfer is captured in the EMS module. Can be calculated as response time plus arrival at patient. or arrival at patient minus alarm time.
	% Fire Emergencies with Turnout Time <80 seconds	NFPA 1710 Turnout Time should take <80 sec for Fire: <60 sec for EMS	90%	NR		
	% EMS Emergencies with Turnout Time <60 seconds		90%	NR		
	% of Total Emergency incidents with Travel Time <4min		90%	NR		
	% EMS emergencies with Travel Time <4min	NFPA 1710 First unit should arrive on scene <4min (Fire-EMS) / full complement by <8min (Fire) - 5.2.4.1.1 - The fire department's fire suppression resources shall be deployed to provide for the arrival of an engine company within a 240-second travel time (definition) to 90 percent of the incidents as established in Chapter 4.	90%	NR		
	% Structure Fires with Travel Time <4min for first arriving unit		90%	NR		
	% Structure Fires with Travel Time <8min for units necessary to render full 15-person response (full complement)		90%	NR		
	%EMS emergencies with Response Time <6 minutes	NFPA 1710 The Fire department's EMS providing first responder with an automated external defibrillator (AED) company within a 60 second turnout time and 240 second travel time (thus 6 minutes) to 90% of emergencies.	90%	NR		
	Time of Control of Fire (Arrival time to Fire Control)	n/a	90%	NR		
	% Cardiac Arrests with Response Time <6min	NFPA 1710 The Fire department's EMS providing first responder with an automated external defibrillator (AED) company within a 60 second turnout time and 240 second travel time (thus 6 minutes) to 90% of emergencies.	90%	NR		
Transport/Transfer Time	Committed times at hospitals have no standard, but anomalies should be flagged internally.	n/a	NR	Benchmark can be established internally; Report duration from arrival to hospital and leave hospital (stratify by facility).	Time stamps are available and analyzable within the basic module.	
Hospital Offload/ In-service Time		n/a	NR			
Workload	Average Unit Committed Time (Unavailability) for FIRE	n/a	n/a	NR	Variable of Unit Utilization / Availability / Coverage	Use Dispatch and Clear Time stamps; stratify by incident type group
	Average Unit Committed Time (Unavailability) for EMS	n/a	n/a	NR		
	Average First Arriving Unit Committed Time (Unavailability) for FIRE	n/a	n/a	NR		
	Average First Arriving Unit Committed Time (Unavailability) for EMS	n/a	n/a	NR		
Effectiveness	Hazmat response, control, size of contamination, cleanup.	NFPA 1710 recommends turnout time of 80sec for special operations responses and "other" calls	n/a	NR	These measures, suggested by the NFPA Research and Analysis Division, identify the actual success made in mitigating the hazard, as well as permit fire departments to understand present and changing environments in which they must work in. By separating hazardous material incidents that were mitigated or controlled before arrival, the fire department is able to actually measure the effect of their actions taken toward controlling the spread of hazardous material for applicable cases. In some cases the fire dept controls the situation but outside contractors are involved in overhaul.	400-499 stratify by category
Workload	% HazMat Incidents in which hazard continued to spread before department arrival	n/a	n/a	NR		
Effectiveness	% HazMat Incidents responded to that spread beyond area of origin after fire department arrival	n/a	n/a	NR		
Effectiveness	% HazMat Incidents that did not spread beyond the area of origin after firefighters arrived on scene	n/a	n/a	NR		
Workload	Average size of contaminated area	n/a	n/a	NR		
Workload	% HazMat Incidents in which contaminated area was larger than "x" square feet (for liquids) or miles (for gases or airborne hazardous materials).	n/a	n/a	NR		

