



Fire and Emergency Medical Services Department
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MEMORANDUM

TO: Alderman Sutton
Mayor Jeff Speaker
Finance Committee

FROM: Charlie Myers, Fire Chief

RE: Answers to Alderman Sutton's Questions

DATE: September 30, 2008

1. Explain the difference between ALS and BLS service.

The short answer is Basic Life Support (BLS) provides care for airway, breathing and circulation "ABC's". In the case of a heart attack this would be rescue breathing, cardiopulmonary resuscitation (CPR), automatic defibrillation and rapid transport to the hospital. Advanced Life Support (ALS) for the same heart attack would the same treatment that could be provided in the emergency room. If patient stabilization is achieve transport to the closest most appropriate hospital that provides advanced cardiac care (a catheterization lab).

Basic Life Support (BLS) is a specific level of prehospital medical care provided by trained responders, including emergency medical technicians, in the absence of advanced medical care.

Basic Life Support consists of a number of life-saving techniques focused on the "ABC"s of pre-hospital emergency care:

- **Airway:** the protection and maintenance of patient airway including the use of airway adjuncts such as an oral or nasal airway
- **Breathing:** the actual flow of air through respiration, natural or artificial respiration, often assisted by emergency oxygen
- **Compressions:** pressure applied on the chest to keep the blood flowing by compressing the heart during cardiopulmonary resuscitation [CPR]

BLS may also include considerations of patient transport such as the protection of the cervical spine and avoiding additional injuries through splinting and immobilization.

BLS generally does not include the use of drugs or invasive skills, and can be contrasted with the provision of Advanced Life Support (ALS). Most laypersons can master BLS skill after attending a short course. Firefighters and police officers are often required to be BLS certified. BLS is also immensely useful for many other professions, such as daycare providers, teachers and security personnel.

CPR provided in the field buys time for higher medical responders to arrive and provide ALS care. For this reason it is essential that any person starting CPR also obtains ALS support by calling for help via radio using agency policies and procedures and/or using an appropriate emergency telephone number.

An important advance in providing BLS is the availability of the automated external defibrillator or AED, which can be used to deliver defibrillation. This improves survival outcomes in cardiac arrest cases, sometimes dramatically.

This level of care is provided by EMT-Basics (with 110 hours of training)

Advanced Life Support (ALS) - Implies that a EMT is capable of performing advanced life support skills EMT-P (Paramedic), commonly referred to simply as a paramedic or medic.

ALS (in most cases) refers to the skills and knowledge that a practitioner possesses. The ALS provider may perform advanced procedures and skills on a patient involving invasive and non-invasive procedures including;

- Cardiac Monitoring
- Cardiac Defibrillation
- Transcutaneous pacing (Cardiac Pacing)
- Intravenous cannulation (IV)
- Interosseous (IO) access and Intraosseous infusion
- Surgical Cricothyrotomy
- Needle Cricothyrotomy
- needle decompression of Tension Pneumothorax
- Advanced medication administration through parental and enteral routes (IV, IO, PO, PR, ET, SL, topical, and transdermal)
- Following protocols as set forth by AHA Advanced Cardiac Life Support (ACLS)

- Following protocols as set forth by AHA Pediatric Advanced Life Support (PALS)
- Following protocols as set forth by Pre-Hospital Trauma Life Support (PHTLS)

This level of care is provide by Paramedics (who have about 1,000 or more hours of training) with assistance for EMT Basics

2. What is the approximate difference in cost to the city between the two services.

The cost difference between a Firefighter/Paramedic and a Firefighter/EMT is \$5,125. The City has 24 Firefighter/Paramedics for a total cost of \$123,000. In 2007 the City provided 914 Paramedic transports. The City ambulance transport rate for Paramedic service is \$125.00 more than a Basic Life Support transport. This allowed the City to bill an addition \$114,250.00 for the paramedic transports. The number of ALS 1 billings (increased amount that Medicare allows for a paramedic patient assessment) for 2007 was 100 allowing for an addition \$20,000 billing. Many of the costs associated with a Paramedic service are recovered by the increased billing revenue.

3. What is the norm for other city's in the area and throughout Wisconsin.

EMS Service provided (reference State of Wisconsin DHS EMS Section web site)

Waukesha County

Paramedic – 9 Communities

EMT Intermediate – 13 Communities (Some are under Contract with City of Delafield to provide Paramedic service). EMT I's can provide some ALS skills and have approximately 400 hours of training.

