

Evaluation of Miami Valley Fire District Emergency Response Modes

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A proposed research project submitted to the Ohio Fire Executive Program

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CERTIFICATION STATEMENT

I hereby certify that the following statements are true:

1. This paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

2. I have affirmed the use of proper spelling and grammar in this document by using the spell and grammar check functions of a word processing software program and correcting the errors as suggested by the program.

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ABSTRACT

In the research project *Evaluation of Miami Valley Fire District Emergency Response Modes*, the problem the author sought to investigate was the continued use of lights and sirens response modes, and, understanding that roadway crashes are the second leading cause of firefighter fatalities, possible options to reduce risk to responders and the public while providing emergency services to all persons within the Miami Valley Fire District response area. The purpose of the research was to determine if there would be a benefit to the MVFD to employ variable response modes to different call types within the realms of crew safety and service delivery.

The author would utilize a variety of research methods, including; Survey Research in the form of a regional survey to understand responder attitudes on the matter, Action Research and Evaluative Research in the form a new response program field trial and analysis of the impact of said trial on service delivery.

The author set forth to answer the following questions:

1. What are the benefits, if any, of the MVFD having multiple response mode options?
2. What are area agencies similar to the MVFD doing concerning variable emergency response modes?
3. What does the MVFD do currently concerning emergency response modes?
4. What are some future options for the MVFD concerning response modes to reduce accident potentials?

The author created a response guide called EBRS, or Evidence Based Response System. EBRS was approved for a 3 month field trial that proved effective in reducing turnout times by over thirty seconds on average; illustrated the true difference in arrival time between lights and sirens and quiet response; and finally, that a varied response system could be employed without negative impacts of service delivery.

The author recommends the full implementation of Evidence Based Response System within the Miami Valley Fire District in response to the research findings within this document.

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INTRODUCTION

Statement of the Problem

The Miami Valley Fire District is a medium sized, combination department, in Southwest Ohio, that like any organization throughout the country must consider the best practices for service delivery. Many studies and publications by national authorities suggest organizations evaluate their modes of response, as research has begun to show attitudes suggesting a correlation between response time and life preservation. In the study, *Emergency Medical Services Evidence Based System Design White Paper For EMSA*, (2011) the authors from the University of Oklahoma School of Emergency Medicine, showed that run times impact a very small number of EMS incidents and evidence based outcome research should determine response modes.

The problem this study will investigate is the continued use of emergency response modes, and the need for a risk benefit assessment, by Miami Valley Fire District crews to calls that do not suggest a patient in a life threatening emergency; and, given that vehicle accidents are the second leading cause of fire service fatalities, continued response decisions by Miami Valley Fire District personnel risks extraordinary financial loss and risk of death or injury to employees and area public.

Purpose of the Study

The purpose of this study is to identify and describe the potential benefits of using variable response modes consistent with the reported reason for service request, what area agencies similar to the MVFD do concerning variable response and some of the options for the MVFD

moving forward concerning response modes.

Since the Miami Valley Fire District's beginning in June 2012, many policies and procedures have been written to give the members a solid and safe foundation from which they can make the best decisions possible. Included is the allowance for crews to practice "on the quiet" or non-emergent response modes when the crew determines the call type to not justify the emergent response. It has been observed within the Miami Valley Fire District that members have chosen to not opt for the non-emergent response in cases where it clearly would have been prudent. The author will seek to quantify the statistical incidence of calls that should and should not warrant varied response modes, as well as make efforts to better understand the issues contributing to crews use or non-use of this important tactical allowance. It is the author's belief that crews are concerned about perception of a slower response, holding on to passed practice, and perceives the lack of support or clear direction the matter. The author also believes that the research will show that the Miami Valley Fire District would benefit from a clearly defined directive of what call type receives what response type.

Research Questions

The author of this Applied Research Project has set forth to answer the following questions:

1. What are the benefits, if any, of the Miami Valley Fire District having multiple response mode options?
2. What are area agencies similar to the Miami Valley Fire District doing concerning variable emergency response modes?
3. What does the Miami Valley Fire District do currently concerning emergency response modes?
4. What are some future options for the Miami Valley Fire District concerning emergency response modes to reduce accident potentials?

BACKGROUND AND SIGNIFICANCE

The Miami Valley Fire District is a combination fire department in the greater Dayton Ohio metropolitan area. With a membership of 73 personnel, 20 per shift (three shifts), responding from five stations, the district answered 7,782 calls for service during 2014. This represents a 10.6% call increase over 2013 statistics. (Miami Valley Fire District 2015) The Miami Valley Fire District services the communities of Miami Township (Montgomery County) and Miamisburg Ohio, which includes a population of 50,735 persons within an area of 34.4 square miles. (2010 United States Census)

The Miami Valley Fire District responds to the community service request from five stations. These stations, in order of highest to lowest 2014 run volumes are; Station 52 – 2064 runs, Station 54 – 1767 runs, Station 53 – 1666 runs, Station 55 – 1515 runs, and Station 51 – 751 runs. The average lights and sirens response time for the district was 6:16 seconds in 2013, and 6:38 seconds in 2014. The response times for “routine”, or no lights and sirens, were 7:11 seconds in 2013, and 7:22 seconds in 2014. The author will attempt to substantiate whether there is or is not a significant service delivery issue caused by this difference. ; a difference that averages 49.5 seconds. (Miami Valley Fire District 2015)

The Miami Valley Fire District faces many challenges, as most organizations do, as they move forward to meet the ever-growing demands of its citizens with proficiency, safety, and budgetary responsibility. Given the consistent increase in run volume and the ongoing economic and commercial development of our region, the Miami Valley Fire District has instituted policies

that allow for, but do not require, the determination of crews to respond “on the quiet” at their discretion. Understanding that response times rarely affect patient outcome and often unduly risk the safety of our public and personnel, the Miami Valley Fire District adopted the commonly accepted best practice of a response mode proportional to the reported issue. That is, “on the quiet” or non-emergent response. Surprisingly, even with the forward thinking efforts of the staff officers that instituted this policy, there has been difficulty in buy in by rank and file personnel. It seems that many factors have contributed to this resistance, including but not limited to, culture, passed practice, liability, and fears of negative public perception by a slower response.

This research project will explore the Miami Valley Fire District’s use, or lack of use, of response modes consistent with the information provided to our dispatchers. Vehicle accidents are the second leading cause of death for fire service members, a tragedy that all members should strive to avoid or reduce. Included in the tragic loss of service members is equipment destruction and the injury or death of civilians. An industry that puts so much credence on the assessment of risks and benefits must ask if it’s worth it to turn on the lights and sirens.