CATEGORY	MEASURE	STANDARD	BENCHMARK	2012	DISCUSSION / INPUT	NIFRS Variable
Effectiveness	Percent of Hydrants Tested	Annex B, Figure B.1.2 - Fire prevention	n/a	NR	Inspections - Planning and Code Enforcement Department, Hydrants - Water Department	Historically recorded
Effectiveness	Percentage of Commercial and Industrial Occupancies Inspected	Annex B, Figure B.1.2 - Fire prevention	n/a	NR	See code information below	n/a
Effectiveness	Property Loss	n/a	n/a	NR	This measure is being recorded in fire reports, however property and content values are estimates on the part of personnel who respond to the incident (via owner communication or own estimate). These values are not funneled from other databases.	Available fields within main incident table
	Content Loss	n/a	n/a	NR		
	Total Loss	n/a	n/a	\$1,280,513.00		
Workload	Total Value in Question	n/a	n/a	NR		
Effectiveness	Percent Value at Risk Saved in Structural Fires	n/a	n/a	NR		
Effectiveness	Total \$ saved, in terms of structure and contents	n/a	n/a	NR	In the event values of property and contents become reliable, further aiming for validity is needed by looking at buildings and dollars saved realistically. For example, if the fire dept. is alerted to a confined cooking fire in a very large building with expensive contents or an alarm activation with nothing found, it is not realistic to say that the firefighters saved millions of dollars worth of property from being destroyed. These measure can be determined by using dollar estimates collected in NFIRS, but remember to be realistic and discuss this issue when using these measures. Averages can be significantly altered by the inclusion of a single major loss.	Estimated dollar losses and values in the basic module of NFIRS can be used to calculate dollars saved. 1. Property saved (pre-incident property value minus property losses. 2. Contents saved (pre-incident content value minus content loss). 3. Total \$'s saved (pre-incident total dollar value minus total dollar value). Remember to limit analysis to incident type 100-129 for structure fires. As an option, remove confined fires 113-118 from "saves" as these fires may skew estimates. It is possible that property saves can be measured for non-structure fires.
	Average \$ saved per fire		n/a			
	% of fires in which \$ damage to the building was greater than "x" amount of dollars		n/a			
	% fires in which \$ saved was greater than "x" amount of dollars		n/a			
Effectiveness	Average Fire First Response Time	n/a	internal	5:23	Averages are not stressed as reflective of performance within NFPA standards; weight of the averages on actual performance depends on the standard deviation from the mean.	100-199
Effectiveness	Average EMS First Response Time	n/a	internal	5:48		300-399
Workload	% fires extinguished before department arrival	n/a	n/a	NR	A high percentage of fires extinguished before departments arrive might show successful campaigns for fire detection and/or fire sprinkler installations. By removing fires that were extinguished before arrival, the fire department is able to actually measure the effectiveness of their own actions taken by only analyzing success rates on applicable cases (narrowing the scope and seeing a usually wider success rate). Fire spread is defined as the extent of the fire in terms of how far the flame damage extended. This includes areas that are actually burned or charred, but not areas receiving only heat, smoke, or water damage. Therefore fire spread cannot directly translate over to property damage.	In NFIRS, fire spread is captured in the structure fire module. This variable only applies to incident types 100-129. This information is not required for fires reported as incident type 113-118 (confined fires). In NFIRS, fire spread is recorded as the final spread area after the fire has been extinguished. There is no record in NFIRS for where the fire was upon Firefighter arrival.
Workload	% fires responded to that spread beyond room of origin before fire department arrival	n/a	n/a	NR		
Effectiveness	% fires in which a person or people were rescued from the building by firefighters	n/a	n/a	NR	Measures of "saves" of rescues show what portion of the community's fire incident calls required rescue. There is obvious risk to firefighter entering buildings to remove victims; this measure tries to identify that risk. It also helps to identify the demand on the department for this service. This measure can be a very small number compared to the total number of fires responded to, and is a low indicator of performance in communities where there are few rescues made. Data on saves can be compared with data on injuries to show effectiveness of fire rescue forces in rescue situations.	Search and rescue is captured in the 'actions taken' codes 20-29 in the basic module. The number of people rescued is not directly captured in NFIRS. However, departments can use the 'actions taken' variable to identify the number of fire incidents in which rescue or removal was necessary, as an alternative. Remember to limit analysis to incident type 100-199 for fires. Stratify categories-structure fires, vehicle fires, outside and other fires.
	Number of "saves" vs. number of casualties		n/a			
	Rate of saves per incident involving at least one save		n/a			
EMS Patient Care	Percentage of Patients in Full Cardiac Arrest with a Pulse upon Delivery to a Medical Center	n/a	n/a	n/a	Not currently being reported at any level - EMS McLean Co. would report this if needed, and BFD can track internally if needed. Many environmental factors play into this outcome and NFPA does not identify this as a performance indicator.	n/a
Effectiveness	% Successful Intubations	McLean County EMS Office establishes 50% as Standard, 75% as Outstanding, and 90% as Stretch Outstanding	50%	60%	Values provided are care of McLean Co. EMS Office. Note: Personnel get two tries and then must pass to new person. Environmental factors include patient behavioral and physical characteristics (oversensitivity, gagging, obesity, age, consciousness).	Common procedure codes are: 31.421 Video mouth only; 96.040 mouth; 96.041 nose; 96.991 and 96.992 confirmation method to see if intubation in trachea (not esophagus); Checked box within module as successful or not.
Effectiveness	STEMI Notifications	n/a	n/a	19	Values provided are care of McLean Co. EMS Office. Note: Within FireHouse, we can track the number of STEMI and trauma notifications, but cannot measure in the context of performance because we cannot see the total number of circumstances where early notification is needed unless looking in the narrative (selecting reason codes with the plethora of exceptions cannot yield robust results). However it is useful to track in seeing how many EMS incidents required STEMI and Trauma notifications to be able to see level of certain medical demand within the community. Note: the notifications tracking on the part of the McLean Co. EMS office contributes to the recent STEMI Center Designation achieved by Bromenn.	Checked boxes within the treatment modules; binary flagging within data sets reveals frequency.
	Trauma Notifications	n/a	n/a	11		
	Pre-hospital stroke screens completed	n/a	n/a	113		