EMT Basic – 3 Communities

Milwaukee County

County wide Paramedic service provide to all 18 Community by 8 municipal providers

Please is the attached spread sheet for a complete listing EMS Providers.



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MEMORANDUM

TO: Finance Committee

FROM: Charlie Myers, Fire Chief

RE: Fire and Emergency Medical Service Delivery

DATE: September 29, 2008

Attached document describes the fire and emergency medical service (EMS) delivery model used by the City of Brookfield Fire Department. The major elements are responses times, manpower and type of equipment to meet standards established by the State of Wisconsin, National Fire Protection Association (NFPA) and Insurance Service Office (ISO). We do not have overlapping response time coverage from our current or new fire stations locations therefore it is important to provide the same level of service from each station ensuring equal fire, EMS and rescue service delivery to all areas.

Please note that the City of Brookfield provides the highest level of care at the paramedic level to all EMS calls, this is referred to as a single tiered advance life support system. Currently there is no higher level of care that can be provided.

I would be happy to answer any questions you may have about service delivery.

City of Brookfield Fire and Emergency Medical Service Delivery Model

“The Mission of the City of Brookfield Fire Department is preservation of life and property through comprehensive education, prevention and emergency intervention.”

Emergency Medical Service (EMS) Response

- Single Tiered Advance Life Support Response. (City of Brookfield Model)
 - Provides the highest level of pre-hospital care available with two (2) Paramedics and three Emergency Medical Technicians to all emergency medical service calls.
 - In a single tiered system, all patients are evaluated by paramedics. City of Brookfield is one of the only communities in the region to provide the highest level of pre-hospital care to all the residents.
 - Shortens the total time of the call. Enough manpower is available to provide care and package the patient for transport.
 - Provides for a continuous level of care because the paramedics do not leave the patient to bring in additional supplies and equipment from the ambulance.
 - Reduces the time for Basic Life Support (BLS) patients that are upgraded to Advanced Life Support (ALS) to receive ALS treatment because all available resources and equipment are on the scene.
 - Does not require calling for additional assistance for patients requiring BLS care that needs more than two Emergency Medical Technicians (EMT's), such as cervical spine immobilization, traction splinting, patient movement, etc.
 - Provides additional manpower for lifting patients that may reduce workers compensation costs for repetitive lifting injuries. 316 responses in 2007 were coded as lifting assistance.
 - Allows BLS transports to be billed at a higher rate because of the paramedic patient evaluation. There is approximately \$200.00 difference between BLS and ALS (1) billing.
 - In 2007 there were 2,234 emergency medical and rescue calls which represent 69% of the total calls. This is approximately five (5) calls per day with 969 BLS and 831 ALS transports. The remaining calls were 395 vehicle accidents/extractions and 39 miscellaneous rescues. We estimate that only one (1) to one and one half (1 ½) calls per day would be BLS calls not requiring additional assistance. With additional assistance immediately available patient care is improved and probabilities of work injuries are reduced.
- Two Tiered EMS systems with ALS and BLS care. (Milwaukee County model)
 - Milwaukee County provides a two tiered system that requires dispatchers to triage the call and sends a basic life support (BLS) response or an advanced life (ALS) support ambulance based on the questions asked. If the BLS crew arrives on scene and determines the patient requires a higher level of care, they must wait for an ALS life support ambulance. Additionally, if patient lifting assistance is needed, the BLS crew waits until another unit is dispatched and arrives on scene before the patient is transported to the hospital. The response for a suburban Milwaukee County community to a BLS call is an ambulance with two personnel. The ALS call is both a BLS and an ALS ambulance or an Engine or Ladder Truck as the BLS crew and an ALS Ambulance. The City of Milwaukee normal response to a BLS calls in a fire suppression vehicle (engine or ladder truck) once on scene they request a private ambulance. ALS response id ALS ambulance and engine or ladder truck.