The significance of this research is far reaching. When we reflect on the approximately 30,000 fire service vehicle crashes, making vehicle crashes the second leading cause of service related death (United States Fire Administration), our agency must evaluate ways to reduce the potentials of vehicle accidents and the losses suffered by organizations, responders, and the public. This applied research project will seek out examples and benefits, if any, to varying incident response modes to more closely reflect the urgency of the problem reported to our dispatching service. We must look outside our organizational boundaries to see what approach

our neighbors, and other similar agencies, are taking in consideration to this important issue. Using the information collected, we can, if deemed appropriate, adjust response modes to better meet the needs of the Miami Valley Fire District.

In 2013, the Miami Valley Fire District had a response incident in which a ladder truck crew lost control and slid off the road striking a utility pole. No personnel were killed in the incident; however, two members were off duty for an extended period of time. This lost time represents significant cost through required overtime, medical and insurance claims, and a potential for increased insurance premiums. The ladder truck was a total loss, and resulted in a claim payment in excess of \$600,000. Noting that the Miami Valley Fire District has a positive record of safety including very few incidents, this singular incident illustrates how quickly a single incident can place an inordinate burden on the system as a whole.

If the findings of the authors' research support the institution of new response policy, it is possible that the Miami Valley Fire District's reduction of roadway incidents could save the community from significant loss of life and property. These reductions represent the organizations mission values. *The potential impact this research study could have on the Miami Valley Fire District is the suggested need of a variable response policy, the implementation of such a policy, and the reduction of loss of life and property by the organization and the public it serves.*

LITERATURE REVIEW

For the purposes of researching the impact of a variable response mode policy by the Miami Valley Fire District, a literature review was conducted. The author reviewed resources including the National Fire Academy online library access, industry periodicals, the Ohio Revised Code. Also included were searches for citations on the matter of vehicle response by the National Fire Protection Agency (NFPA), United States Fire Administration (USFA), International Association of Fire Chiefs (IAFC), International Association of Firefighters (IAFF), and the Association for the Advancement of Automotive Medicine.

Given that the American fire service experiences 30,000 crashes per year (NFPA 2013), accounting for 20-25% of service related line of duty deaths (USFA), it is imperative for the Miami Valley Fire District (MVFD) to give careful consideration to our response policies. At present the MVFD allows personnel to opt for a non-emergent response (MVFD Policies and Procedures, 2014).

In reviewing the Ohio Revised Code (ORC) for citations of law concerning the manner in which emergency responders operate on roadways the author found article 4511.041 Exceptions for Emergency or Public Safety Vehicle Responding to Emergency Call to make and interesting citation. "This section does not relieve the driver of an emergency vehicle from the duty to drive with due regard for the safety of all persons and property upon the roadway." This spirit of this section of the ORC clearly conveys two things; the understanding that emergency vehicle may be required to operate outside of the normal standards of the roadway and this

understanding does not provide the emergency with an allowance to unduly risk the safety of persons or property.

In the comprehensive article on fire service vehicle crash considerations, *Analysis of Firetruck Crashes and Associated Firefighter Injuries in the United States*, authored by Kelly Donoughe, Jennifer Whitestone, and Hampton Gabler, we see the comingling of several data sources to illuminate a broad view of the implications of roadway incidents. Sighting datasets from every associated body of today's fire service response we can better understand the urgency to reduce response related crashes as the authors discuss analysis of deaths and injury resulting from injury patterns secondary to emergency response mishaps.

The International Association of Firefighters clearly presents its recommendations for the utilization of alternative response modes in the foundational roadway safety work titled *Best Practices for Emergency Vehicle and Roadway Operations Safety in the Emergency Services*. The entire guide is a wealth of information, but specifically states on page 68 how and when organizations should employ "on the quiet" response plans. This section also includes several organizations that have adopted non-emergent response standard, and some citations of the resulting reduction in roadway response incidents.

In the *Guide to IAFC Model Policies and Procedures for Emergency Vehicle Safety*, published by the International Association of Fire Chiefs, the case for alternative response to specifically identified call type is again given credibility. In another body blow to the status quo, the hangers-on to the attitude of 911 calls automatically receive emergent response; will continue

to fade into the sunset. Thanks to the important work of the IAFC we are building the case for organizations nationally to respond in a prudent manner consistent with the citizen need.

In an article found on www.JEMS.com featuring the selections for Innovators in EMS 2013, the author found the story about a project conducted by Scott Matin and Peter Dworsky. The pair set out to study the use of lights and sirens in EMS response and from their research results created a video public service announcement video titled *Driving Responsibility: The Truth about Sirens*, available at www.monoc.org/sirenPSA2.cfm. In the video the creators conduct a study to show the distance at which a person within a modern car actually hears a responding medical unit. In a controlled course with no outside factors other than a standardized ambient noise level, it was shown that at 25 mph the person in a car had a 7 second reactionary gap. This gap was cut significantly when speeds were increased.

In July 2011, the University of Oklahoma School of Emergency Medicine published the *Emergency Medical Services Evidence-Based System Design White Paper For EMSA*. This research focused on evidence based approach to service delivery. In discussion of a 6 month study of response time impact on mortality which included 5424 patient contacts, it reads, “It was concluded that when comparing actual and expected survival based on arbitrary assigned response times, there were no statistically significant differences for times between 5 and 10 minutes.”

In an effort to deliver some research results to the masses of emergency service providers, the public service announcement *Driving Responsibility: The Truth about lights and*

Sirens was produced by Scott Matin and Peter Dworsky. This production was featured in the 2013, JEMS.com innovators in EMS edition, and provides viewers with a great deal of information to help them carefully consider the benefits or drawbacks of emergency response.

In *Driving Responsibility* it is mentioned that 53% of all judgments against EMS organizations, in which monies are awarded, are paid out in relationship to negligence in roadway incidents.

In a compelling experiment to show the reactionary gap of motorists in normal operating situations, the producers showed that at 25 mph, with windows rolled up on vehicles, the driver heard the audible warning systems from the approaching medic unit at a distance of 283 feet. This distance allowed for a total of 7 seconds of driver reaction. When the speed was increased to 45 mph, the reaction distance allowed for 4 seconds of driver reaction. Matin and Dworsky concluded from their research that use of lights and sirens increase the chance of a roadway crash.

Many believe that culture and passed practice is a primary driver of departmental hesitation to dramatically alter the response practices employed to date. In *EMS Mythology, EMS Myth #4*, by Bryan E. Bledsoe featured in the June 2003 EMS Magazine, Bledsoe shares the results of several national research efforts concerning lights and Sirens response. He sights the results of one study out of North Carolina that compared the response modes when transporting patients to local hospital within distances of eight miles. The findings showed that the average time saved within the eight mile area, was only 43.5 seconds when traveling using lights and sirens. The conclusion, “*although the mean difference is statically significant, it is not clinically significant.*”

EMS Mythology sights Wolfberg's 1996 JEMS article in which the author states "A recent study estimated that the fatality rate for EMS personnel is 12.7 fatalities per 100,000 EMS workers annually, which compares with 14.2 for police, 16.5 for firefighters, and a national average of 5.0 during the same period."

