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Triage: Is it Time for an Update to Standards and Protocols?

Michele A. Farris

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Triage: Is it time for an update to standards and protocols?

A Master's Thesis

Submitted to the Faculty

of

American Military University

by

Michele Farris

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Arts

August 2015

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Charles Town, WV

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DEDICATION

I dedicate this thesis to my husband Robert. Without his support and sacrifices throughout my studies, this would not have been possible.

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I wish to thank several people who made an impact on my being able to complete this degree. Bruce Teitlebaum, rest in peace- a man who pushed me to follow my passion, no matter what obstacles I encountered and to complete the journey wherever it may lead with integrity and fearlessness. To my parents Pat and Harry and my husband Robert, who have been with me throughout this entire process offering their love and support even when I was frustrated and about to give-up; their belief in me helped guide me through this amazing journey of personal growth.

ABSTRACT OF THE THESIS

Triage: Is it time for an update to standards and protocols?

by

Michele Farris

American Military University, August 2015

Charles Town, West Virginia

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The most recognized goal of any triage system is to do the greatest good for the greatest number of people, but is doing the greatest good leaving out an entire generation. The older population is aging and this will have far-reaching implications in the future regarding disaster triage goals if the current expectant categories of triage systems are not updated. A review of the available

literature was analyzed and the findings validated the initial claim that the older population is significantly undertriaged and classified as unsalvageable based on chronological age.

Additionally, triage system algorithms do not take into consideration the physiological changes in addition to the comorbidities that occur in the aging population. In order to mitigate this generation being ignored during mass casualty incidents in the triage phase, policymakers will need to implement an updated set of protocols that incorporate a new set of criteria aimed specifically at the older population. Unless these protocols are deemed a necessity in the near future, the result of the overall response effort will not be considered as doing the greatest good for the greatest number because at some point the greatest number of people will be the older population.

Keywords: Triage, Expectant, Older Population

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Introduction

Over the last decade, the world has witnessed several catastrophic mass casualty events that have overwhelmed local jurisdictions and brought into question the current best practice approach of triage protocols pertaining to the expectant group of the civilian population. Since all disasters are considered a local event, the level of trauma experienced by an individual or group varies depending on the type of emergency: natural, terrorist attack, public health emergency. Typically, major disasters have the potential of being classified as mass casualty events where medical resources are overwhelmed leading to a disturbing and controversial aspect of triage who will receive treatment and who will be left to die. This last statement may sound unforgiving, but it is a simple fact of mass casualty disasters involving multiple victims.

The most recognized goal behind any triage system or protocol is to do the greatest good. The greatest good concept is where the similarities between conventional or hospital triage and disaster triage ends. The traditional triage of conventional wisdom is to do the most good for individual patients, whereas the concept of disaster triage is to do the greatest good for the greatest number of people derived from contributions and theoretical viewpoints from pioneers in the field of military triage. Civilian triage has been adapted from the concepts of military triage protocols, but in disaster triage involving mass casualties the likelihood that the event will overwhelm a jurisdiction and decisions will be made based on a first responder's instinct that may conflict with the public's opinion or a best practices approach within the medical community is highly probable.

Responders struggle with the need to maintain a balance between doing the most good for the greatest number while attempting to justify morally their actions to the community in which they publicly serve. The morality of a responder's decision-making ability can be said to fall into

one of two categories from a medical perspective: actions or consequences. Are the actions themselves considered morally right or wrong without taking into consideration the outcome of that action as opposed to the relevance or unfairness of the consequences of those actions? The theories in question then becomes embedded in the ethical aspects of disaster triage with experts arguing over three major philosophies; principle of equal chances, utilitarianism, and egalitarianism.

Additionally, when resources are limited, can an argument be made that it is ethical and justified in recognizing that some patients, particularly the older generation categorized in the dead or black category may have been saved, but instead are allowed to die to save others. This argument was the global focus surrounding the perceived alleged criminal actions of Dr. Anna Pou during the evacuation of patients at Memorial Hospital in New Orleans when the levees failed after Hurricane Katrina. The decisions not to treat or evacuate the patients that were judged to have the least chance of survival with the resources available were found to have been directly responsible for their deaths. Moreover, a global debate erupted over whether the actions of the staff at Memorial to provide palliative care to a group of patients violated the primary goal of triage protocols of doing the greatest good when the perception that they blatantly euthanized those deemed unsalvageable was the focus of an investigation.

The challenges health care providers and first responders face in disaster situations is the ability to balance the medical needs of the victims with the resources available while ethically maintaining care to those not expected to survive the ordeal with the limited resources at hand. In disaster situations, healthcare providers and responders may view that in order to do the greatest good for the greatest number of people it is justified to leave the most vulnerable until last. This potentially creates situations where the need to assist in the death of a patient so as not to see

them suffer is a high probability. Therein lies the challenge of morally justifying a triage protocol currently in practice today in regards to the older generation. This research attempts to address the following research questions and hypotheses:

Hypothesis

Hypothesis 1: The best practice approach used is based on guidelines at the local level, but when there are multijurisdictional events, not all responders and medical personnel are making decisions based on the same criteria and level of experience optimizing the same triage methodology.

Hypothesis 2: Doing the greatest good for the greatest number of people in triage systems has the potential to ignore an entire generation.

Hypothesis 3: Unnecessary deaths have occurred due to inappropriate triage systems in place.

Research questions

1. What are the challenges in trying to implement a universally accepted national standard for disaster triage protocols?
2. Is the expectant category a social and ethical injustice among the most vulnerable, the older population?
3. What alterations to procedures and operations could be put in place to remedy shortcomings in triage?

Literature Review

Several triage protocols or systems in use in the United States are not considered scientifically evidenced-based. Simply meaning that triage systems differ in the outcomes they strive to produce (Iseron & Moskop, 2007a). Most of the literature surrounding disaster triage mentions the ethical aspects surrounding the decision-making dilemmas that first responders and medical personnel will need to make in determining whether an individual will receive life-saving treatment. Additionally, there is a gap in the literature surrounding disaster triage when it comes to the older population and the expectant category. The abundance of literature that was reviewed has been broken down into two categories triage and ethics of disaster triage and the older population. Although, in almost all of the literature, there is an overlap within each category regarding the ethical and systematic designation of what constitutes the justification of the expectant group of the triage system, most of the available literature pertaining to the older population regarding disasters and triage falls under ethical considerations.

Triage

The prevalent recurring theme among the available literature regarding disaster triage is the philosophy that the goal is to do the greatest good for the greatest number of people. Triage systems were designed to be able to assess victims of a disaster rapidly by sorting and prioritizing the severity of the injuries sustained and being able to manage resource scarcity. The triage systems in use in the United States can be considered resource-based; in other words if the resources are available, victims unless irrefutably dead, will not be assigned to the expectant category.

Even though doing the greatest good for the greatest number of people is considered a triage philosophy, the crossover into the systematic categorization of severely injured victims is a

process required in most triage systems that allows for responders to maximize the resources at hand in determining who will or will not be treated. Some authors argue that the designation of a victim to the expectant category is a social issue with a moral problem. According to Veatch (2005), disaster triage is a violation of the Hippocratic Oath because a physician's position is to keep people from harm. When assigning a patient to the expectant category during triage the responder is abandoning the patients that are subjectively considered the worst in order to do the greatest good for the multitude of victims. Conversely, Herring and Herrman (2010) consider the assignment of patients to the expectant category a controversial aspect of medical response not specifically related to disaster triage. Furthermore, they explore the variety of expert opinions citing that some believe that patients assigned to this category should not be treated at all, while others believe that it is objectionable to deny treatment only because the injuries were sustained during a mass casualty incident.

Christian, Farmer, and Young (2009) assert that the overall goal of doing the greatest good for the greatest number of people is achieved by providing a methodical approach in optimizing the limited resources available in order to preserve and protect the patients who are in the greatest need and will derive the most benefit from the treatment given. In an attempt to achieve this goal, there is a propensity of many victims being undertriaged or rather having the severity of their injuries not recognized in a timely manner resulting in the delayed treatment and possibly death. Victims typically undertriaged are those that have been unnecessarily assigned to a triage group known as the expectant/black/unsalvageable category instead of being assigned to the immediate or red category and under any other circumstances would have what is considered a treatable injury.

The American College of Surgeons (2014) advocate that the trauma community make it a priority to reduce the number of patients classified as being under-triaged during mass casualty incidents because this can minimize preventable mortalities from the delay of care and consider this a medical problem resulting from inadequate triage systems being practiced.