<u>CATEGORY</u>	<u>MEASURE</u>	<u>STANDARD</u>	<u>BENCHMARK</u>	<u>2012</u>	<u>DISCUSSION / INPUT</u>	<u>NIFRS Variable</u>
Effectiveness	% Trauma incidents with GCS<13 that are stabilized within 10 minutes	National standard states that trauma victims must be stabilized within 10 minutes from patient contact. According to McLean Co. EMS Office, these incidents have a threshold benchmark of 75% and a target benchmark of 90%.	75%	NR	Environmental factors include lengthy extrication, scene safety, staging for police, altercations, crowds, inability to find a patient; exceptions to sampling trauma patients to test if the benchmark was met are if alcohol or drug use unannually produces a GCS<13, and possibly patients who have disability, also. Limitations of the sample are the inability to capture cases of those with GCS at normal levels, but having significant blood loss.	n/a
Effectiveness	Pediatric Asthma Patient			NR		n/a
Effectiveness	E.Z. - I.O. First Time Attempt Success	McLean County EMS Office establishes 50% as Standard, 60% as Outstanding, and 70% as Stretch Outstanding	50%	88%	Personnel have informed the analyst that logging this procedure is either shown as one code with many attempts, or new code for each attempt. So analyst needs to fix for one code per patient and all attempts accounted for.	Procedure codes 41.920 for adults and 41.921 for pediatric - must report separately
Effectiveness	Res-Q-Pod Utilized during cardiac arrest ages 12 and older	n/a	100%	34	This is for non-chest trauma only. Environmental factors include presence of intubation (which increases success rate) otherwise personnel must hold onto non-intubated patient and maintain seal to airway. (manpower issue, especially if patient is unresponsive).	Procedure code 96.703, filter cardiac arrests, and age.
Fire Inspection Code Enforcements	Structure Fire Rate	Measuring Code Compliance Effectiveness for Fire-Related Portions of Codes (NFPA, FPRF Fire Protection Research Foundation) 2008 (see Discussion/Input for specific instructions)		NR	structure fires in inspectable properties/1000 inspectable properties	PACE FH
Fire Inspection Code Enforcements	Presence and severity of Hazard Matrix			NR	list each fire >=\$25k and list (1) each hazard present (2) the magnitude of the contribution of the hazard to the fire's severity	PACE FH
Fire Inspection Code Enforcements	Value per additional inspection			NR	(fire loss per year x percentage of loss that was preventable by inspection)/the number of occupancies	PACE FH
Fire Inspection Code Enforcements	Number of Violations			NR	List the number of violations per inspection for (1) every inspection (2) sprinkler-related violations (3) safe-evacuation related violations	PACE FH
Fire Inspection Code Enforcements	Percent of preventable fires			NR	(The number of preventable fires / total number of fires) X100	PACE FH
Fire Inspection Code Enforcements	Percent of fires with pending uncorrected violations at time of fire			NR	(#fires in properties subject to inspection not listed in files/total number of fires)x100	PACE FH
Fire Inspection Code Enforcements	Percent of properties not inspected			NR	(#inspections for which time since last inspection was greater than dept target cycle/the total number of inspections performance)x100	PACE FH
Fire Inspection Code Enforcements	Percent of inspections not completed in target cycle			NR	List the major building systems and features, for which inspection and approval were not completed, per new construction project. Rerecord the number and/or fraction of new construction cases where inspection and approval were not completed for that particular system or feature.	PACE FH
Fire Inspection Code Enforcements	Building systems/features without completed inspection			NR	(#inspections incomplete by inspector with all necessary certifications/the total number of inspections performance)x100	PACE FH
Fire Inspection Code Enforcements	Percent Certified inspections			NR	# inspections conducted by fulltime inspectors/the total number of inspections)x100	PACE FH
<p><i>All standards, unless cited as otherwise, came from NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Firefighters. Some of the discussion notes, measures, and NIFRS variable information came from NFPA Research and Analysis Division, 2009. 2012 Performance/Workload information were taken from City Manager monthly reports found on www.cityblm.org; "NR" indicates that the measure listed was not reported in 2012 in these reports; n/a = not applicable.</i></p>						