In an article that represents some important considerations for organizations evaluating response modes the author located a position paper by the National Association of EMS Physicians published in March of 2003. The position paper *Considerations in Establishing Emergency Medical Services Response Time Goals*, by E. David Bailey, MD, and Thomas Sweeney, MD the concept of fractal response intervals are featured. The focus of the article is that response time standards should take into consideration the difference of emergent, urgent and non-urgent complaints by persons requesting service.

Setting response time standards based on nature of call represents a paradigm shift away from the response time standard set forth by NFPA 1710 which states, concerning EMS response, a BLS arrival standard of 4 minutes with and ALS arrival standard of 8 minutes. These standards were created using response needs of a cardiac arrest patient, giving no consideration to less or non-emergent patients.

The NAEMSP states in this position paper "*Except for cardiac arrest, there is little or no scientific evidence suggesting a casual relationship between response interval and improved patient outcome, little evidence linking improved response intervals to improved survival in critical trauma, and NO literature suggesting rapid response intervals improve outcome for non-critical patients.*"

In a six part series authored by Richard Patrick to be included in the VFIS' Operation Safe Arrival Initiative, the author builds on the USFA findings that "*Since 1984, motor vehicle accidents accounted for 20 to 25% of firefighter fatalities every year.*"

Patrick shares the concept of "Sirencide" a phenomenon in which emergency vehicle operators are emboldened in such a way that best practices of roadway operation suffer. This increases the likelihood of an incident

Further the author discusses the finding of Dr. Jeff Clawson, President of the Medical Priority Dispatch that shares, "*Approximately 95% of all 911 calls aren't life-threatening or even potentially life-threatening. Of the rest, less than 3% turn out to be life-threatening or potentially life-threatening.*" This must be given additional consideration as organizations weigh the risk versus benefit aspects of emergency response.

Patrick encourages the reader to define for their organization the terms *Non-emergency response* and *True emergency response* in an effort to reduce confusion on the matter and increase success potentials of an operational change that includes non-lights and siren response.

Use of Warning Lights and Siren in Emergency Medical Vehicle Response and Patient Transport, published in Prehospital and Disaster Medicine 1994, is a position paper by the National Association of Emergency Medical Services Physicians (NAEMSP). In this paper the NAEMSP made several position statements the author felt notable on the questions facing the Miami Valley Fire District. In summary, body stated that response mode should be based on

protocols that take into consideration specifics of patient condition, and that lights and sirens response by more than one vehicle is generally unnecessary.

The NAEMSP position paper goes on to say “*published data demonstrating the use of lights and sirens in response or patient transport is effective in improving patient outcome are lacking.*” This is an interest consideration for researchers that wish to include sources of data suggesting a point counter-point study of available information. The author confirms, through his research efforts, that there is almost no available data, publications, or body having authority that suggests furthering the practices of across the board lights and sirens response. This position paper is no different, concluding “*a large number of calls to 911 are for non-emergency problems that require neither rapid response nor rapid transport. Systems utilizing non-lights and sirens response modes for such low priority calls have experienced few problems.*”

PROCEDURES

After selecting to research questions concerning the modes of emergency response by the Miami Valley fire District the author began an Internet based search for articles concerning the matter. This was in an effort to gather a representation of preliminary factors immediately available, and build a reference search list.

The author focused first on answering what policies, procedures, directives, laws, or passed practices were in place to determine response mode determination within the Miami Valley Fire District (MVFD). It was found that only one brief mention was made concerning “on the quiet” response in the MVFD policy manual. At the time of this draft, slightly broader mention was being considered for the MVFD Fireground Strategy and Tactics Manual (2015). No further mention in any of the above cited sources.

Interviews were conducted with MVFD internal membership to gather some information on organizational attitudes on response practices and potential future procedures. These discussion included Chief Officers, Lieutenants and Firefighter/Paramedics. Additionally, the author reached out to officer peers and superiors in the Montgomery County Ohio operational area. The goal was to begin to collect what data exists in similarly sized organizations throughout the area. The goal was to quantify how neighbors of the MVFD approached this operational concern, and if the MVFD could benefit by utilizing a similar process. The author found that of the dozens of fire/EMS organizations he had access to, only three had any formal process

through which response modes were determined, all of which were controlled through dispatch software systems and dispatcher protocols.

A brief telephone interview was conducted with the Captain Supervisor of Montgomery County Communications Center, which is the primary dispatching center for the bulk of the police and fire/EMS organizations in Montgomery County Ohio. The author had hoped to find some presently utilized protocols determining response modes. Ironically, the above mention “on the quiet” or no lights and sirens mode was the only organization using any sort of variable response modes throughout the county communications system.

To clearly communicate to the reader an understanding of the type of organization the Miami Valley Fire District is, the community, and the response challenges they face, United States Census results were accessed. This shows the reader the population served within the communities of Miami Township and City of Miamisburg.

Concerning the MVFD’s response challenges and records search of the departments Emergency Reporting software was conducted. This effort was undertaken, using statistics from 2013 and 2014 that organized some 14,860 calls, to understand the organizations present pertinent datum. Included in this search was; total incidents by shift, total lights and sirens and non-lights and sirens responses, average response time (lights and sirens), average response time (no-lights and sirens), average time saved by lights and siren response (2013-14), and incident type per call per station.

The above mentioned Emergency Reporting searches and literature/internet searches were used to provide enough data to the Chief of the MVFD to request authorization for a field trial. The author is preparing a 3-month field trial of variable response. Using criteria supported by the IAFF, the IAFC and several cited EMS specific authorities including local emergency physicians and medical directors; one shift of the MVFD will operate with a new variable response protocol. Specifically the Miami Valley Fire District A-shift including all ranks and apparatus assignments will utilize a provided variable response protocol. B-shift and C-shift will for the duration of this trial conduct their operations as they have to date. At the conclusion of the trial, the author will have several hundred additional pieces of data to compare the results of the operation.

In preparation for the field trial that initiated on 15 April 2015, continuing through 15 July 2015, the author had to establish the criteria personnel would use to determine mode of response. This was accomplished by combining the previously referenced publications by the IAFF, IAFC and the NAEMSP (National Association of EMS Physicians) into a response matrix that would become a training aid to crews. Initial training was delivered to A-Shift only, as B-Shift and C-Shift would continue their normal response operations.