Inconsistencies of category assignment of patients are another recurring theme throughout disaster triage (Ramesh & Kumar, 2010; Herring & Herrmann, 2010; Lerner, et al; 2011; Hick, Hanfling, & Cantrill, 2011; Cotta, 2011; Armstrong, Fryberg, & Burris, 2008; Wiseman, Ellenbogen & Shaffrey, 2002), but the most discussed methodology is the Simple Triage and Rapid Treatment (START) system. Several studies have been conducted in an attempt to decide the efficacy of this system within a mass casualty event and the conclusions have not been favorable as most experts agree that this system can produce very little scientific evidence to validate and support this system as a national standard. (Kahn, Schultz, Miller, & Anderson, 2008; Cannon & Heightman, 2015; Navin & Waddell, 2005; Armstrong, Frykberg, & Burris, 2008; Lerner, et al, 2008; Navin and Waddell (2005).

Subsequently, with START not considered a viable option towards a national standard, the Federal Interagency Committee on Emergency Medical Services (FICEMS) endorsed the development of a new system. This new system is called SALT (sort, assess, lifesaving interventions, treatment/transport). In a statement by the FICEMS (2014), they recommended

State and local Emergency Medical Services (EMS) systems improve their mass casualty incident triage capabilities through adoption of triage protocols and systems that are based on the Model Uniform Core Criteria. Federal resources may be used to support development of capabilities, which improve EMS system preparedness for mass casualty triage. (p.3)

Ethics of disaster triage and the older population

Disaster triage presents a unique dilemma for responders when a mass casualty incident occurs, who lives and who is left untreated to die. The underlying premise of ethics in disaster triage is resource availability. The goal of any triage system according to the available literature is to do the greatest good for the greatest number of people. This philosophy is known as being utilitarian in nature, and there are many arguments as to whether this approach is an ethical and justifiable way of attending to victims of a mass casualty incident (Pesik, Keim, Iserson, 2001; Geale, 2012; Petrini, 2009; White, Katz, Luce, & Lo, 2009). The debates on the utilitarian approach begin to factor in whether age should be criteria for excluding treatment.

White, Katz, Luce, and Lo (2009) argue that even though the utilitarian rule of maximizing the number of lives saved is a widely accepted practice, the potential to exclude a specific age group is probable and these exclusions are not justified because this would imply that a categorical exclusion means that a particular group is not worth saving. In contrast, Williams (1997) supports the claim that the exclusion of a specific age group is justified in medical terms because the older population has lived a normal life span and the medical resources should be used on those that are younger and should be given priority. This ethical approach is considered the fair innings argument. While the guiding principle of the fair innings argument is commonly used as justification for withholding treatment from the older population when resources are scarce, Rivlin (2000) argues that if by withholding treatment based solely on chronological age, a person's life has been cut short and has the same implication if treatment was withheld from a younger person.

The debate is further expanded upon by O'Laughlin and Hick (2008) when the meaning of the greatest good philosophy in relation to the egalitarian philosophy and fair innings

argument is explored from a societal viewpoint. The question then becomes, is doing the greatest good based on 1) the number of lives saved, 2) the fair innings argument based on the total years of life the victim has lived, or 3) an egalitarian approach where an equal chance has been given in distributing the resources equitably to ones who are in the most need. Additionally, White, Katz, Luce, and Lo (2009) consider this approach as well and make a correlation between the fair innings argument as being egalitarian in nature because everyone has had an equal opportunity to live a normal life span.

Undeniably, all the available literature describes the older population as being vulnerable in disasters. They are vulnerable not only because of their chronological age, but also because of the comorbidities associated with the natural aging process. Jenkins, Rutkow, and Spira (2014) identify the underlying comorbidities that typically affect the older adults in disasters as cognitive impairment, diabetes, hypertension, and heart disease. Additionally, they conclude based on several studies reviewed that there is scientific evidence that older adults are more vulnerable to an increased risk of death. There is a consensus among experts that one of the main causes of increased rates of mortality among older victims of trauma is because of being under triaged, resulting in delayed treatment (Rogers et al, 2012; LaMantia et al, 2013; Chu et al., 2007).

Another theme regarding the older population in disasters is the fact that the population in the United States is progressively aging. The consensus among the prevailing literature is that this will have far-reaching implications in the management of disaster triage in the years to come. Age, not severity of injury, will become one of the most challenging aspects that responders and medical personnel will face in the near future. There will be a need for a more definitive approach in how the older or geriatric population is treated, especially in situations

where injury and trauma has occurred (Chu et al, 2007; Fernandez, Byard, Lin, Benson, & Barbera, 2002; Kuhne et al, 2005; Adams, Kaufman, Van Hattum, & Moody, 2012).

Methodology

Research strategy

The basis for this research began after several experiences by the researcher by direct observation of the triage protocols utilized in two disaster scenario exercises in 2013 and 2014 and the attendance at a symposium with the Maryland National Guard in Aberdeen Maryland in August 2014 where the renowned author, Dr. Sherri Fink was the guest speaker. The most impact on the researcher was during Dr. Fink's presentation, when the realization that there were varying philosophies around the world on how to triage patients in disaster situations, especially during the evacuation of patients from Memorial Hospital in New Orleans during Hurricane Katrina that had been re-categorized as belonging to the expectant category. Moreover, all triage protocols have their foundations based upon battlefield triage philosophies is a determining factor that no longer can be tolerated in civilian disaster situations because doing the most good for the most people has the potential to alienate an entire generation; the aging population due to comorbidity issues associated with growing older.

The researcher approached the triage dilemma with the notion that during a disaster involving mass casualties unless the victim was irrefutably deceased, they had a high probability of being under-triaged and placed in the expectant category. This research was done in hopes of being able to validate whether there was a need for a change to the black category of all triage systems in the civilian arena after a disaster or mass casualty incident occurred, especially when dealing with one of the most vulnerable population groups; the elderly.

Methodology

The overall general philosophy regarding research methodologies can be summarized in terms of how the research is conducted and the strategies a researcher uses in order to achieve

the ultimate goal; a solution to a problem. There are various strategies widely accepted by scholars to analyze and interpret the data that has been collected regarding a specific subject matter. The most widely recognized research designs employed by researchers today are qualitative and quantitative. An additional methodology can be used in research and is known as a mixed method strategy, which incorporates both facets of qualitative and quantitative strategies. Researchers that use a mixed method strategy incorporate the strengths of qualitative and quantitative strategies when a problem being addressed in the social sciences is so complex that one strategy is inadequate to address the problem in order to gain a more in-depth insight of the issues (Creswell, 2009). A determining factor of which methodology a researcher uses depends on the type of information being collected, the assumptions being made and the conclusions that can be drawn from the analysis. No one particular research strategy is mandated, but there are some basic characteristics that differentiate between the systems in helping a researcher choose the appropriate approach.

Quantitative research is primarily the design choice among researchers to test a theory or hypothesis that is based on empirical data that can be either proven or disproven in a quantifiable numerical statistical fashion. Additionally, quantitative research studies are categorized as objective in nature where experiments can be repeated and validated with the same or similar results using the same data sets; in other words, the research is based on calculable data that can be measured accurately and precisely by way of surveys or true experimental research. This strategy is typically used in the natural sciences where the researcher expects the mathematical results are comprehensive and pertain to a percentage of a population.

Whereas quantitative research is centered on objective data that can be validated statistically and has its foundation primarily in the natural sciences (physics, biology, and

chemistry). Qualitative research is founded upon the disciplines known as social sciences (sociology, politics, anthropology, etc...) and is deemed subjective in nature based on the interpretive views of not only the researcher, but the views of the targeted audience. Qualitative research within the social sciences seeks to understand the social interaction between cultures or groups of people within a given society by identifying issues and problems within a given targeted demographic to resolve an issue or bring to the forefront social and human concerns that are lacking in research.

The approach employed in this research is based in theory upon qualitative research design methodologies. According to Creswell (2009), a qualitative approach to research is a means for exploring and understanding a social or human problem. One way in which the qualitative data is reviewed is by utilizing available public documents. Additionally, the researcher took a holistic approach through a theoretical lens to organize the research to identify and advocate for social change in the context of the problem. This was approached by attempting to identify the factors involved in addressing the issue of why the expectant category in triage protocols needs to be reevaluated by interpreting the lessons learned from the data collected and the direct observational views based on the two disaster mass casualty incident scenario exercises experienced by the researcher. This holistic approach encompasses the true characteristics of qualitative research.

Data Collection

All portions of this research study rely on the published literature available. An exhaustive search of the available literature was conducted using google, google scholar, and ProQuest by entering the following key words to compile a plethora of documentation; “triage”,

“disaster triage”, “elderly in disasters”, “vulnerable populations in disasters”, “expectant”, “triage national guidelines”, and “ethical considerations in triage”.