# Appendix C

## Bloomington Fire Department Performance Measure Matrix

<b>APPENDIX C: BLOOMINGTON FIRE DEPARTMENT WORKLOAD AND PERFORMANCE RATINGS (PERFORMANCE MEASURE MATRIX)</b>						
<b>MEASURE</b>	<b>STANDARD</b>	<b>ACTUAL</b>	<b>BENCHMARK</b>	<b>DISCUSSION</b>	<b>NIFRS VARIABLES</b>	
Total Incidents/Calls	n/a		N/A	n/a	n/a	
Total Runs	n/a		N/A	n/a	n/a	
# Fire Calls	Fire department cannot control demand on it's services. See Discussion for benefit of tracking demand.		N/A	These measures can be used as an aggregate for the demand for Fire or EMS service within the community and EMS can be broken down further to see what portion of EMS recuse result from fire incidents. Can show whether inspections and public education are impacting the community, as well as influence training and operational decisions.	100-199	
# Fire Emergencies			N/A			
# EMS Calls			N/A			300-399
# EMS Emergencies			N/A			
# Fire calls requiring EMS			N/A			300-399
# Hazmat Responses					N/A	These rates are analyzed over time to see that inspections are generating 'returns' in reducing fires within the community, through educational programs and other activities, and can be examined over time. Lower rates can indicate increased impact from education, awareness, safety precautions in handling and storing hazardous materials. Measures of rates of Hazmat calls are measures of department workload.
# Other Responses	n/a		N/A	Gauge fire rates for other types of calls.	200-299 Overpressure Rupture, Explosion, Overheat (No Fire) 500-599 Service calls 600-699 Good Intent Calls 700-799 False Alarms 800-899 Severe Weather and Natural Disaster 900-999 Special Incident Type (Stratify all fire rates by category)	
TOTAL EMERGENCY CALLS	n/a		N/A	Emergency (no false alarm, no cancel)	Filter first arriving unit	
% Alarm Handling Time <60 seconds	NFPA 1221 Alarm handling and dispatch time should take <1min 95% of the time		95%	It is important to clearly define arrival time when using this measure. Looking at both arrival to scene and arrival to patient are necessary. The data gives three different response time options (PSAP to arrival, Dispatch to arrival, and Alarm to arrival). The current statistics present here are for Dispatch to Arrival. Factors that play into emergency response performance outcomes are typically the following: early notification, and type of alarm (911 used or not or automatic alarm, first person or third person), late notification, time of day, whether other incidents are being handled in concurrence, accelerant contents and presence of hazardous material that contribute to fire spread. The length of the elapsed time from fire start until fire suppression depends on several factors that may or may not be controllable by fire departments. The faster response time results in less loss, all other things constant. Response time can depend on when the fire starts, when it is detected, how efficiently the firefighters prepare for and head to the fire, traffic conditions and weather. A large part of the fire service contribution to reducing loss can be measured by combining response time measured with measures of fire spread after arrival of the fire department. Analyzing the crash rate en route to or from fires to indicate if response times are being achieved at the expense of increased en route damage and casualties would be a useful indicator of traffic conditions.	Variables include: Alarm time, dispatch time, roll out time, arrival time, fire control time, patient contact time (all found in basic module). EMS calls specify 300-399, and stratify by type of category. Time of arrival to patient and time of patient transfer is captured in the EMS module. Can be calculated as response time plus arrival at patient (arrival at patient minus alarm time).	
% EMS Emergencies with Turnout Time <60 seconds	NFPA 1710 recommends 80 seconds for turnout time for fire and special operations response. For the initial arriving company, the fire dept's fire suppression resources shall be deployed to provide for the arrival of an engine company within a 240-second travel time to 90% of the incidents. (See below for EMS response standard)		90%			
% Fire Emergencies with Turnout Time <80 seconds			90%			
% All Emergency Incidents with Travel Time <4 minutes	NFPA 1710 5.2.4.1.1 - The fire department's fire suppression resources shall be deployed to provide for the arrival of an engine company within a 240-second travel time (definition) to 90 percent of the incidents.		90%			
% Fire Emergencies with Response Time <4 minutes	The fire department's fire suppression resources shall be deployed to provide for the arrival of an initial engine company within a 240-second response to 90 percent of the incidents.		90%			
% Fire Emergencies with Full Response Time <8 minutes	NFPA 1710 First unit should arrive on scene <4min/ full compliment by <8min		90%			
% EMS Emergencies with Response Time <6 minutes	NFPA 1710 The fire dept's EMS providing first responder with an automated external defibrillator (AED) shall be deployed to provide for the arrival of a first responder with AED company within a 60 turnout time and 240 second travel time to 90% of the incidents.		90%			
% Cardiac Arrests with Response Time <6min	NFPA 1710 The fire dept's EMS providing first responder with an automated external defibrillator (AED) shall be deployed to provide for the arrival of a first responder with AED company within a 60		90%			
% Trauma Emergencies with Response Time <6min	According to McLean Co. EMS Office, national standard uses a threshold benchmark of 75% and target benchmark of 90% of unstable trauma patients had a 10 minute or less scene time.		75%			
% Trauma Emergencies with On Scene Time <10 minutes						
Average Committed time All Emergency Calls			N/A			
Average Committed time 1st Arriving Unit - Emergencies			N/A	Average Availability of units stratified by category of call gives the department an estimate of demand. Additionally, the comparison of resource use along with other benchmarked performance can help to illustrate to the department the relationship between inavailability of units with longer response times		
Average Unit Committed Time (Unavailability) for FIRE emergency			N/A			
Average Unit Committed Time (Unavailability) for EMS Emergencies			N/A			
Average Fire Response Time			N/A			
Average EMS First Response Time			N/A			
Fire First Response Time at 90th percentile of fire emergency incidents			0:04:00			
Fire Full Compliment Response Time at 90th percentile of fire emergency incidents			0:08:00			
EMS First Response Time at 90th percentile of EMS emergency incidents			0:06:00			

Appendix D:

BFD Performance Measuring Procedures

Objective: To carry out a consistent data analysis process for completing the Bloomington Fire Department Workload and Performance Matrix on an annual or monthly basis.