In the interest of consistency in data set comparison it was determined that in order to control the consistency of the new data a new departmental standard on the turnout interval, or the measurement of time between the alert tone and the assigned apparatus going en route, would be established. This became apparent when it was found that the department turnout average was far below NFPA standards on the matter, at 2:28. The standards of turnout are 60 seconds for

EMS, or 80 seconds for fire response with 90% compliance. Discussions with the Chief resulted in the establishment of a department goal of a turnout average standard wherein all shifts would meet a total turnout average of below 2:00. This would enable the author to compare data sets resulting in a truer representation of the difference between emergent and quiet response. A 2:00 turnout standard, it was agreed, represented a near 30-second reduction in turnout time and a better effort toward compliance of the standard. Note; An uncontrollable variable in this effort is that Miami Valley Fire District units mark en route over the radio, causing an apparent lag for some companies when multiple units are attempting to respond at the same time. This situation will be streamlined in the future with the implementation of mobile data computers (MDT).

The response matrix crews would use to determine their mode of response was named EBRS, or Evidence Based Response Strategy. Shortly after the field trial was initiated, a data trend was noted that resulted in the author opting to change the data set the trial would be compared with. Due to personnel “bleed over” created by overtime and leave of various sorts, personnel from other shifts were working on A-Shift on a more consistent basis. Because they were working on A-Shift they were exposed to, and expected to meet the standards set forth in the trial. This resulted in them returning to their respective shifts and reducing the turnout time of their home shifts. This brought to light a variable that the author believed to be detrimental to a true comparison of current response standards with the findings of an EBRS data set. In response to this variable, it was determined that the EBRS trial would be compared the response statistics of the entire previous calendar year. The newly established sets of comparative data would compare the A-Shift EBRS trial, spanning 15 April 2015 to 15 July 2015 to the statistics of all shifts spanning from 15 April 2014 to 15 April 2015.

Throughout the duration of the EBRS trial the author would evaluate several key data sets by use of the department's reporting software, Emergency Reporting. The data sets evaluated would include; Average turnout time by company and shift. Average response interval (alert to on scene) lights and sirens (emergent) by shift. Average response interval no lights and sirens (quiet) by shift. These data sets would be evaluated on a continual basis by the author with weekly updates to the upper command staff. Also to be evaluated were any field based findings or complications by responding crews that should be considered.

The author will conduct interviews with two local EMS Directors, both of whom are experienced trauma physicians at level one and level two trauma centers respectively and are intimately involved in progressive EMS delivery regionally. The goal of the interviews will be to more clearly show regional organizations what the EMS Directors attitudes are towards variable response, possibly stimulating more dialogue on the matter. Additionally, a questionnaire was created to gather some opinions of physicians of varied specialties.

A variety of selected representative samples to include; MVFD Officers and Firefighter/Paramedics, regional officers and chiefs, and participants of the above-mentioned field trial of variable response will complete surveys. The surveys that include MVFD personnel and regional officers will attempt to measure attitudes about variable response, their agency's present procedures, their first hand experience, beliefs about benefits or shortfalls. The focus of the surveys conducted with the members that operated within the field trial group will focus on everything above but be expanded to include participant attitudes about variable response. The

survey participants will be provided with opportunities to say if they would or would not feel comfortable moving forward with a Miami Valley Fire District variable response policy.

After the surveys, the author will attempt to provide a departmental training to share the results of the field trial and surveys as compared to regional efforts concerning variable response.

Definition of Terms

Quiet Response. “On the quiet” references the mode of response by emergency vehicle wherein they do not employ lights or sirens.

Emergent Response. “Lights and sirens” reference the mode of response by emergency vehicles wherein they employ lights and sirens.

Variable Response. Of or relating to the mode of emergency response being determined by the type of call specifically in order to determine the safest mode of response. Usually Emergent or Quiet response.

EBRS. Evidence Based Response Strategy

IAFF. International Association of Firefighters

IAFC. International Association of Fire Chiefs

NAEMSP. National Association of EMS Physicians

Turnout. The period of time between an alert tone and an emergency vehicle going en route to the incident.

Response Interval. The total period of time between the alert that initiates a service response and the time the responding vehicle arrives on the scene.

Limitations of the Study

Although referenced above, the author wished to further address the limitations of response time measurement. It must be understood that an uncontrollable variable exists concerning the author's ability to, with perfect accuracy, measure the turnout interval of the Miami Valley Fire District. Responding over the radio creates a back up of the responding units being acknowledged by dispatch and subsequently being recorded. For example, a structure fire response will generally include five responding units. When the first unit advises dispatch they are responding, the dispatch center then repeats the address, operating radio channel that has been assigned, as well as any pertinent additional information. This repeating of information continues for every addition apparatus that advises en route, naturally creating a back up that will not exactly reflect the true turnout interval of every rig. For purposes of this study, the author and command staff determined that, with this variable being acknowledged, any improvements would be understated. This variable would be offset within organizations using mobile data terminal (MDT) or mobile digital computer (MDC) technology.

A second potential limitation of the study is related to the cultural attitudes of organization personnel, commonly present in today's fire service. The research topic at hand is controversial in many circles of the fire service. The author, in collaboration with command staff, have taken steps within the research and set organizational goals that strive to reduce the ability of any members to skew the data collection efforts. For example, it became apparent that in order to get a true representation of the turnout intervals and response intervals, clarification had to be made concerning the response procedure. Specifically, a standard turnout time had to

be established. Beyond this standard, crews had to be made aware that advising en route prior to all members being on an apparatus and vehicle rolling would not be tolerated.

RESULTS

The author set forth to answer the following questions:

1. What are the benefits, if any, of the Miami Valley Fire District having multiple response mode options?
2. What are area agencies similar to the Miami Valley Fire District doing concerning variable emergency response modes?
3. What does the Miami Valley Fire District do currently concerning emergency response modes?
4. What are some future options for the Miami Valley Fire District concerning emergency response modes to reduce accident potentials?

The answers to these questions were found through a survey of 100 regional responders and, after creating the Evidence Based Response Strategy, searched for any potential improvements to service delivery.

Question One

Through the research process data was gathered that could show that there are benefits to having multiple response modes. As a component of the field trial of a variable response mode standards were established to reduce the amount of time it took for crews to depart the station for a call. A 29 second reduction in this timeframe was the result of this effort.

Beyond the impact on turnout times, the 29 seconds reduction there carried over to impact the overall response times. Using both lights and sirens and quiet response modes, the EBRS response model resulted in a faster overall average than previously experienced by the

Miami Valley Fire District. Lights and sirens response mode using EBRS was an average of 19 seconds faster than crews using their traditional response approach, while quiet proved a slight improvement of five seconds by comparison.