The discussion portion of the paper will systematically take the reader through a comprehensive history and inception of triage protocols to include the numerous triage systems in use in the United States including the similarities and differences. Additionally, the researcher will introduce a system recently proposed by a panel of experts known as the SALT work group in hopes of validating the advocacy of implementing one triage system. The premise of implementing a standardized technique to be used across jurisdictional lines will improve efficacy and reduce confusion among responders, especially in the determination of what defines a victim in the expectant category. Additionally, ethical considerations of triage with a focus on the expectant category is evaluated in an effort to determine if an entire generation, the senior vulnerable population, is alienated or under-triaged due to the comorbidities that are associated with this group. Lastly, an evaluation of several philosophies are examined to determine why the battlefield mentality of doing the greatest good for the greatest number of people in a disaster or mass casualty event is not the answer in civilian triage systems.

Limitations and role of the researcher

The limitations of this research can be viewed as potentially significant by experts in the emergency management field requiring a more in-depth study and analysis in the future, given the fact that the literature and studies available have a foundation in correlating procedures and knowledge of medical personnel in a hospital setting when evaluating triage systems and their efficacy. These limitations can also be seen to have different interpretive values based on the lack of experience and knowledge of actual mass casualty incidents and disaster triage protocols outside of tabletop exercises conducted on a sporadic basis by emergency medical disaster teams.

Another limitation of the research could be attributed to the perceived bias of the researcher resulting from the participation in several disaster scenario exercises involving mass casualty triage. The researcher has been fortunate to participate in two well-developed disaster exercises in the State of Maryland. One was in preparation for the Grand Prix that was held in Baltimore in 2013 and the other was to satisfy the federal requirement to test the initial response to a commercial airline incident at Baltimore/Washington International Thurgood Marshall Airport in 2014. During both of these exercises, the researcher had the opportunity first hand to observe the triage protocols in use by multijurisdictional first responders and had already formed an opinion. The opinion formed by the researchers was that responders in a mass casualty incident were unsure of what triage category the victims should be assigned. Additionally, there was a perceived attitude among the responders that they knew this was only an exercise, one in which some did not take seriously to be able to identify the gaps in the procedures.

In an attempt to overcome researcher bias, an exhaustive search regarding triage protocols and the ethics involved was initiated. The researcher realized that the initial opinions formed from the observation of responders during the exercises did not take into account the complexities associated with mass casualty triage protocols. In light of this discovery, the researcher was able to evaluate objectively, the mechanics of the protocols themselves, the ethics involved, and the degree of training and experience of responders in mass casualty events.

Discussion

History of triage

Triage is an integral part of any disaster response, but the limitations are at times prejudicial based on the preconceived methodology of a battlefield mentality of doing the greatest good for the greatest number of people that was seen during World War I from a United States military manual. Up until this time, the greatest good philosophy was not the status quo; but rather focused on the most seriously injured. The first battlefield triage protocol is rooted in the strategies first employed by a French military surgeon during the Napoleonic wars in 1812 by the name of Baron Dominique-Jean Larrey (Iserson & Moskop, 2007a, Kennedy; Aghababian, Gans, & Lewis, 1996; Blagg, 2004). According to all the available literature regarding the history of triage, Larrey developed a system of sorting and attending to the most critically wounded on the battlefield immediately instead of waiting for the end of the conflict, as was an antiquated way of thinking in all previous battles. Larrey saw a need to treat those most in need of medical attention first and clearly expressed that there was no distinction between ranks, but rather on the severity of the injury.

The next major impact in military triage according to Iserson and Moskop (2007a) was in 1846 when the philosophy of triage was expanded. This expanded philosophy now included the criteria that lifesaving immediate treatment could only be attained if the chances of survival were favorable, thereby eliminating the need to treat the wounded considered as having fatal injuries where the rate of survival would be minimal with the resources at hand.

Types of Triage

The ultimate goal of any triage system is to save as many lives as possible by sorting patients initially into categories depending on the severity of the injury sustained. As stated

previously, there is not a triage system practiced universally in use today and this presents a challenge to EMS and healthcare providers acting in a first responder capacity, especially when an MCI requires a multijurisdictional response effort, which is frequently the case. According to a report by the Federal Interagency Committee on Emergency Medical Services (FICEMS), and illustrated in appendix A, thirteen states do not have local or state specific MCI triage protocols in place; sixteen states have locally specific protocols; and eighteen states have statewide protocols. What these statistics indicate is that if an MCI were to occur in sixty-one percent of the United States requiring a multijurisdictional response effort the likelihood of different triaging systems being used is probable.

Additionally a survey conducted in 2007 by the Virginia State Office of EMS noted that of twenty-eight EMS offices across the United States polled, 71.4 percent used START, 10.7 percent used regionally implemented systems, 3.5 percent used the MASS system, and 14 percent do not have a state based recognized triage system (Owens, 2008). Although the basics of each system have their similarities, as well as weaknesses and differences, if EMS are not using the same criteria to sort, evaluate and attend to the victims involved, the potential of under triaging victim's increases. According to most of the literature detailing triage protocols, the categorization of victims into one of the triage categories is not based on anything other than the injury sustained in the incident, but some experts argue that age and lack of responder experience in MCI's play an unconscious decision leading to under-triaging of the geriatric population.

Several triage systems have been identified in the literature as being used in the United States: Simple Triage and Rapid Treatment (START), Sacco-Triage Method (STM), Triage Sieve, Move-Assess-Sort-Send (MASS), Careflight, Reverse Triage, and Secondary Assessment of Victim (SAVE). START, STM, and MASS will be explained below, as they are the most

prevalent triage systems in which to evaluate the need for an update or change to how the black/nonsalvageable/expectant groups are designated.

Sort-Assess-Lifesaving Interventions-Treatment (SALT) a new triage system proposed was developed from evaluating and comparing current triage systems in use across the United States by a consensus workgroup formed under the direction of the National Association of EMS Physicians in 2006. The group known as the SALT workgroup determined after evaluating all the triage systems in use that there was no one system that could scientifically justify a national adoption of any current system and advocated for the adoption of this new system (FICEMS, 2014).

Simple Triage and Rapid Treatment (START)

This system was developed in the early eighties in California with the prime directive of assisting hospital personnel in organizing resources quickly to receive victims from a mass casualty incident. This system creation was a result of a partnership between the Newport Beach Fire Department and the Hoag hospital system (Owens, 2008; Khan, Schultz, Miller, & Anderson, 2009). The intent was to be able to assess a patient in under one minute in order to determine the severity of an injury so that additional medical treatment could be obtained. This system eventually became one of the most widely recognized and used triage systems in the United States. Several strengths can justify an argument for the use of START as a national standard; it allows first responders to assess a patient quickly in a mass casualty situation, can be adjusted to fit within the incident command structure (ICS) used on scene therefore maintaining compliance with the National Incident Management System (NIMS).

Conversely, the weaknesses of this method allows for under-triaging of patients, especially the older population and does not allow first responders to reassess any improvement

or decline of a victim originally classified as unsalvageable before transport of the less injured .
Somes and Donatelli (2014) explored this ethical question regarding the vulnerable adult population and asked the following question; does one just assume that they will not survive? Additionally, one of the strongest arguments for not using the START method is that even responders with the same training can assess the same victim differently and depending on whom is doing the initial evaluation can make the difference of whether they are tagged as non-salvageable or in immediate need of treatment.

According to the literature, START has a primary goal of doing the greatest good for the greatest number of people. The basics of START are simple; the first unit on the scene of the MCI begins the triage protocol of sorting the victims into one of four categories. The categories associated with START are minor (green), delayed (yellow), immediate (red), and deceased or non-salvageable (black). The process of START begins with initially clearing the scene of what is considered the walking wounded with a responder verbally asking anyone who is able to walk, to make his or her way towards the sound of his or her voice. The walking wounded are then asked to stay in a separate area so they are not mistaken for one of the injured in need of immediate medical attention. The walking wounded are not considered an immediate medical concern, but eventually will be attended to if needed and resources permit. If the response team utilizes a tagging system, these victims are designated as belonging to the green category.

Once the walking wounded has been separated from the remaining victims, the sorting, assessing, and medical attention begins using an algorithm (appendix B). Victims are then designated as belonging to one of the three remaining groups depending on the severity of their injuries. The delayed category or color yellow is designated for the patients that have injuries but are not in any danger if medical care is not given immediately. The red or immediate category is

generally designed for patients that require immediate attention. The practical basis of these patients is based on the respiration, perfusion or capillary refill rate, and mental status. The last category is the one met with the most controversy. In the START methodology of triage, not only are the deceased designated to this category, but as are patients that are deemed nonsalvageable because the resources are not available, this does not allow for reassessment of these patients prior to other less injured victims.

A retrospective study was conducted in an attempted to determine whether the START triage system was an effective method after a disaster in which victims were assigned the proper triage levels once reevaluated upon transport to a hospital based on the actual clinical degree of injury. Key findings based on this study concluded that there was no scientific proof that the START triage method could adequately reduce the amount of under triaging observed in an actual field triage setting, but rather was useful for detecting minor injuries. The authors of the study based this evaluation on the fact that there is limited research and data being compiled in real life mass casualty events in which to make a comparison. The plethora of information on triage methodology is not evidence based, but gathered from after action reports based on tabletop and multijurisdictional training exercises (Khan, Schultz, Miller, & Anderson, 2009).