Queries Needed: 1

Variables Needed:

unit	dest_date	(V)prop_loss
inci_no	clr_date	(V)cont_loss
exp_no	clr_time	(V)prop_val
resp_code	long_address	(V)cont_val
complete	number	city
disp_date	st_prefix	(F)mutl_aid
disp_time	street	(F)station
alm_date	st_type	district
alm_time	zone	ls_to
notif_date	inci_type	(F)complete
notif_time	descript	pt_date
roll_date	incident_group	pt_time
roll_time	shift	xfer_date
arv_date	descript_b	xfer_time
arv_time	alm_type	lv_date
pt_date	alm_dttm	lv_time
pt_time	month	dest_date
xfer_date	(r)incident_hour	clr_date_b
xfer_time	(F)inc_commt_time	clr_time_b
lv_date	(F)unit_commt_time	in_date
lv_time	reason	in_time

Instructions:

- Query Location and Title:
  - Incident Queries; Administrative Section; “Unit Responses All Time Stamps”
- Query preferences and export:
  - Run query; set dates to period desired; Check that all variables are needed (if need to add, see ‘adding fields’ below)
  - Go to ‘Options’; Output to; Excel Compatible; indicate Desktop and Create file name; OK

- Go to desktop and open file; CTRL A to highlight all active cells; paste data into new sheet; preserve exported version in file folder; Rename your new data set (i.e., March 2013 Performance Ratings and Workload)
- Adding Fields (in the event other measures get incorporated at a later date): Go to New, Make a Copy of Existing Query, Select Query, Rename, select Fields (and tables, if applicable), and go to Save. Go back to query location and new title to export your adjusted query.
- Initial Treatment of the Data Set
  - Variable Creation (Calculations) – the following variables are created within the data sets as inserted columns next to their source variables. The creation of these variables are justified in the descriptions below.

UNITNEW	ONSCENE	respEMS6
ORDER	onscene10	resp4fire
DISPDTTM	CLRDTTM	resp8fire
ROLLDTTM	COMMIT	RESPONSE(PSAP)
TURNOUT	DISP60	RESPONSE
ARVDTTM	DISPATCH	RESPONSE(tone)
RESP	Turnout60	e911_used
RESPCOMPLY	Turnout80	CLRDTTM
RESPNEW	TURNOUT	INDTTM
LVDTTM	TRAVEL240	
	TRAVEL	

*UnitNew: This variable is created to correct for administrative changes as unit names are historically different than current names, despite that they are the same units with the same function (i.e. switching from an old name, that was used when ambulance companies were separate from the fire department, to the new name used state-wide – Medic). The new variable is created using the “unit” variable provided by the software and a Lookup Table, which is an index explaining to the data that old go to new and new stay as new. The formula used is =VLOOKUP(indicate old unit cell, table array(index), 2, false). This allows the data to reference another spreadsheet where two columns represent all old-new combinations, making only exact matches. Once the formula is entered and held (using “\$” around the table array), the formula should be distributed down the whole column of UnitNew, by double clicking the bottom right-hand corner of the top cell where the initial formula was entered.*

unit	(R)UNITNEW
MEDIC1	MEDIC1
MEDIC4	MEDIC4
MEDIC2	MEDIC2
MEDIC4	MEDIC4
XMED01	EMS01
MEDIC2	MEDIC2

**ORDER:** This variable is created by using the incident number. The data set has capacities to generate statistics on workload that go beyond what the matrix calls for. In this regard, it is best to be able to switch back and forth between analyzing Calls (one single incident, defined in performance by its first response) and analyzing Runs (many runs per incident depending on how many units are used for this particular call). Thus, it is important to be able to flag first arriving units as well as reinforcements. Next to the incident number column, hard code a "1" for the first cell of ORDER. The next cell should receive the formula =IF(incident number=previous incident number, yield above order number+1, otherwise 1). The formula should be distributed down the whole column of ORDER, by double clicking the bottom right-hand corner of the top cell where the initial formula was entered.

inci_no	(F)ORDER
13-0000883	1
13-0000884	1
13-0000885	1
13-0000886	1
13-0000886	2
13-0000886	3

**New Variables containing DTTM:** this is the combination of the time and date stamps for each interval lapse. It is important (when calculating response times) to use DTTM only, to count for any interval that crosses the midnight hour, once distributing to all cases in the data. It is a preparation function for calculating response times. Take =time+date to yield DTTM and format as Time date+24-hour time (i.e. 01/01/2013 13:30:00)

clr_date_b	clr_time_t	CLRDTTM
01-Feb-13	03:13:48	2/1/13 3:13 AM

**TURNOUT:** enter formula =ROLL\_DTTM-DISP\_DTTM; then format the cell to Custom hh:mm:ss.

**TRAVEL:** enter formula =ARV\_DTTM-ROLL\_DTTM; then format the cell to Custom hh:mm:ss.

**RESPONSE:** enter formula =ARV\_DTTM-DISP\_DTTM; then format the cell to Custom hh:mm:ss.

**COMMIT:** enter formula =CLR\_DTTM-DISP\_DTTM; then format the cell to Custom hh:mm:ss.

ONSCENE: enter formula = ARV\_DTTM-CLR\_DTTM (for fire calls) or LV\_DTTM-PT\_DTTM (for EMS calls); then format the cell to Custom hh:mm:ss.