Anecdotal evidence would suggest the possibility that over time the Miami Valley Fire District could reduce maintenance cost, and greatly increase safety to the traveling public. Further research would be required to substantiate this.

The Response Attitudes Survey conducted by the author showed that 87% of respondents felt that they should have the ability to respond in different modes to calls, with 85% admitting they had responded to calls in what they believed was an inappropriate manner for the call.

Question Two

The author made an effort to understand what area agencies were doing concerning the matter of variable response. The first dialogue occurred with the regional dispatching supervisor who stated that no department in the area of the Miami Valley Fire District, that they provided dispatching services for, had any formal, dispatch based, variable response guideline. While the concept of variable response modes was very well received, with survey showing an overwhelming attitude of best practice, hundreds of hours of monitoring the radio traffic of neighboring agencies, revealed an almost non-existent utilization of any alternative response modes. Lights and sirens response was nearly the exclusive modes of operation across all call types. Of particular interest to the author were the increasing requests for information on the Evidence Based Response Strategy and the correlating statistics as the trial progressed and word spread to the possible advantages of such a program.

Question Three

The Miami Valley Fire District, previously, had no consistent or stated expectation of how crews would approach variable response. Attitudes and response norms were what prompted the author to conduct this research, leading to the creation of the Evidence Based Response Strategy. Where no policy or procedure had existed prior, the Chief of the MVFD empowered the author to write the policy and conduct all training concerning the district's future implementation of this program.

Question Four

The options for the Miami Valley Fire District moving forward are numerous. With a more complete understanding of risks and benefits of having, or not having, a variable response option, the MVFD can move forward with strong justifications for its response policy. Setting and maintaining a minimum turnout time standard across the department accomplish the first, easiest, and most clear-cut option. The two-minute average turnout standard had a large impact on the eventual field study outcomes.

The District now has the data that supports the implementation of a variable response plan through the use of EBRS. Ongoing training for department personnel to better understand the potentials of response decisions is a critical part of a variable response modes discussion. Through this research, this training is now available.

Survey Summary

The Response Attitudes Survey conducted showed some interesting trends amongst regional responders. The 100 respondents represented all ranks, experience, and education levels. Miami Valley Fire District personnel were specifically excluded. Included were members from area agencies, of like size and structure.

1. *Do you believe your organization should respond in different modes (emergent or quiet) to different call types?* 87% YES, 13% NO
2. *Does your organization allow for an emergent or quiet response mode to be determined by responding crews?* 57% YES, 43% NO
3. *Have you responded to a call in a manner that you didn't feel was appropriate for the call type?* 85% YES, 15% NO
4. *Do you believe that culture/tradition have an impact on your response mode determination?* 74% YES, 26% NO
5. *Do you believe that running lights and sirens (emergent) has a significant impact on response times?* 46% YES, 54% NO
6. *Does your organization prioritize turnout time (dispatch to en route)?* 84% YES, 16% NO
7. *Does your organization prioritize the amount of time you spend on an EMS scene?* 34% YES, 66% NO
8. *Do you respond lights and sirens to call types that you do not believe are emergencies?* 69% YES, 31% NO
9. *Should crews have discretion concerning their mode of response?* 85% YES, 15% NO

10. *Have you ever witnessed, or been involved in, any motor vehicle crash while responding to a call? (Involving your apparatus or not)* 52% YES, 48%

NO

There are a few trends a reader can extract from the survey results. First, it seems to be a common attitude that responders should have the ability to determine a response method based on the call type. This is consistent with the commonly accepted training programs of the day, but inconsistent with what most departments are actually doing. Another notable trend is that of the perceived power of culture in the decision of how crews respond. The survey shows that culture is a driving force in response mode, supported by the common practice of driving lights and sirens when the responder otherwise knows it's not appropriate. The literature review materials commonly show little to know correlation of lights and sirens response with patient/incident outcome. Given that nationally the average response difference by response mode is 45.3 seconds, the fact that little effort is spent on decreasing time on scene or turnout time by agencies show another inconsistency in approach to this topic.

DISCUSSION

From the outset of this research project, the author sets forth to answer several questions to better understand what options, opportunities, and responsibilities are indicated for the Miami Valley Fire District. The initial research on the matter of variable response modes indicated that, quite simply, the agency had a great deal of work to do in order to operate within the realm of best practice. The Miami Valley Fire District was commonly responding to calls that presented virtually no potential to loss of life or property, in a manner that could no longer be justified.

Given the positions of research materials by the International Association of Firefighters and the International Association of Fire Chiefs, as well as many articles on the matter, the early indicators were that the MVFD would benefit from an in depth understanding of variable response. The literature review revolved around the judicious utilization of lights and sirens response, with no findings of research that supports the continuance of the practice on a nearly exclusive basis. These common themes in the literature research phase were supported throughout the variable response field trial conducted by the author.

After creating a trial program through which the author could quantify the suggestions of the literature, the EBRS (Evidence Based Response Strategy) went into effect for three months. One should note, the Chief of the MVFD extended the trial as he opted to implement it district wide. The program proved to reduce all benchmark timeframes of service delivery without complications throughout the trial and including the four months since.

The initiation of the program was not without controversy, all of which easily overcome by education. As the trial progressed and understanding of the new response model rationale increased a new understanding was reached. With a new understanding of what

constitutes an emergency, and subsequent lights and sirens response, great progress has been realized by the agency.

RECOMMENDATIONS

Based on the results of research, including surveys and an intensive field trial, the author is prepared to make conclusive recommendations to the Miami Valley Fire District. The recommendations by the author are possibly better referred to as outcomes, as the EBRS program, associated training and operational guideline are being fully implemented by the author's agency. Based on early findings of research and field trial data, the Chief of the MVFD committed to the program siting that it is clearly the best practice of the agency. The following are a summary of outcomes of this research project.

1. The MVFD will set a minimum turnout average of 120 seconds.
2. The MVFD will conduct departmental training to increase understanding of evidence-based response, to include training in Evidence Based Response Strategy. (EBRS)
3. All MVFD members will receive a copy of the EBRS guide, to aid in the real time decision-making process concerning modes of response.
4. The Evidence Based Response Strategy policy will be added to the MVFD policy manual.