Another well-documented study occurred in 2003 by the Pennsylvania Department of Health's EMS office. In this study, twenty-nine counties were evaluated to uncover any inconsistencies among responders in the triage tagging or rather the inconsistencies with which responders assessed similar victims. The key findings were that depending on which triage officer a victim received was the determining factor on whether they were transported to the hospital immediately, delayed, or deemed unsalvageable. The participants in the study were observed as using other factors in making triage decisions, one of them being age of the victim.

Another observation made of the participants of the study was that most responders relied on their level of experience and judgement in making triage decisions instead of relying on the standard START algorithm protocols. According to Navin and Waddell (2005), these observations led to the statement from former USAF Surgeon General, Dr. Carlton that “triage is broken”

Concrete evidence based on the START algorithm support the findings that this triage philosophy shows a discrepancy between non-breathing and those deemed unsalvageable or undertriaged and supports the first hypothesis presented in this paper that not all responders and medical personnel are making decisions based on the same criteria and level of experience.

Sacco-Triage Method (STM)

A challenging proposal for a new methodology of triage was introduced in order to give an equal chance to all victims of a mass casualty incident based on scientific analysis of the injuries sustained and does not rely on a color coding systems. This method of triage relies on mathematical calculations that have been assessed in the areas of respiration, pulse, and motor responses; each victim is assigned a number from zero to four with data input into a computer software program. The data is then calculated and based upon the scores are used to determine the severity and probability of survival rates with those being assessed with the lowest scores being transported to trauma centers or hospitals immediately (Montán, 2012; Owens, 2008).

One advantage of implementing this system for triage practices in the field is that patients can be upgraded or downgraded as necessary very easily since it relies on empirical data. The limitation of using this system lies solely on the cost aspect. Implementing this type of system would require the purchase of not only the software, but also a sufficient number of computer equipment in the field. Additionally, according to Owens (2008), this system is not NIMS

compliant and localities that choose to use this methodology would be limited in mutual aid response activities.

STM was introduced as a way to focus on not only the condition of a patient but to also take into consideration the number of resources that were available in an evidence and scientific based model. Proponents for implementing this methodology as the triage system of choice allows for consistent triaging regardless of the number of casualties and the decisions are not subjective based on the amount of training a responder has had (Sacco, et al, 2007).

Implementation of the STM triage method would present a challenge trying to adopt this method as a universally accepted national standard due to the cost of upgrading all computer systems and having these systems readily available among all responders across jurisdictional lines.

Move-Assess-Sort-Send (MASS)

Move, Assess, Sort, Send (MASS) is based on the military's triage system that has been modified for civilian use. As indicated previously 3.5 percent of states recognize this as the triage method of use; there are four steps in this process. Move is similar to a responder asking any victims that can move to a predefined area to do just that, but in addition, the responders also ask that victims are able to move their limbs. Within the MASS methodology, those that cannot move a limb are further evaluated in the next step called assessment. The assessment process incorporates the standard checking of circulation, breathing, and the status of the airway; but does not place any emphasis on the ability of being able to follow instructions or mental status. Once the assessment process has been completed, the victims are then sorted into one of four categories immediate, delayed, minimal, or expectant referred to by the acronym ID-me (Owens, 2008).

There are several strengths in using this methodology; it allows for a cooperative effort and integration of military personnel if needed in a mass casualty event. Additionally, responders will reassess the immediate category and sort the victims into treatment priorities accordingly if the victim is not expected to survive they will be transported after the immediate category, but before the delayed category instead of placing them into the expectant group and being left untreated.

Opponents of using this methodology as the triage of choice contend that since there is not a system of using a tagging system, the possibility of a responder forgetting what treatment has been administered and what the initial priority was is high and that steps would need to be repeated, significantly delaying the transport to a medical facility.

Sort- Assess- Lifesaving Interventions- Treatment/and or Transport (SALT)

Sort-Assess-Lifesaving Interventions-Treatment (SALT) developed by the SALT workgroup is a compilation of multiple triage systems with several differences in the integration especially in the identification of what constitutes a victim of a disaster being placed in the expectant group, a new tagging category. This system is based on four activities (appendix C); global sorting, lifesaving interventions that can be quickly applied, individual assessment and assignment of priority category, and providing treatment and transport that responders will initiate (Lerner, et al 2008).

As with other triage systems, the first step is to sort the living from the dead, called global sorting. A well-known fact after any MCI is that the scene is chaotic, and by adopting a procedure known as global sorting the number of “walking wounded” presenting themselves to healthcare facilities on their own would be minimized. Global sorting is based on voice commands and wave commands similar to what is used in the MASS triage system; by giving

those that can walk instructions on where to go to receive further treatment, whether to an area already set up on site or to a medical center that is prepared to receive the less injured for further evaluation.

The SALT workgroup concluded that other systems where the victim was categorized as green or minimally injured were rarely evaluated by medical personnel. The way global sorting is supposed to work is that those that can follow simple commands are sorted away from the other injured and will once again be sorted into two groups based on the severity of injuries. Lerner, et al. (2008) determined that if a victim were unable to follow simple commands or move, they would be attended to first; this first group also includes those that can follow commands and make movements, but may show signs of internal injuries. Once the global sorting has been accomplished, the next step is called lifesaving intervention treatments.

Lifesaving intervention treatments occur before the victim is assigned any triage category and is predicated on the notion that a few simple treatments should be given before a victim is arbitrarily assigned to the “black” or dead category as occurs in other triage systems. The treatments that were determined to be acceptable are controlling major hemorrhages, opening the airway, decompression of tension pneumothorax also known as a collapsed lung, and the use of autoinjector antidotes also known as nerve agent treatment (Lerner, et al, 2008) . Whereas other triage systems would declare these types of injuries during an MCI as being non-salvageable, due to the available resources, the workgroup believes that these lifesaving treatments if applied rapidly, can improve the survival rate of the victim, instead of declaring victims with these types of injuries as non-salvageable. The next step in the process is to assess patients on an individual basis and assign them to a triage category, which will determine the priority of transport to the closest medical facility.

The workgroup analyzed the already accepted triage category and tagging process and determined that under the SALT system, assignment of patients would remain relatively similar with one major exception, the designation of a new category; the expectant group. Under SALT, the expectant group would receive a color code of grey. The expectant category was developed to allow victims typically categorized as “black” to have a fighting chance of being evaluated if the resources become available, whereas in other triage systems, once categorized as non-salvageable, they are rarely reevaluated and reclassified. The SALT workgroup intended for the expectant category to be a flexible, dynamic, and a resource based category with the intent of being implemented only if the available resources on the scene of the MCI are limited. Once additional resources become available, persons in this category would then be reassessed using the SALT protocols.

Triage Philosophies

With the inception of triage systems practiced by first responders and first receivers dealing with the civilian population, ethical considerations became a widely debated issue among academia and those associated with medical trauma services. Within the medical field, there are two principles that all philosophical theories are based upon: consequentialism and deontology. Consequentialism is based on the thought that all actions are considered moral or ethical if the ends justify the means, whereas deontology judges the morality of the actions without regards to the consequences (Tanner, Medin, & Iliev, 2007; Zack, 2006).

Ethical considerations of triage protocols cannot stand alone if one is to evaluate the morality of the responder’s actions. Is it ethically sound to allow a first responder with limited medical knowledge to make life and death decisions for victims of mass casualty events and should the morality of the consequences of those actions be evaluated in triage protocol

decisions. If one bases triage protocols strictly on the ethical theories of consequentialism and deontology in times of mass casualty events, then any triage protocol could be considered ethical in regards to the older generation. The action of assigning a person to the expectant category occurs out of duty, and this will probably save the most number of lives when resources are limited; but the morality of a responder in a disaster situation is beyond the scope of this research and is a topic that requires more research in the future.

On the other hand, ethical considerations of triage systems can be evaluated when defending whether a triage system is ethical or fair in regards to human life. There are three widely debated philosophies and theories considered being in the best interest of society, a form of distributive justice. Within the theory of distributive justice, there are three principles; principle of utility, principle of equal chances, and the principle of egalitarianism (Hoffman 2009; Iserson & Moskop, 2007b). Additionally, the ethical philosophy where an argument can be made that uniformly leads to the alienation of an entire generation known as the fair innings argument is also briefly described.