TRANSFER: enter formula =LV\_DTTM-DEST\_DTTM; then format the cell to Custom hh:mm:ss.

Example of RESPONSE:

DISPDTTM	ARVDTTM	RESP
1/1/13 0:21	1/1/13 0:28	0:06:44
1/1/13 0:22	1/1/13 0:28	0:05:09
1/1/13 0:46	1/1/13 0:53	0:07:26

COMPLY and RESPNEW(otherNEW) variables: Create a system of thresholds outside of active data set, on same spreadsheet. Use the the threshold to create flags by using the logic statement =IF(AND(x<lowerthreshold,x>upperthreshold),1,0) this tests the response times to see if they fall into logical interval lengths (ruling out incomplete stamps in the data due to cancelled calls). Even though there is a variable that the software provides called “complete” to rule out cancelled calls, the data won’t perform descriptive statistics on variable fields that have empty cells. You need to run stats on calls after filtering out the “0.” Then, the calculation of descriptive statistics will be based on complete incidents only (no cancelled calls or false alarms). The new column used will be RESPNEW.

Thresholds:

	RESP
UPPER	23:00:00
LOWER	0:00:00

Onscene10, DISP60,Turnout60, Turnout80, TRAVEL240, respEMS6, resp4fire, resp8fire: Create a system of thresholds for each benchmark you want to test on turnout, travel, and response times. They reference those thresholds with logic statements similar to the comply variables. “1” can be used for calls that fall within the benchmark, and “0” can be used for calls that miss the benchmark. Use =if(x<upper,1,0) use the logic statements for the correct response time intervals that they apply to. DISP60 to DISPATCH, Onscene10 to ONSCENE, respEMS6/resp4fire/resp8fire to RESPONSE or RESPONSE NEW, etc.

Thresholds:

	DISPATCH	travel	turnout60	turnout80	respEMS6	resp1fire	resp8fire	ONSCENE
UPPER	00:01:01	00:04:01	00:01:01	00:01:21	00:06:01	00:05:02	00:08:00	0:10:00

- Pivot tables – click a cell anywhere in the data and go to Insert, Pivot Table.
  - Filters needed:



```

(R)UNITNEW
inci_type
resp_code
RESPCOMPLY
(F)DISP60
Turnout60
Turnout80
(F)TRAVEL240
(f)respEMS6
(f)resp4fire
(f)resp8fire
(F)ORDER
(f)EMERGcomplete
(F)complete
(F)mutl_aid
reason
onscene10

```

You will need *UNITNEW* to be able to distinguish MEDIC units when measuring the on-scene time for trauma incidents. Inci-type will also help you select Fire (100-199) or EMS(300-399), as well as reason will be used for cardiac arrests and traumatic injury. Resp\_desc (renamed here as Emergcomplete) is used to select emergencies only when measuring response times as response time benchmarks are not applied to non-emergencies. All the threshold-related benchmarks are here, as well as ORDER to test only first responses on the response time benchmarks, as well as making sure they're non-mutual aid (cannot expect calls that go outside of city limits to make benchmark, nor reinforcing units to make benchmark).

- Calculating and entering answers into the matrix – place response time variables in the Values section of the table. They will have COUNT as their value field setting, which is correct for measuring most workload and performance for the matrix. Calculate all workload first to be able to establish your denominators when looking at # of calls that make benchmark out of all applicable calls.
- Use the following process with the pivot table to calculate performance ratings as percentages where the number of calls that meet a benchmark are divided by total calls applicable to that respective benchmark and is formatted as percentage (indicating that this was the percentage of the calls that meant benchmark). Most target percentages are 90%. The left-hand “measures” column is taken from Appendix C BFD Performance Measure Matrix which contains standards, targets, factors, and NFIRS variables that go with the following processes:

<b><u>MEASURE</u></b>	<b><u>Processes</u></b>
Total Incidents/Calls	Set ORDER filter to "1"
Total Runs	Set ORDER to All
# Fire Calls	Set ORDER to "1"; inci_type select 100-199,
# Fire Emergencies	Set ORDER to "1"; inci_type select 100-199, Set resp_desc to Emergency. List with and without mutual aid.
# EMS Calls	Set ORDER to "1"; inci_type select 300-399,
# EMS Emergencies	Set ORDER to "1"; inci_type select 300-399, Set resp_desc to Emergency. List with and without mutual aid.
# Fire calls requiring EMS	Set ORDER to "1"; inci_type select 100-199, UNIT NEW MEDIC
# Hazmat Responses	Set ORDER to "1"; inci_type select 400-499,
# Other Responses	Set ORDER to "1"; inci_type select 200-299, 500-599, 600-699, 700-799, 800-899, 900-999.
TOTAL EMERGENCY CALLS	Set ORDER to "1"; Reset inci_type to All; Set resp_desc to Emergency. List with and without mutual aid.
% Alarm Handling Time <60 seconds	Set Order to 1, All else to All, and disp_60 to 1. Take COUNT of disp_60 over the total incidents/calls found above. Also take disp_60 at "1" for Emergency over all Emergency count.