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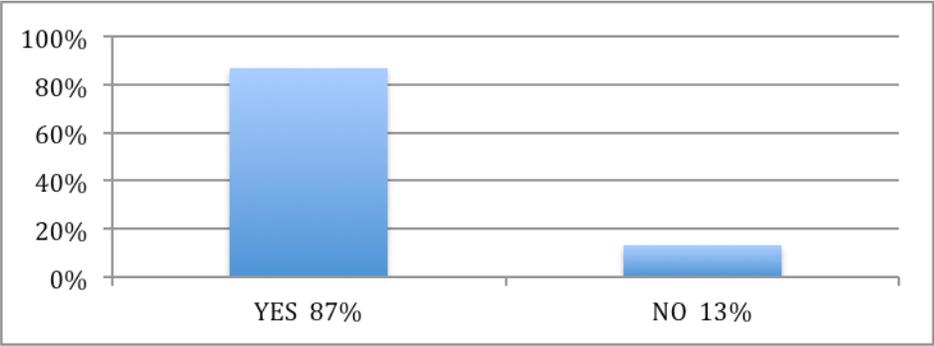
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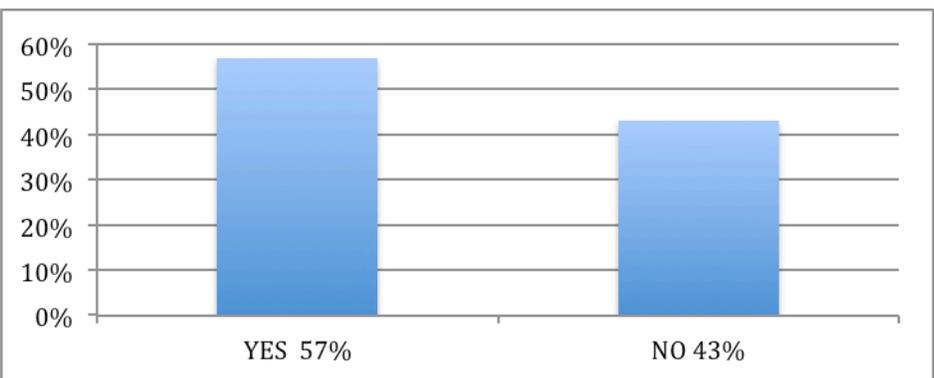
Blackwell T, Clawson J, Eckstein M, Miramonti C, Wang H. *Emergency Medical Services Evidence-Based System Design White Paper For EMSA. University of Oklahoma School of Emergency Medicine. 2011*

APPENDIX 1 – RESPONSE ATTITUDE SURVEY

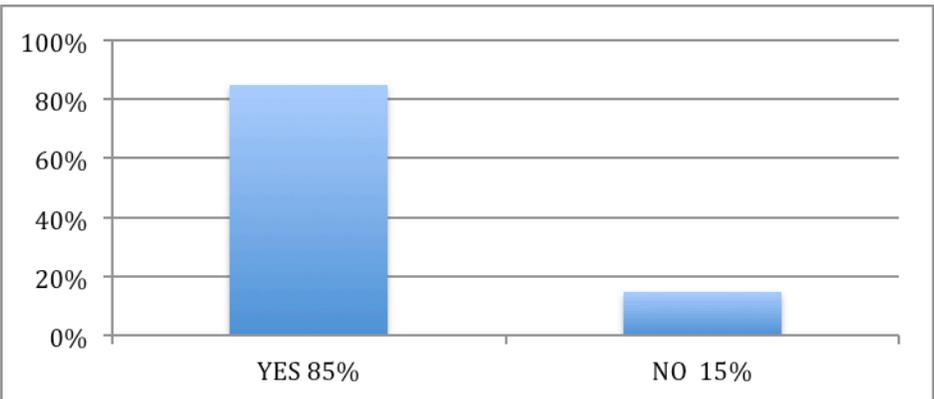
1. Do you believe your organization should respond in different modes (Emergent or Quiet) to different call types?



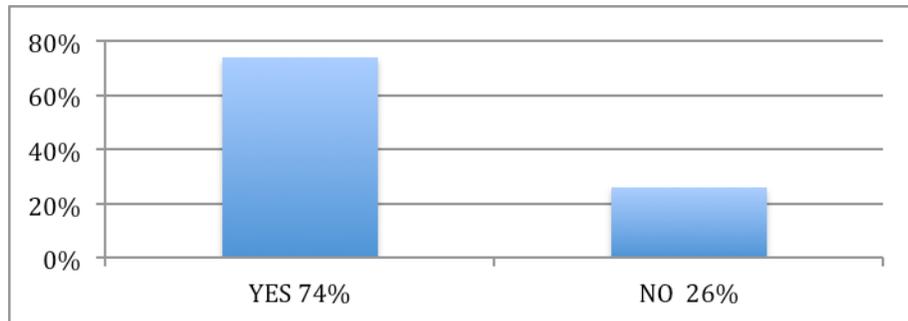
2. Does your organization allow for an emergent or quiet response mode to be determined by responding crews?



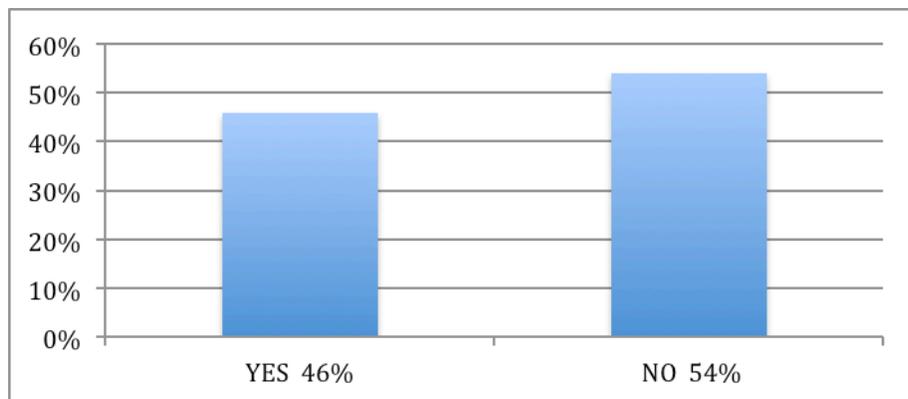
3. Have you responded to a call in a manner that you didn't feel was appropriate for the call type?



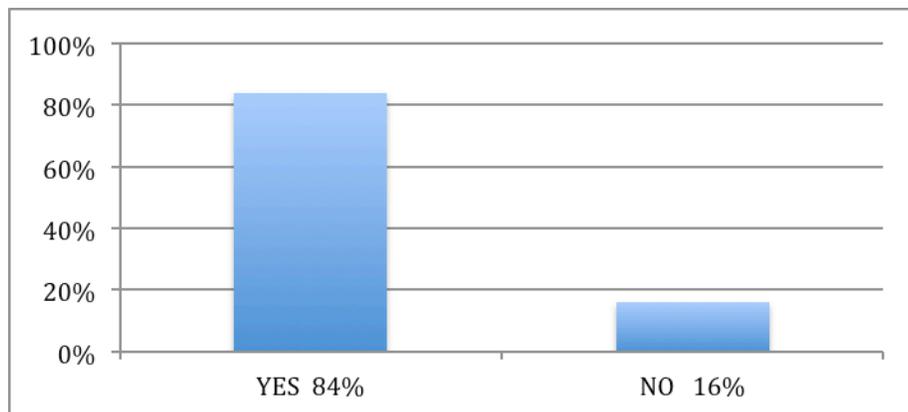
4. Do you believe that culture/tradition have an impact on your response mode determination?