Consequentialism vs deontology

Under the consequentialism theoretical view, the morality of the responder using a triage system is dependent upon the consequences of the action only. Therefore, a morally right action is one that yields the best outcome and all other factors are negligible. The practice of the START triage protocol by responders can be seen as falling under the theory of consequentialism when assigning a victim into the expectant category because the goal of this triage system is to do the greatest good for the greatest number of people, so therefore the responders would be acting in a moral and ethical manner. According to Haines (nd), consequentialism does not

define what consequences are good, but whether the action itself produces the best reasonable outcome.

The morality of an action judged strictly upon the adherence to a predefined set of protocols or rules in which the results are not taken into consideration, but rather the intentions behind the acts themselves falls under the deontological theoretical view. This duty-based philosophical view is predicated on whether the intentions of the responder's actions were malicious when they assigned a disaster victim to the expectant category. Under the triage protocols practiced today, responders have a predefined set of criteria they must follow when assessing mass casualty injuries and the intent is to do the greatest good for the greatest number of people regardless of how many may perish due to the resources available. Therefore, under this premise, the responder's action can be deemed morally acceptable under the circumstances.

Principle of Utility

The principle of utility is based on the concept that the greatest overall benefit is achieved through the actions and consequence they produce. According to Iserson and Moskop (2007b), triage systems that are judged for their fairness in regards to human life based on the utilitarian principle evaluate the consequences based on the resulting overall benefit. Additionally, the argument is further expanded upon that even though the utilitarian approach is doing the greatest good for the greatest amount of people; the consequences are not required to be equally similar for all concerned. In other words, the appearance of a depraved outcome for some may be justified if the resulting action produces the greatest overall benefit to the many.

Whereas Hoffmann (2009) contends that, a triage system based on utilitarian philosophies has its strength in the efficiency of the medical resources that are immediately available and its weakness in the capacity of emergency medical personnel to be able to judge

which group or individual will benefit the most from medical treatment necessary in mass casualty incidents. Conversely, a common utilitarian principle in medical protocols dictates that care may be denied during triage because of compensating factors that would require more resources and in retrospect cause, more lives to be lost that could have been saved because they were healthier prior to the incident.

Principle of equal chances

The second principle of distributive justice is one of equal chances; where the premise encompasses the philosophy that every victim has the potential to be saved regardless of the severity of his or her injury. This principle is derived from philosopher John Taurek, in which the concept that everyone is equally valuable to themselves and therefore deserves an equal chance for survival; thus triage would be handled on a first-come first-serve basis. Moreover, the primary goal of triage would then be an equal opportunity for survival no matter the severity of injuries, thus intensifying the resources being allocated to the otherwise group known as expectant (Iserson and Moskop 2007b).

The flawed premise of this principle according to critics is that not everyone who presents for treatment after an incident can be saved and it is morally irrelevant to quantify the number of lives saved over the quality. The principle of equal chances is additionally refuted by the World Medical Association (WMA). In the *WMA Statement on medical ethics in the event of disaster* (2006),

It is ethical for a physician not to persist, at all costs, in treating individuals “beyond emergency care”, thereby wasting scarce resources needed elsewhere. The decision not to treat an injured person on account of priorities dictated by the disaster situation cannot be

considered a failure to come to the assistance of a person in mortal danger. It is justified when it is intended to save the maximum number of individuals. (pp 3-4)

Principle of egalitarianism

The last principle of distributive justice is based on the concept that the most in need should be the first to receive treatment regardless of the available resources, also known as egalitarianism or the difference principle (Moskop & Iserson, 2007b). This principle is more in line with daily hospital triage protocols, where patients are evaluated based on the severity of their injury and attended to first. The weakness in deploying a triage system based on this principle is that the available critical resources would be directed towards victims that have a high probability of not surviving their injuries, otherwise commonly referred to as belonging to the black or non-salvageable category in most triage systems. A triage system designed to prioritize the expectant group under egalitarianism as needing treatment first potentially could increase the overall number of patients that do not survive.

Fair innings argument

The prioritization of the young over the old is the premise of the fair innings argument because younger individuals have not had the opportunity to live through all phases of a normal life cycle (Williams, 1997). The justification for using this philosophy in disaster triage is based on the perception that an older patient will require more resources because of perceived additional comorbidity factors. When those resources are limited, priority treatment will be given to the younger population, because in effect this is doing the greatest good for the greatest number of people, which is the primary goal of disaster triage. Another argument for using the fair innings philosophy in a triage system is that a person's whole lifetime is taken into consideration, not just the current scenario at hand, relieving the responder from assessing the

severity of the injury. The flaw in this way of thinking is that an older person categorized as non-salvageable based purely on chronological age will probably survive the incident, whereas a younger person with a severe injury will not.

Older population and triage systems

Age is considered a factor as to whether an individual is vulnerable, but is not the defining characteristic. Several studies have been conducted assessing the vulnerability of the older population following disasters and have concluded that what makes the elderly vulnerable in a disaster include impaired physical mobility, diminished sensory awareness, and chronic health conditions to include diabetes, hypertension, and heart disease. Additionally, in some cases, medications can mask the severity of an injury in the older adult and delay the appropriate initial triaging assessment leading to an increased number of victims being categorized as non-salvageable (Fernandez, 2002; Jenkins, Levy, Rutkow, & Spira, 2014; Rogers, et al, 2012).

The older population of the United States is aging at a rapid pace and is expected to double by the year 2050 from 43.1 million in 2012 to 83.7 million according to a report issued by the United States Census Bureau (Ortman, Velkoff, & Hogan, 2014). The older population is typically defined as being age 65 or older. The older population is further categorized based on age groups. These groups are defined as young old being between 65 and 74, aged from 75-84, and 85 and over as being oldest-old; additionally, the Administration on Aging (2009) estimates that the oldest-old is projected to account for 6.6 million of the population by 2020, up from 5.7 million in 2008 in the United States alone.

As stated above, age is considered a factor as to whether an individual is vulnerable, not whether they should be denied lifesaving treatment during an MCI or categorized to the black or expectant category during the initial triage process. Experts consistently agree that the larger the

incident, the greater the focus will be on saving the greatest number of people with an emphasis on treating those with whom the most benefit will be derived. This mentality potentially leaves the older generation to be medically ignored and priority given to the younger individuals collectively, based on the premise of short-term survival rates are more favorable based on nothing but the victim's age; therein lies the problem with assigning the older population to the expectant category.

Unnecessary deaths due to inappropriate triage system decisions

As stated above, the most common and widely accepted triage protocol used in the United States is START. Even though the START method promotes the philosophical aspect of utilitarianism of doing the greatest good for the greatest number another theory can be evaluated as well; deontology. Within this premise, the morality of the responders actions are not typically called into question because the intentions are not maliciously decided, but rather based on a set of predefined protocols and duty based. Based on the deontological philosophy, the START method of triage has the potential to elicit a number of unnecessary deaths, which is what occurred during Hurricane Katrina at Memorial Hospital. Additionally, the morality and ethics of the responders or rather the hospital personnel were called into questions because of the unnecessary deaths that occurred.

A variation of the START methodology of triage was implemented by the staff at Memorial Hospital after Hurricane Katrina made landfall in New Orleans in 2005. A group of physicians, led by Dr. Anna Pou, who had very little training in triage and evacuation protocols during a disaster, began making decisions regarding the treatment and triaging of patients that had not been evacuated from the hospital. It has been documented that as many as 180 patients needed to be assessed under what some would consider third world conditions no electricity, no

potable water or food, and sweltering heat (Fink, 2013). The triage strategies implemented by the staff fall under the fair innings argument, where infants and pregnant women were triaged and evacuated first. As previously stated, the fair innings argument prioritizes the young over the old. The next decisions made by Dr. Pou and her team created an ethical and legal sandstorm, which is still being debated today. Patients that had do not resuscitate orders (DNR's) on file were to be triaged and treated last, if at all; and the patients judged to be more critically ill than others would be given palliative end of life care or high doses of morphine.

DNR orders are a common occurrence when patients enter a hospital regardless of the treatments being provided. A DNR instructs health care providers not to do cardiopulmonary resuscitation (CPR) if they stop breathing or their heart stops beating. The order is very specific regarding CPR and is not to instruct a healthcare provider on directives for receiving other forms of treatments, such as pain medicine (Gersten, 2014). DNR orders should not ethically be used as a criterion for assigning a patient into the expectant category. According to Lugosi (2006), DNR became synonymous with "Do Not Rescue" for the patients at Memorial Hospital.

The challenges that the staff faced, even though the circumstances and resources were scarce led to the inability to balance the principle of utility where the greatest overall benefit is achieved through the actions and consequences they produce and the ethics of deontology in being able to defend the intentions behind the acts themselves. Leaving these two subsets of patients until last in the triage decision making process, was an attempt to possibly do the greatest good with the resources at hand, but from an ethical and moral standpoint, allowed the staff to assist in the death of the patients instead of watching them suffer by administering lethal doses of morphine.