<p>% EMS Emergencies with Turnout Time &lt;60 seconds</p>	<p>Set ORDER to “1”; inci_type select 300-399, Set resp_desc to Emergency. Mutual Aid to “N”. Set respEMS6 to “1” over total EMS nonmutual aid emergencies found above.</p>
<p>% Fire Emergencies with Turnout Time &lt;80 seconds</p>	<p>Set ORDER to “1”; inci_type select 100-199, Set resp_desc to Emergency. Mutual Aid to “N”. Set resp80 to “1” over total Fire non-mutual aid emergencies found above.</p>
<p>% All Emergency Incidents with Travel Time &lt;4 minutes</p>	<p>Set ORDER to “1”; inci_type select 100-199 for fire and 300-399 for EMS, Set resp_desc to Emergency. Set Mutual_aid to “N” set travel240 to “1” for EMS over all EMS emergencies, and travel240 to “1” for Fire over all Fire emergencies.</p>
<p>% Fire Emergencies with Response Time &lt;4 minutes</p>	<p>Set ORDER to “1”; inci_type select 100-199, Set resp_desc to Emergency. Set Mutual_aid to “N”. Set resp4 to “1” over all non-mutual aid Fire emergencies.</p>
<p>% Fire Emergencies with Full Response Time &lt;8 minutes</p>	<p>Set ORDER to ALL but “1” inci_type select 100-199, Set resp_desc to Emergency. Set Mutual_aid to “N”. Set resp4 to “0” over all Fire emergencies. Take the difference from the total divided by the total.</p>
<p>% EMS Emergencies with Response Time &lt;6 minutes</p>	<p>Set ORDER to “1”; inci_type select 300-399, Set resp_desc to Emergency. Set Mutual_aid to “N”. Set respEMS6 to “1” over all non-mutual aid EMS emergencies.</p>

<p>% Cardiac Arrests with Response Time &lt;6min</p>	<p>Set ORDER to “1”; set reason to select Cardiac Arrest, Set resp_desc to Emergency. Set Mutual_aid to “N”. Set respEMS6 to “1” for numerator and set to All for denominator that reflects non-mutual aid Cardiac arrest emergencies.</p>
--	--

<p>% Trauma Emergencies with On Scene Time &lt;10 minutes</p>	<p>Set ORDER to “1”; set reason to select Traumatic Injury, Set resp_desc to Emergency. Set onscene10 to “1” for numerator and set to All for denominator that reflects all possible traumatic emergencies. Once getting the set of all trauma scene times (whether at “1” or at “0” for meeting benchmark, look in the reports to verify GCS&lt;15 in patient reports, if it is applicable apply whether benchmark was attained or not.</p>
<p>Average Committed time All Emergency Calls</p>	<p>Make sure Commit is in the values portion of the pivot table with a value field setting of “Average.” Set Order to “All”, resp_desc to Emergency, and Compy to “1” or Complete to “True” to ask the data to not let the cancelled calls bring down the average. Make sure the Commit value is in Custom format for hh:mm:ss.</p>
<p>Average Committed time 1st Arriving Unit - Emergencies</p>	<p>Make sure Commit is in the values portion of the pivot table with a value field setting of “Average.” Set Order to “1”, resp_desc to Emergency, and Compy to “1” or Complete to “True” to ask the data to not let the cancelled calls bring down the average. Make sure the Commit value is in Custom format for hh:mm:ss.</p>
<p>Average Unit Committed Time (Unavailability) for FIRE emergency</p>	<p>Make sure Commit is in the values portion of the pivot table with a value field setting of “Average.” Set Order to “All”, resp_desc to Emergency, and Compy to “1” or Complete to “True” to ask the data to not let the cancelled calls bring down the average. Make sure the</p>

	Commit value is in Custom format for hh:mm:ss. Set inci_type to 100-199.
Average Unit Committed Time (Unavailability) for EMS Emergencies	Make sure Commit is in the values portion of the pivot table with a value field setting of "Average." Set Order to "All", resp_desc to Emergency, and Compy to "1" or Complete to "True" to ask the data to not let the cancelled calls bring down the average. Make sure the Commit value is in Custom format for hh:mm:ss. Set inci_type to 300-399.
Average Fire Response Time	Make sure ResponseNew is in the values portion of the pivot table with a value field setting of "Average." Set Order to "1", resp_desc to All, and Compy to "1" or Complete to "True" to ask the data to not let the cancelled calls bring down the average. Set mutl_aid to "N." Make sure the ResponseNew value is in Custom format for hh:mm:ss. Set inci_type to 100-199.
Average EMS First Response Time	Make sure ResponseNew is in the values portion of the pivot table with a value field setting of "Average." Set Order to "1", resp_desc to All, and Compy to "1" or Complete to "True" to ask the data to not let the cancelled calls bring down the average. Set mutl_aid to "N." Make sure the ResponseNew value is in Custom format for hh:mm:ss. Set inci_type to 300-399.
Fire First Response Time at 90th percentile of fire emergency incidents	Take the same process as with "Average Fire Response Time" measure above. Double click on the responsenew field to open a new data set of only applicable calls. Find the column where RespNew is calculated. Outside active cells, use the column to calculate percentiles. Use =percentile(cell,array). If the cell is 90% indicating 90 percentile, and the array is the RespNew column, say column "u", then the formula would read =percentile(90%,u:u) and reveal at what response time the 90 <sup>th</sup> percentile of all calls is, as standard says it should be