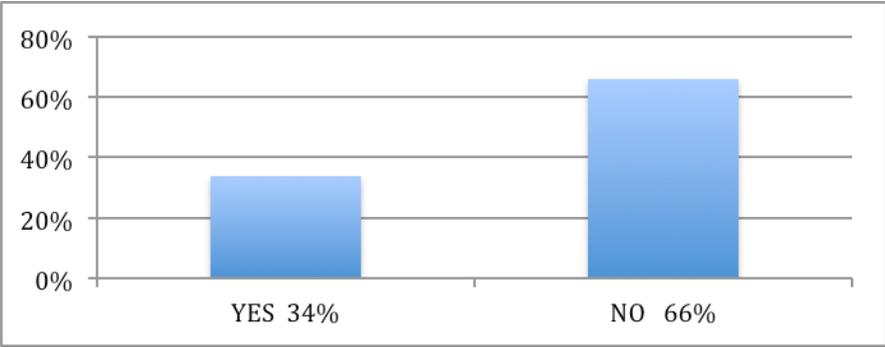
5. Do you believe that running lights and sirens (emergent) has a significant impacts on response times



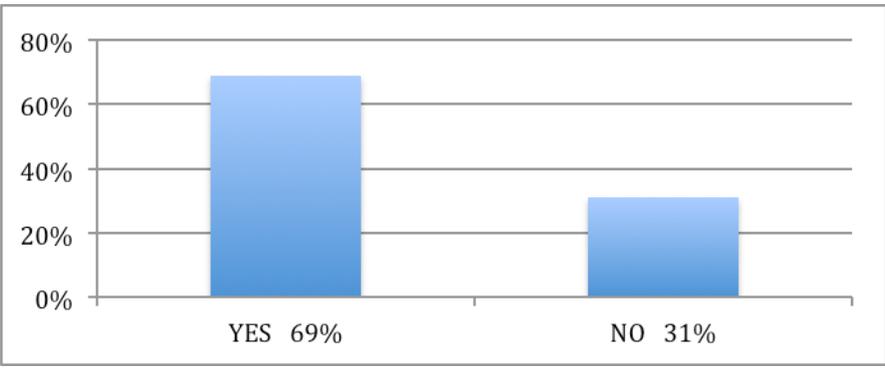
6. Does your organization prioritize turnout time (dispatch to en route)?



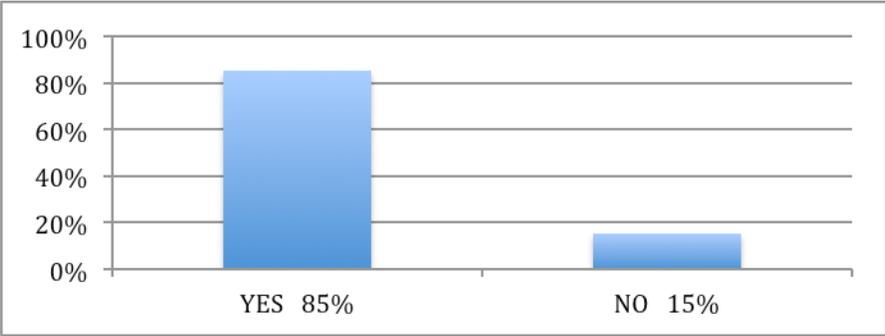
7. Does your organization prioritize the amount of time you spend on an EMS scene?



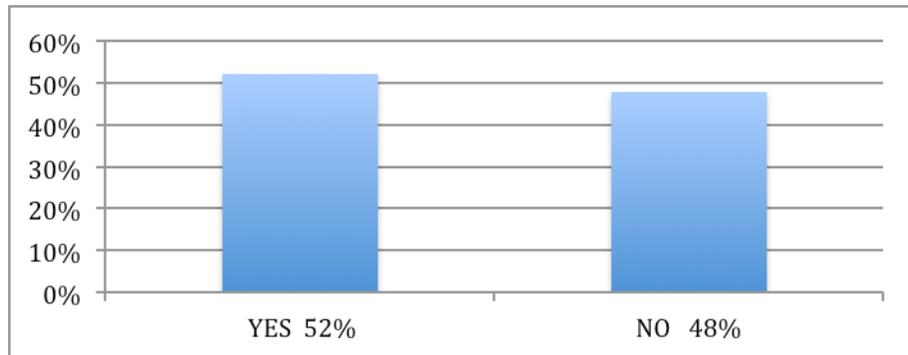
8. Do you respond lights and sirens to call types that you do not believe are emergencies?

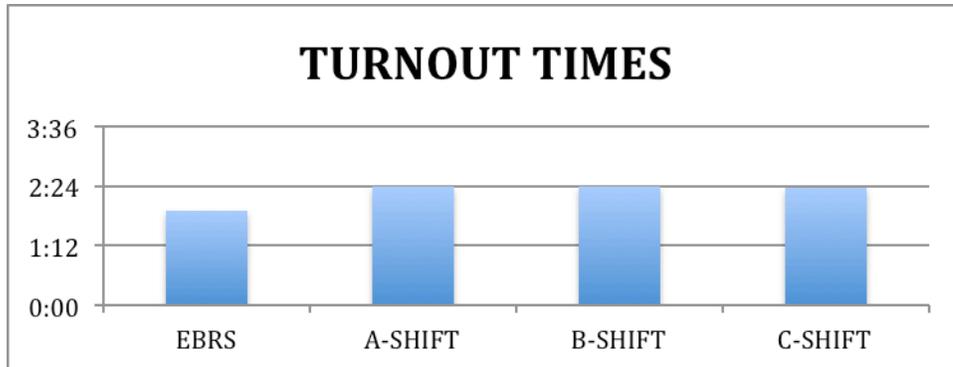


9. Should crews have discretion concerning their mode of response?

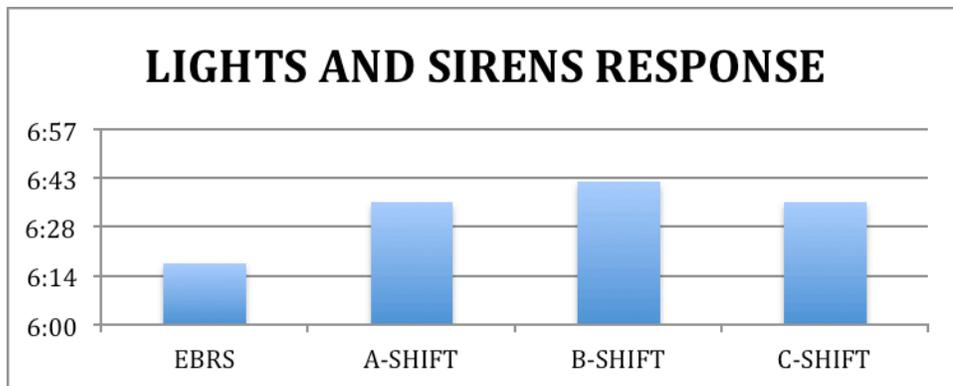


10. Have you ever witnessed, or been involved in, any motor vehicle crash while responding to a call? (Involving your apparatus or not)