There was an investigation into twenty-five deaths at Memorial Hospital deemed not from natural causes but from the consequences of the triage decisions by Dr. Pou and her staff (Fink, 2013). Additionally, it was concluded by medical experts that nine of those patients that died were over the age of sixty, were not terminally ill, and would have probably survived the evacuation had it not been for the lethal doses that were administered (Lugosi, 2006). The only thing these twenty-five patients had in common was a DNR order on file and lethal doses of morphine and other drugs in their systems.

Palliative care is specialized medical care focusing on providing patients with relief from the symptoms and stress of a serious illness. The goal is to improve quality of life for both the patient and the family (Center to Advance Palliative Care, 2012); whereas euthanasia occurs when a deliberate injection of a lethal dose of a drug, such as morphine, is administered in order to relieve the suffering of a patient. This has also been referred to as physician-assisted suicide (Medical News Today, 2014).

Results

The results of the findings clearly define the need for an overhaul of the triage protocols where the definition of the expectant category is refined. In all the literature reviewed and drawing from a consensus of experts, victims are placed or categorized as expectant when the likelihood of survival is minimal given the resources available at the time and place of the incident. Additionally the inexperience of most responders in an MCI coupled with a propensity of using the fair innings logic, some patients or victims are categorized as expectant based on chronological age alone. This aspect can be considered controversial because under normal circumstances a severely injured victim would receive immediate medical attention. There is no scientific way to predict that a victim classified in the expectant category would not survive in

the days following an injury if medical attention was given immediately. Therefore, under this premise the findings from the literature support the need to advocate for a revision to the expectant category that is now in place and adopt a universally accepted triage system so that there is a common language and protocols used in assessing and categorizing victims in disaster triage, regardless of their age.

Conclusion

The research of current of triage methodologies, ethical dilemmas that first responders are faced with, and the assignment to the expectant category of the older population in a mass casualty incident attempted to determine if there was a need to update the standards and protocols of current triage systems or whether a new national system needs to be implemented.

The first question posed by the researcher of what are the challenges in trying to implement a universally accepted national standard for disaster triage. The researcher determined that there would be several challenges in trying to implement a national standard for triage protocols.

One of the challenges is that it will be difficult to get all medical and EMS personnel to adopt and buy into a new system. The validity of this concern is based on the conclusion from two separate studies that were conducted by the FICEMS and the Virginia State office of EMS. The FICEMS study revealed that 61 % of the states do not use the same triage protocols at the current time; with the Virginia State office of EMS revealing that even if the same systems is used within a state or jurisdiction, there are inconsistencies among responders regarding how and why patients were assigned to a particular category.

In order to mitigate this challenge a new triage system should be developed not with a panel of academics, policy makers, and medical experts, but with the rank-and-file of EMS responders and trauma teams on the front line. Additionally, input should be gathered in a public forum that addresses the needs of vulnerable populations so that specific criteria can be incorporated into a proposed guideline that will be fair and ethically sound for any age group.

Another challenge is the reality that MCI's are an infrequent occurrence and responders typically only practice triage techniques in a drill or simulated environment. The challenge

associated with this category and the implementation of a national system would be the cost associated with retraining experienced EMS personnel, conducting training exercises on a regular basis, and the redesigning and distribution of triage tags across the nation.

The second question posed by the researcher was, is the expectant category a social and ethical injustice among the most vulnerable, the older population. The research indicates that unless triage protocols are changed to include the physiological needs of the older population there will be more victims involved in mass casualty incidents over the age of 65 being assigned to the expectant category. This conclusion is based upon the data retrieved from the United States Census Bureau that the older population of the United States is expected to double by the year 2050 from 43.1 million in 2012 to 83.7 million.

Currently there is a perceived acceptance that older patients of a disaster will more than likely be listed as unsalvageable or be placed in the delayed treatment category because the criteria associated with the currently practiced triage protocols do not take into consideration the physiological changes an older person exhibits over a younger person. This can be seen in the following analysis of the START triage system methodology as it pertains to the older population.

The START triage system begins the assessment process with the responder verbally asking all that can hear the sound of their voice to move towards them. These patients are then designated as the walking wounded and assigned a green tag. One concern regarding the older population and could potentially be a problem is that the START method does not take into account the many physiological impairments that the older population faces. For example it is not unprecedented that many of the older generation has some difficulty with the following; 1) hearing impairment, so they do not hear the commands, 2) mental confusion, so they do not

understand the command,3) decreased or impaired mobility, they are unable or have difficulty walking, or 4) a combination of all the above. In this instance is it fair or ethical to assign these patients to a lower triage category because of their physiological incapacity to follow the instructions given when no other injury is sustained.

Another concern for the older adult is the previously discussed comorbidities that many suffer like diabetes, heart problems, and high blood pressure. It is well documented throughout the literature that these conditions can be exacerbated under stressful situations that mass casualty incidents can cause. If any of the physiological impairments are present, the likelihood that these patients will be assigned as unsalvageable is a high probability based on the unconscious decision-making of the responder that uses age as a determining factor.

Therefore, in order to answer the question of whether the expectant category is a social and ethical injustice among the older population depends on what the philosophical basis is used to reach any conclusion. A person's moral and ethical thinking and behavior is purely subjective. Logically, if the goal of disaster triage is defined as doing the greatest good for the greatest number of people then the question becomes what does the greatest good mean and is the meaning based on what society thinks is the greatest good or what the greatest good means from a medical perspective in an overwhelming mass casualty scenario. The researcher does not believe this question can ever be answered in a mutually agreed upon way between society as a whole and the medical professionals.

The question then becomes should ethics even enter into the process of triage or should there be stringent guidelines strictly adhered to and whatever the outcome of any one group is justified because rules were followed. This dilemma based on recommendations from the WMA, can be continually debated by experts, as to what defines an injury as so severe, that procedurally

a person is assigned to the expectant category. Moreover, because disaster triage is resource based, if a person is perceived to have a low survivability rate due to the lack of resources available at the time of the incident, is it truly unethical to attempt to maintain lifesaving treatments, as suggested by the WMA? Conversely, is the statement by the WMA ethically subjective because of the varying degrees in which different responders approach the triage making decisions, since there is no uniformity to the criteria for which assignment of a patient is made?

The varying degrees of how a responder or healthcare provider approaches the triage decision making can affect the mortality rates and potentially cause unnecessary deaths due to inappropriate triage systems in place. The issue then becomes should the morality of the consequences of those actions be evaluated in triage protocol methodologies or should the responder's intentions behind those actions be evaluated before they assign a person to the expectant category. In an attempt to validate the third hypothesis presented by the researcher of the claims that unnecessary deaths have occurred due to inappropriate triage systems in place, a brief overview was given regarding what transpired at Memorial hospital after Hurricane Katrina struck New Orleans in 2005.

The issue of using the inappropriate triage system at Memorial Hospital was researched because patients were assigned to the expectant category based the fact that they had a DNR on file and no other medical reason. The conclusion of the medical examiner after an investigation was that some of the patients that had died would have survived the evacuation and their deaths were hastened by the lethal doses of morphine found in their system. An ethical, legal, and moral debate ensued as to whether the medical staff, especially Dr. Pou acted in good faith and whether the actions were justified under the circumstances in which they faced.

Evaluations of triage protocols were examined in order to determine if they were ethical and fair in regards to human life, but no triage system is a one-size fits all concept. It can be concluded that the research validated there were unnecessary deaths that occurred, but did not validate that the cause was due to an inappropriate triage system was in use at the time. The reason for this conclusion is that these deaths occurred due to the decision making of qualified medical personnel and adhered to the position held by the WMA, that wasting scarce resources when needed elsewhere is unethical to persist at all cost in maintaining the life of a patient beyond hope. It can also be concluded that the staff at Memorial, whether consciously or not was acting within the moral parameters that define deontology. Whereby the intentions of the staff was not to cause the deaths of several patients, but rather to ease the suffering by administering palliative care, because they were judged to have no hope of survival, which unfortunately is the premise behind assigning patients to the expectant category in any triage system.

The answer to the first question presented above also validated part of the first hypothesis that the researcher alluded to in the introduction of when there are multijurisdictional events, not all responders and medical personnel are making decisions based on the same criteria and level of experience optimizing the same triage methodology. The aspect that could not be validated based on the available research was that the best practice approach used is based on guidelines at the local level, which highlights the need for further research on this topic and discussions initiated between first responders, medical professionals, and policy makers.

The second hypothesis introduced by the researcher that doing the greatest good for the greatest number of people in triage systems has the potential to ignore an entire generation has been partially validated through the research based on the inclusion of the fair innings argument. Additionally, research shows that the currently practiced triage protocols do not take into

consideration the physiological changes and comorbidity issues common as a person ages, thereby potentially ignoring an entire generation during triage by responders of a mass casualty incident.