- Standards
 - Advanced Cardiac Life Support (ACLS) care identifies the roles of all five team members.
 - Team Leader
 - Airway management Team Member
 - Cardiopulmonary Resuscitation Team Member
 - Electrocardiogram monitoring and defibrillation Team Member
 - Vascular Access and Medications Team Member
 - State of Wisconsin Department of Health Services
 - HFS 112.07 EMT – Paramedic Operational Plan— Paramedic Ambulance two (2) paramedics for services providers that were licensed prior to January 2000.
 - HFS 110.04 Licensing of Ambulance Service Providers (1) – two EMT-Basics
 - The goal of the American Heart Association
 - The American Heart Association's scientific position is that brain death and biological death start to occur in 4 to 6 minutes after someone experiences cardiac arrest. Cardiac arrest can be reversible if treated within a few minutes with an electric shock and ALS intervention to restore a normal heartbeat. Verifying this standard are studies showing that a victim's chances of survival are reduced by 7% to 10% with every minute that passes without defibrillation and advanced life support intervention. Few attempts at resuscitation succeed after 10 minutes.
 - National Fire Protection Association (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, guidelines for emergency response.
 - (1) One minute (60 seconds) for turnout time.
 - (2) Four minutes (240 seconds) or less for the arrival of a unit with first responder or higher level capability at an emergency medical incident (this is for the BLS care provider.)
 - (3) Eight minutes (480 seconds) or less for the arrival of an advanced life support unit at an emergency medical incident where this service is provided by the fire department (this is for the paramedics in a two tiered system).

Established performance objective is not less than 90 percent for the achievement of each response time objective.

Need For Three Ambulances

- The 2006 Uniform Fire/EMS Service Delivery Task Force Report identified the need for three fire stations on the center axis of the City (Calhoun Road). It is necessary to provide an ALS emergency medical response from each fire station to meet the standards established by the American Heart Association and National Fire Protection Association to save lives and facilitate positive outcomes for patients.

Fire and Rescue Response

Standards

1. National Fire Protection Association
 - 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, guidelines for emergency response.
 - (1) One minute (60 seconds) for turnout time
 - (2) Four minutes (240 seconds) or less for the arrival of the first arriving engine company at a fire suppression incident and/or 8 minutes (480 seconds) or less for the deployment of a full first alarm assignment at a fire suppression incident

Established performance objective is not less than 90 percent for the achievement of each response time objective.
2. Insurance Services Office (ISO)
 - Distribution of companies — ISO credits the percentage of the community within specified response distances of pumpers (1-1/2 miles) and ladder/service apparatus (2-1/2 miles). The majority of the community is covered within this standard.
 - Pump capacity — ISO compares the pump capacity of the in-service and reserve pumpers (and pumps on other apparatus) with the Basic Fire Flow. ISO considers a maximum Basic Fire Flow of 3,500 gallons per minute (gpm). The total combined pump capacity of the two engines and quint (ladder truck) is 4,500 gpm's.
 - The department must have sufficient membership to assure the response of at least four members to first response to structure fires.
3. Department of Commerce Comm. 30 Fire Department Safety And Health Standards
 - Comm 30.14 Emergency operations “A fire fighter using self-contained breathing apparatus and operating in an interior structural fire shall operate in a team of 2 or more fire fighters. Except in the case of a structural fire which is in the initial or beginning stage and which can be controlled or extinguished by portable fire extinguishers, a back-up team of at least 2 members wearing self-contained breathing apparatus shall be available at the scene for rescue if the need arises. One back-up team member with a charged line shall be committed to a safe non-affected area in or near the structure. The other back-up team member shall remain within voice contact and may be assigned to additional roles so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any fire fighter working at the scene. In all structural fires in which fire fighters use self-contained breathing apparatus, at least one additional member shall be assigned to remain outside the structural fire and monitor the operations.” This standard designates the minimum first response to a structure fire of five personnel.
4. Department of Commerce Fire Department Dues program
 - Fire Department Dues Fund program, which distributes to municipalities money collected from fire insurance premiums paid in the state, under subsections 101.14, 101.573, and 101.575 of state statutes states “The Fire

Dues Fund payments to municipalities are conditioned on responsibilities that must be substantially fulfilled in order to be eligible to receive the money.”

- “Fire department must ensure the response of at least 4 firefighters, none of whom is the chief, to a first alarm for a building. Required by: s. 101.575 (3) (a) 2., Stats”

Need For Three Fire Suppression Vehicles

- The 2006 Uniform Fire/EMS Service Delivery Task Force Report identified the need for three fire stations on the center axis of the City (Calhoun Road). A fire suppression response from each station is necessary to meet the standards established by NFPA and ISO to save lives and property.