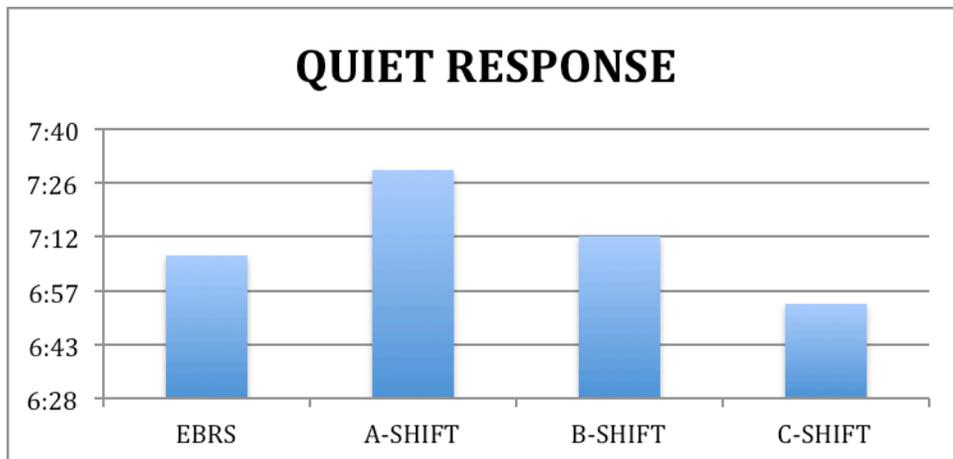


APPENDIX 2 – EBRS TRIAL RESULTS

EBRS improved turnout an average of 29 seconds.



EBRS lights and sirens improved on scene time an average of 19 seconds.



EBRS response to non-emergent service request creates no undue delay.

APPENDIX 3 – EBRS POLICY

1. Purpose

To ensure all members of the Miami Valley Fire District understand the procedure for determining the appropriate mode of response to calls for service by fire and EMS apparatus.

2. Scope

This standard is intended for all members of the Miami Valley Fire District. The provisions of this procedure may be suspended, revised or deviated from by the Chief of the Department or his designee whenever special or unusual circumstances warrant.

3. Responsibility

All Miami Valley Fire District personnel have the responsibility to learn and follow this procedure.

All Miami Valley Fire District Officers are responsible to comply with and ensure that Personnel under their command are adequately trained, fully understand, and comply with this procedure.

4. Application

A. All personnel will understand and utilize the Evidence Based Response Strategy (EBRS) to determine the most appropriate response mode and insure the safest response to each call for service.

1. **Evidence Based Response Strategy (EBRS)** – Decision making guideline that utilizes evidence based research to give supporting reason to each member when deciding on emergent (lights and sirens) or quiet (no lights and sirens) modes of

response. This guideline to the risk versus benefit assessment required of each response is designed to allow for the most prudent response mode decision possible, creating the highest level of safety to responding personnel and the motoring public.

2. As a component of the EBRS guideline, **shifts will take all necessary steps to achieve an average turnout time (tone to responding) of less than 2 minutes.** The turnout time has been proven to be the most significant component of the total response interval that can be controlled by responding personnel.
3. Department members will use the EBRS guideline to determine if a response will be Emergent (lights and sirens) or Quiet (no lights and sirens)

a. Emergent Response

EMS

- Respiratory Difficulty

Asthma

COPD Exacerbation

Toxic Inhalation

- Cardiovascular

Cardiac Arrest

Chest Pain / AMI

Malignant Dysrhythmia

Decompensated Heart Failure

Acute Aortic Dissection

- Critical Trauma

Unstable Airway

Altered LOC

Uncontrolled Hemorrhage

Intracranial Hemorrhage

- Others

Anaphylaxis

Choking

Child Birth

Diabetic Emergency

Overdose

Anticipated LONG (>15 min) Travel

FIRE (Emergent Cont.)**- Smoke or fire in a building****- Vehicle Fire**

- MVC w/ trap or injury

- Outdoor Fire w/ exposure

- Arching Wires DOWN
- Gas leak in a building
- HazMat w/ persons in distress or significant knowledge of risk / exposure
- Water/Special rescue
- Anticipated LONG (>15 min) Travel

b. Quiet Response

EMS

- ALL EMS calls not on EMERGENT list.

FIRE

- Fire Alarm & NO additional report of smoke or fire.
- Residential Alarm & NO smoke or fire indicated.
- MVC & Extended LE on scene time or “just to check an occupant”.
- CO Detector sounding & NO patient symptoms
- Trash/Outdoor Fire & NO exposures
- Small brush fire
- Wires down / hanging NO arching

- **Odors Outside (Gas or Smoke)**

- **Smoke in the area, no source noted**

- **Gas leak outside**

- **Water leak**

- **Controlled burn investigation**

- **Outside Arching Wires & NOT down**

FIRE (Quiet Cont.)

- **Fuel Spills – Routine < 25 gals**

- **HazMat & NO persons in distress & NO significant**

knowledge of risk or

exposure

- **Station Fill-in / Move Ups**

4. Medics responding EMERGENT should routinely have a fire apparatus responding as well. Fire apparatus or Battalion accompanying medics on emergent responses may respond quiet as intel and risk/benefit indicate.
5. Apparatus responding with inbound mutual aid or out of first response district medics should respond EMERGENT to a call their medic would have responded EMERGENT to.
6. Mutual aid responses by the MVFD will utilize EBRs in the same manner as any in district response.
7. **This information is presented as a guideline for decision making, not a replacement.** The Miami Valley Fire District recognizes that extenuating circumstances can and will occur. The above cited response guideline should not

replace, but assist the prudent decision making of personnel based on previous experience, additional intel, and technical expertise.

5. Attachments

A. Evidence Based Response Strategy (EBRS) Guide