There are limitations in all triage systems and at times can be viewed as an ineffective way of handling mass casualties during times of disasters. Disaster scenes are typically chaotic and a well-developed system in place prior to an incident can go along way when determining whether the response effort succeeded or failed in the eyes of the public, policymakers, and healthcare professionals. The third question posed by the researcher of what alterations to procedures and operations could be put in place to remedy the shortcomings of triage can be answered by reviewing the limitations that all triage systems contain.

The first limitation of all triage systems addressed in the available research is that triage protocols are not scientifically evidence-based. There is no evidence that suggests that one system is better than another system due to the lack of field validation because of the infrequency of mass casualty incidents requiring disaster triage. Another issue that contributes to the lack of scientific evidence of the efficacy of triage systems is that even with the same training different results are produced by the same responders in annual drills. This leads to the conclusion that the inconsistencies in triage assessments are due to the level of experience of the triage officer, in addition to the different factors with which an individual is making those triage decisions.

Triage algorithms are supposedly designed so that predefined protocols in place can be objectively applied when assessing victims injured at the scene. The available research indicates that responders are basing their decisions on how to assess a victim based on several factors 1) their level of experience with the triage system in use; 2) their level of training; 3) biases that influence their decisions to include a victims age; and 4) their own set of ethical and moral

standards. Additionally, studies have confirmed that responder's lack confidence in their understanding of the criteria needed to assign victims to specific categories as well as their lack of understanding of what delineates the expectant category; leading to higher percentages of over and under triaging of victims.

The second limitation associated with triage systems in use today is that most systems do not take into consideration the distinguishing characteristics of the population being triaged; a person's age, physical or mental disability, or cultural differences when assigning victims to predefined triage categories. As previously stated, triage is not a one-size fits all system. The potential to alienate entire demographics are high with the "cookie-cutter" methodology of triage systems in place today. Currently, no triage system allows situational awareness of the demographics being triaged in order to do the greatest good for the greatest number of victims present at a disaster scene.

Now that the limitations included in all triage systems in use today have been addressed, what alterations or procedures can be put implemented to mitigate these shortcomings. An effective triage system should contain the following characteristics versatile, simple to use, practical, and evolving. Additionally, these protocols need to be well defined so that the physiological parameters experienced by specific subset of patient groups are easily identified in order to alleviate the likelihood that these groups will receive special considerations based on the emotions of the responders or factors including, but not limited to, the victim's age.

As of today, no one-triage systems fulfills every one of these criteria, so how can a triage system be implemented or changed to include these basic characteristics. First, a triage algorithm can be developed for the geriatric population that incorporates the physiological differences of older adults. This new algorithm can be achieved by including medical personnel experienced in

geriatric medicine to develop guidelines if a mass casualty incident involves a large number of geriatric patients occurs. A predefined set of guidelines that responder can follow will alleviate the propensity to triage this patient groups with special considerations based on emotion or simply on chronological age alone and will allow the system to have a versatility that is currently not in practice. It is worth mentioning at this time that a variation of the START protocol has already been developed to compensate for the physiological difference in pediatric patients versus adults, known as JumpSTART (see appendix D).

Another alteration that can be made to triage systems is in the training methods and mandatory exercises and drills that are required by all responders and trauma teams throughout the United States. One recurring theme throughout the literature is that triage systems are not scientifically evidence based, but rather evaluated from the standpoint of academics and think-tank experts of how a system should be evaluated. Even when drills and exercises are conducted, consistent results are not produced. One way this can be altered is a universal system is designed taking the input from EMS responders in the field and a panel of medical professionals that deal in trauma medicine on a daily basis. With the inception of a universal system that is mutually agreed upon, a mandate can be issued that incorporates the methodologies of a new triage system on a daily basis in the field.

If triage is practiced on a daily basis in all jurisdictions, then when a mass casualty event occurs and there are multiple victims, the responders will have firsthand knowledge and experience dealing with a multitude of situations that will alleviate the inconsistency of results associated with triage protocols. Additionally, if the responders are practicing triage on a daily basis, the annual drills will be able to identify any deficiencies encountered and be more easily implemented into the protocols. If a system is implemented based on these factors, the same

results should be able to be duplicated. Subsequently, the triage system would be considered scientifically evidence based and there will no longer be a need to have multiple systems in use across jurisdictions.

The conclusion to be drawn from this research is that there is a need for more research regarding mass casualty incidents in respect to how current triage systems relate to the older population. Moreover the researcher will continue to advocate for the establishment of a standard set of triage protocols that can be used universally by all responders and medical personnel with the incorporation of a separate triaging criteria aimed at one of the most demographically vulnerable population; the elderly. As the population of the United States ages and responders and medical personnel are responsible for triage assignment of this demographic, the potential of a controversial outcome should be expected on a greater scale than what occurred after Hurricane Katrina. Higher mortality rates will be seen among the older population because there is not a universally accepted triage protocol in place nor a justification of assigning the older population to the expectant category, based on anything but chronological age. The result of the overall response effort will not be considered as doing the greatest good for the greatest number because, at some point in the future the greatest number of people could potentially be the older population.

Recommendations

The following recommendations are being made in the hopes that policymakers, emergency management professionals, academia, healthcare professionals and first responders will take note of the deficiencies associated with current triage systems overall. These recommendations are being made based on the on the evidence presented in this research regarding current triage practices. The evidence presented included the need for an evidence-based triage system that allows for continuity across jurisdictional lines by making changes to the current definition of the expectant category in civilian triage. Moreover, situational awareness needs to be practiced by all responders in being able to identify the unique characteristics of the population being triaged. Continual training is a necessity and needs to occur on a regular basis. Additionally, there is a need for a universally accepted and mutually agreed upon triage system so that the proper triage of all victims, including the older population, in order to reduce the number of patients being under-triaged which will minimize the number of unnecessary deaths during an event while still maximizing the greatest benefit for the greatest number of people. The last recommendation and perhaps the most important is that as the population ages, there is a need for more geriatric medical professionals specializing in disaster and emergency management preparedness and planning, in addition to actively involving this population in the planning process.

Recommendation I

The current description of the expectant category is unclear in many triage systems in use today. Presently the only triage system that defines a black category is the START method. Under the START triage system, the expectant category is associated with what is described as the black category and is used for victims pronounced dead at the time of the incident.

Additionally, this category is reserved for what is considered non-salvageable because the resources are not available and the victims are not predicted to survive based on a responders best judgment; Moreover, these patients are rarely reevaluated under current triage systems.

Based on in the research, the recommendation for defining the new category as expectant should be modeled after the proposed classification identified by the SALT workgroup. Under this triage system, patients are identified by who is likely to die given the limited available resources. The category is intended to be "flexible and dynamic," with patients reevaluated frequently based on the availability of resources. This allows a patients triage category to change continually as they improve or decline because of the injuries sustained.

Recommendation II

Continual assessment of triage methodologies should be reviewed on a national level incorporating the lessons learned from previous disasters. Disasters involving mass casualties occur on an infrequent basis, but it is still important to assess what occurred in past disasters involving mass casualties in an attempt to avoid the same mistakes being made again. Case in point; the lessons evaluated after Hurricane Katrina with the conduct of the staff at Memorial Hospital regarding the unnecessary deaths was averted when Super Storm Sandy struck the New York area in 2010. Reports that there were no lives lost in the hospitals due to improper triage techniques were widely reported.

It is recommended that policy makers and emergency managers in a coordinated effort with first responders and personnel experienced in trauma care should meet on a frequent basis so that recent global disaster responses can be dissected and determine what triage systems were implemented. This will allow changes to be made to existing systems currently in place on a frequent basis if deemed valid.

Recommendation III

Continual training on triage systems needs to be implemented so that responders are continually prepared for the next mass casualty incident. A well-known fact is that many responders and medical personnel have not or never will experience a mass casualty catastrophic event, but that is no reason not to be prepared for one to occur at any time. Typically, a responder or dedicated hospital personnel will randomly participate in multijurisdictional exercises on a sporadic basis. Therefore, it is suggested that continual training be mandated on a more frequent basis than the current annual basis.

The first recommendation for continual training is to rotate responders and trauma teams on a quarterly basis so that their skills and knowledge are kept up to date. Additionally, it is recommended that mass casualty exercises should incorporate different disaster scenarios on a rotating basis so that all hazards are identified and trained for; triage protocols will need to be amended depending on the type of disaster that occurs. For instance, you will not triage mass casualties the same for a bombing as you would for a chemical explosion. Secondly, if a triage system were universally accepted, the recommendation is that triage protocols are rotated into the daily routine of any response effort. If triage is practiced on a daily basis in all jurisdictions, then when a mass casualty event does the responders will have firsthand knowledge and experience dealing with a multitude of situations that will alleviate the inconsistency of results associated with triage protocols.