Fire Department Minimum Staffing

The City of Brookfield Fire Department uses cross-trained Firefighter/EMT's and Firefighter/Paramedics to provide a wide range of municipal services such as firefighting, EMS, rescue, fire inspection, public education, hazard evaluation, toxic environment mitigation and domestic terrorism emergency response. Utilization of the 24 hour/365 days service provides public value in the form of domestic security and all hazard response to the public's request for assistance. By maintaining a minimum staffing of 16 personnel per day, the fire department provides the same level of service from each fire station to residents and businesses with the City. The minimum staffing level allows the City to meet minimum standards from accrediting agencies. This staffing model provides a single tiered emergency medical response that has all patients evaluated and treated by paramedics, the highest level of pre-hospital care. The City of Brookfield is one of the only fire-based emergency medical system (EMS) in the region to provide this level of care. The placement of the fire stations dictates the need to have both a fire and EMS response from each station in order to meet the minimum standard for five (5) minutes. We do not have overlapping response coverage's that can meet the standards. Another factor that affects staffing is our overlapping or concurrent calls. Records indicate that 1/5 of the calls overlap, with most occurring during 7:30 am and 7:30 pm. There are times when three calls overlap depleting all of the available resources.

Paramedic Emergency Medical Service

- From above, the State of Wisconsin Health Services establishes the minimum staffing for an ambulance at two (2) paramedics for paramedic service providers. Additional personnel are needed at the scene of an advanced life support call to provide care. These additional personnel are required to be trained EMS providers. The City of Brookfield uses Firefighter/EMT's from fire suppression apparatus to provide this care.
- To provide Advanced Cardiac Life Support (ACLS) in a single tiered system five personnel (two (2) paramedics and three (3) EMT's) are needed at each station to begin resuscitation efforts within four (4) to six (6) minutes as identified by the American Heart Association. Please note that there are other medical conditions that require five personnel to provide care such as asthma and respiratory crisis intervention, treatment of anaphylaxis/severe allergic reactions, drug therapy for diabetic shock and seizures, pharmacological stabilization of cardiogenic shock, cardiac monitoring and interpretation of electrocardiogram (EKG's) including 12-lead ECG.

- To provide both a single tiered ALS system and a fire/rescue response throughout the City within the NFPA and ISO response times, each station is staffed with Firefighter/Paramedics and Firefighter/EMT's.

Fire and Rescue Service

- The City of Brookfield meets the requirement of NFPA by using cross-trained firefighter/EMT's and Firefighter/Paramedics. Each of the three (3) stations are staffed with three (3) Firefighter/EMT's and two (2) Firefighter Paramedics.
- Both ISO and the Department of Commerce Safety and Buildings (for fire service insurance dues compliance) require a minimum of four (4) firefighters for the first response to a structure fire. To provide this within the response time identified in NFPA 1710 of six (6) minutes from the receipt of the call at the dispatch center and arrival of the first fire suppression apparatus. City of Brookfield meets this requirement of five (5) personnel per station.
- Department of Commerce Comm. 30 Fire Department Safety And Health Standards requires five (5) personnel for the first response to a structure fire. Two for the primary fire attack, two for backup/rescue and an incident commander.
- NFPA also identifies a response within 8 minutes (480 seconds) or less for the arrival of a full first alarm assignment at a fire suppression incident. The full first alarm assignment is identified as 15 personnel. City of Brookfield meets this requirement of five (5) personnel per station and the on-duty Deputy Chief.

Overtime

A general rule of thumb for staffing career fire and EMS employees on a three platoon system whose work schedule are 24 hour shifts of duty that results in an average work of 56 hours, is that one additional employee is needed for every three on shift in order to cover employee absences. This is most often referred to as the four for three coverage. This rule applies for the department's "California" schedule defined in the Contract.

In reality, a more accurate figure for City of Brookfield Fire Department is that they need 0.75 additional employees for every three-shift personnel. This number naturally varies with the average tenure of the group, but better represents the current employee tenure and benefits received in the City of Brookfield Fire Department. Therefore, if the department wanted to cover the shift with a minimum staffing of 16 without incurring coverage overtime, they would need 4 additional employees per shift. City of Brookfield Fire Department has only 2 employees per shift above the minimum to cover vacations, and therefore is covering the additional vacant time by paying employee overtime.

It becomes a mathematical calculation to determine if it is cheaper to pay the overtime or employ an additional firefighter/paramedic. Although there is an initial cost to clothe and equip a new employee, the larger costs are salary and benefits. However, if off-duty personnel are required to work excessive overtime, it could result in a number of other problems. Thus, there is a balancing act in determining whether to add staff or to utilize overtime.

City of Brookfield Fire Department assigns 15 firefighters/EMTs to all three shifts. Projected for 2008, there will be a maximum of 94 days that the department could be above minimum staffing. In reality, this number will be less because it doesn't take into

account any unforeseen duty injuries or extended absences. Because of vacations and sick/injury leave, the department will not be at full staffing of 17 personnel in 2008.