	at 00:06:00.
Fire Full Compliment Response Time at 90th percentile of fire emergency incidents	Take the same process as with “Average Fire Response Time” except making ORDER be at all but “1,2,3” but in turns. Double click on the responsenew field for each arriving unit to open a new data set of only applicable calls. Find the column where RespNew is calculated. Outside active cells, use the column to calculate percentiles. Use =percentile(cell,array). If the cell is 90% indicating 90 percentile, and the array is the RespNew column, say column “u”, then the formula would read =percentile(90%,u:u) and reveal at what response time the 90 <sup>th</sup> percentile of all calls is, as standard says it should be at 00:08:00 for full compliments. Report the stat for 4 <sup>th</sup> to X <sup>th</sup> arriving unit, as 4 or more units can contain the 15-person full complement characteristic.
EMS First Response Time at 90th percentile of EMS emergency incidents	Take the same process as with “Average EMS Response Time” measure above. Double click on the responsenew field to open a new data set of only applicable calls. Find the column where RespNew is calculated. Outside active cells, use the column to calculate percentiles. Use =percentile(cell,array). If the cell is 90% indicating 90 percentile, and the array is the RespNew column, say column “u”, then the formula would read =percentile(90%,u:u) and reveal at what response time the 90 <sup>th</sup> percentile of all calls is, as standard says it should be at 00:06:00.

## Appendix E: Action Plan

**GOAL:** While continuing to report improved operationalizations of Workload (community demand) and Performance, move towards the following objectives: (1) higher circulation of information within the organization/municipality, (2) higher assistance/troubleshooting with incident reporting software and reporting processes, (3) higher generation of easily visualized deployment-related information, and (4,5,6,7) help transition periods during technological/organizational improvements, intra-/inter-departmentally.

### **Objectives:**

1. OBJECTIVE 1: Continue pulling and cleaning data from BFD database and producing consumable performance ratings and workload statistics. Present information in easily understandable way for departmental, municipal, and public consumption.
  - a. Rectification of organizational barriers to performance reporting
  - b. Re-organization of CPM spreadsheet in working with administrative needs for fluidity
  - c. Rectification of any remaining data cleaning or data entry changes needed through presentations and training sessions (making sure the facilitation of data environment does not undermine the public safety administrative environment).
  - d. Generating statistics and visuals per request of staff and department heads.
2. OBJECTIVE 2: Facilitate needs of the department by supporting need statements quantitatively.
  - a. Helping expand performance section of budget narrative to better align with “input” items and show relationship graphically.
  - b. Provide quantitative support on monthly basis per particular staff role
  - c. Continue streamlining reporting processes through checking software journals and updating templates/graphs for monthly reporting.
  - d. Produce the quantitative evaluations and performance audits needed in support of grant retention
    - i. Use memberships/partnerships to access database, filter and produce binder of possible grant proposals and prepare all base materials needed to complete proposals, outline year-round evaluation/audit schedule for retention of grant via reports and promotional support to funders (Note: Due to AmeriCorps policy, no grant information or support will be provided during the internship period; this sub-Objective is noted as a prospective second year activity).
3. OBJECTIVE 3: Using the full 2 years of NEMESIS historical incident reports, incorporate particular run/call statistics by Weekday/Hour/Month/Location/Type into numerous graphical and geographical visual aids to assist departmental goal of strategic deployment of resources.

- a. Work with AVI information from CAD – use in additional models
  - b. Complete additional GIS training (June)
  - c. Use GIS and other statistical programs to produce visual aids that can be used in reports, presentations, and administrative planning.
  - d. Apply new model for generating stats/visuals on out-of-district calls (using new lookup from latitude/longitude coordinates and district assignments).
  - e. Report significant correlations with groups of incidents that missed benchmarks
  - f. Produce unit-specific statistics, district-specific, hour-specific, and combinations
  - g. Be able to produce data-driven deployment information, as well as information relating to threatening circumstances, rapidly for department, municipality, and public.
  - h. Graph all performance and community demand over time.
4. OBJECTIVE 4: Support department by troubleshooting with FireHouse software issues in monthly reporting, quality assurance of data entry in regard to continuity-related data environment, and eventual software upgrades in collaboration with IS and FH Tech.
    - a. Create processes for circumventing “flaws” in software, and help department prepare for new versions.
    - b. Communicate with IS, BFD and assist to move upgrade process forward.
    - c. Help IS incorporate PACE occupancy information into dept. database
    - d. Should help facilitate process of storage/retrieval of data and intelligence material in a secure network-based system.
  5. OBJECTIVE 5: Continue transition of survey program reporting to counterpart.
  6. OBJECTIVE 6: Continue to get peer review from other analysts (BPD, McLean Co. EMS)