City of Brookfield Response Matrix

Investigation/Fire Alarm	1 st due Engine or Ladder and Ambulance	
Investigation/Fire Alarm Target Hazard (Target Hazard is a Large Life or Property Structure)	1 st & 2 nd due Engine or Ladder and Ambulance, Command Vehicle	
Vehicle or Outside Fire	1 st due Engine or Ladder and Ambulance	
Grass Fire	1 st due Engine or Ladder and Ambulance	
Grass Fire (large)	1 st due Engine or Ladder and Ambulance, Brush Vehicle and Command Vehicle	
Carbon Monoxide/Slight Gas leak	1 st due Engine or Ladder and Ambulance	
Gas Odor Strong, Inside or Outside	1 st & 2 nd due Engine or Ladder and Ambulance, Command Vehicle	
Hazardous Spill (Small)	1 st due Engine or Ladder and Ambulance	
Hazardous Spill (large))	1 st & 2 nd due Engine or Ladder and Ambulance, Command Vehicle	
Wires Down	Single Engine or Ladder	
Service Call (Tree Down/Water Problem/Etc.	Single Engine or Ladder	
Emergency Medical Call	1 st due Engine or Ladder and Ambulance	
Vehicle Accident With Injuries	1 st due Engine or Ladder and Ambulance	
Structure Fire (NFPA Full Assignment)	Personnel	Tasks
Engine Company	4	First Attack Line (3) & Water Supply (1)
Engine Company	4	Backup Line (3), Backup Water Supply or Ariel (1)
Ladder Company	4	Rescue & Ventilation (4)
Paramedic Ambulance	3	EMS/Rapid Intervention Crew
Deputy Chief	1	Incident Command
	16	
Extrication Assignment	Personnel	Tasks
Engine Company	4	Extrication (inside circle)
Engine Company	3	Suppression (outside circle)
Ladder Company	4	Patient Packaging (inside circle)
Deputy Chief	1	Incident Command
Paramedic Ambulance	2	Patient Care/Transport
Paramedic Ambulance	2	Patient Care/Transport
	16	
Water Rescue/Ice Rescue Assignment	Personnel	Tasks
Engine Company	3	Scene size-up/stabilization
Engine Company	4	Entry/Rigging
Ladder Company	4	Backup Entry/ Rigging
Deputy Chief	1	Incident Command
Paramedic Unit	2	Patient Care
Paramedic Unit	2	Patient Care
	16	
Mass Casualty / Multiple Patient (5-6)	Personnel	Tasks
Engine Company	3	Patient Movement
Engine Company	3	Patient Movement
Ladder Company	3	Rescue
Deputy Chief	1	Incident Command
Paramedic Unit	2	EMS Group (1), Triage (1)
Paramedic Unit	2	Patient Transport
Paramedic Unit	2	Patient Transport
	16	

5.2.4.2 Initial Full Alarm Assignment Capability.

5.2.4.2.1* The fire department shall have the capability to deploy an initial full alarm assignment within an 8-minute response time to 90 percent of the incidents as established in Chapter 4.

5.2.4.2.2 The initial full alarm assignment shall provide for the following:

1. Establishment of incident command outside of the hazard area for the overall coordination and direction of the initial full alarm assignment. A minimum of one individual shall be dedicated to this task.
2. Establishment of an uninterrupted water supply of a minimum 1520 L/min (400 gpm) for 30 minutes. Supply line(s) shall be maintained by an operator who shall ensure uninterrupted water flow application.
3. Establishment of an effective water flow application rate of 1140 L/min (300 gpm) from two handlines, each of which shall have a minimum of 380 L/min (100 gpm). Each attack and backup line shall be operated by a minimum of two individuals to effectively and safely maintain the line.
4. Provision of one support person for each attack and backup line deployed to provide hydrant hookup and to assist in line lays, utility control, and forcible entry.
5. A minimum of one victim search and rescue team shall be part of the initial full alarm assignment. Each search and rescue team shall consist of a minimum of two individuals.
6. A minimum of one ventilation team shall be part of the initial full alarm assignment. Each ventilation team shall consist of a minimum of two individuals.
7. If an aerial device is used in operations, one person shall function as an aerial operator who shall maintain primary control of the aerial device at all times.
8. Establishment of an IRIC that shall consist of a minimum of two properly equipped and trained individuals.

Incident Command	1
Primary Attack/Support Team	3
Backup Attack/Support Team	3
Pump/Ariel Operator	2
Search/Rescue	2
Ventilation Team	2
Rapid Intervention Crew (safety team)	2
<u>Total</u>	<u>15</u>