Recommendation IV

Current triage systems do not take in to consideration the unique physiological differences of the older adult population when being assigned to one of the triage categories. Current triage protocols are based on an assessment of a typical healthy individual between the

ages of 18 and 64 and in extreme cases may even be as low as age 50 depending on whether there are any co-morbidities. The available research indicates that the older population suffers from many physiological impairments: 1) loss of hearing, 2) mental confusion, 3) decreased or impaired mobility, or 4) a combination of all the above. Additionally, there is a general consensus that the older population in a disaster will more than likely be listed as unsalvageable or be placed in the delayed treatment category because the criteria associated with the currently practiced triage protocols do not take into consideration the physiological changes an older person exhibits over a younger person.

It is recommended that a separate triage algorithm be developed for the geriatric population that incorporates the physiological differences of older adults. This new algorithm should be developed by medical personnel experienced in geriatric medicine and first responders in addition to a designated group of the older generation. A predefined set of guidelines will alleviate the inclination of responders to triage this patient group with special considerations based on emotion or simply on chronological age alone. This new system will allow a versatility that is currently not in practice by responders when attending to different age groups on the scene. Additionally, these guidelines will minimize the possibility of under-triaging an entire generation of people.

Recommendation V

More training is needed that addresses situational awareness among first responders regarding the older generation. Research indicates that older adults frequently suffer comorbidities that include diabetes, heart problems, and high blood pressure in addition to physiological deficiencies of hearing impairment, mental confusion, decreased or impaired mobility, or any combination thereof. It is well documented in disaster literature that these

conditions can be exacerbated under stressful situations of any disaster, especially ones where mass casualties are observed. There are specific indicators that an older person may cognitively exhibit that potentially can lead to under-triage; in doing so, treatment is delayed by inappropriately assigning the older patient to the incorrect triage category potentially minimizing the survivability rate. Typical cognitive changes in the older adults can be characterized as taking longer to process information, the inability to remember instructions, and they may at times appear distracted by all the response activity.

To mitigate the possibility of under-triaging occurring, sensitivity training regarding the older population is recommended for all responders on a regular basis. Training should include how to identify if any cognitive impairments are present, how to effectively communicate instructions and information to the older patient, and training on how to identify any existing disabilities that may affect the triage assignment decisions.

Recommendation VI

As the population ages, there is more of a need for geriatric medical professionals to specialize in disaster and emergency management preparedness and planning. This will allow policy makers, trauma healthcare professionals, and responders to gain a better understanding of the unique needs of the older population regarding physiological changes and comorbidity issues. Additionally the older populations should be involved in the planning process as well.

The recommendation is that a representative from every community where there is a large population of older adults be appointed to a committee responsible for assessing the needs of this generation. An older person can be a valuable resource in the planning process at the community level when trying to develop policies and protocols that will affect their ability to survive not only common disasters, but mass casualty incidents as well. The input that the older

population conveys to community leaders regarding the physiological changes that occur, how these changes are affected by co-morbidity issues can help in developing strategies that will in the long run protect these individuals from becoming victims discarded as non-salvageable because of the lack of understanding by those in a response capacity. Additionally, it is not only imperative that this group is represented by one of their peers, but that their concerns are taken seriously, the vulnerabilities of this particular group are identified, and a valid plan is implemented. As previously stated, at some point in the near future the greatest number of people affected by disasters will be the older population.

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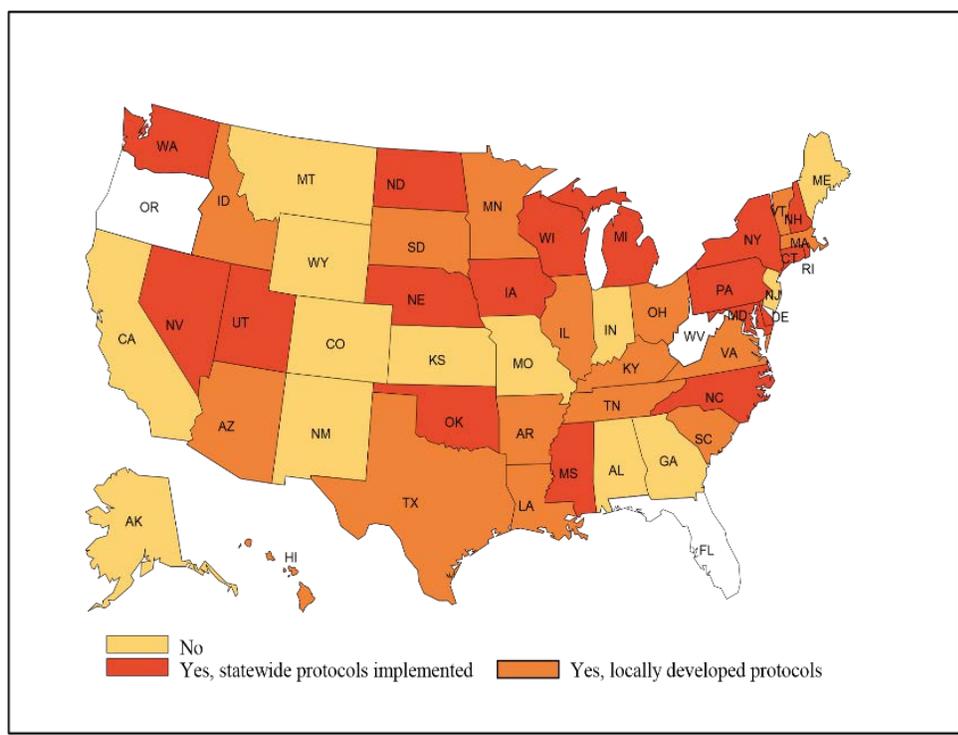
Appendix A

(FICEMS, 2014)

States with EMS Specific Mass Casualty Protocols and Triage Guidelines for Local EMS Agency Use

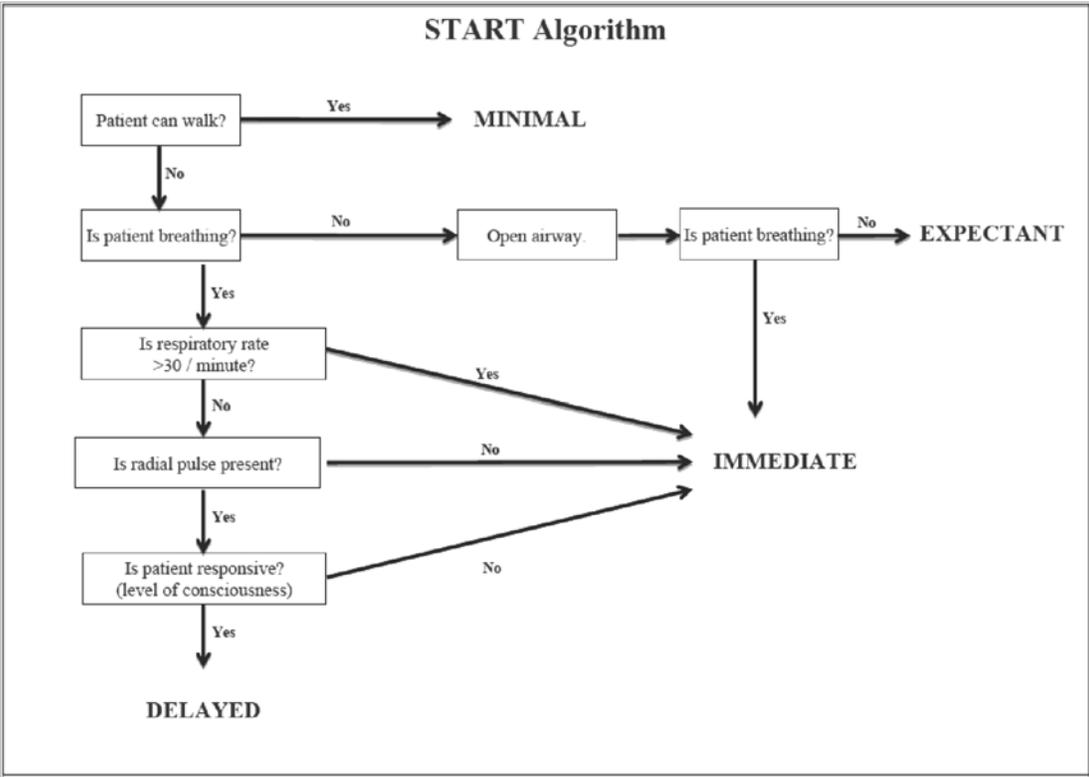
EMS Mass Casualty Protocols	States		Territories	
	Frequency	Percent	Frequency	Percent
No	13	27.7%	1	25.0%
Yes, locally developed protocols implemented	16	34.0%	0	0.0%
Yes, statewide protocols implemented	18	38.3%	3	75.0%

***FL, OR, and WV State data unavailable. AS and DC territory data unavailable.*



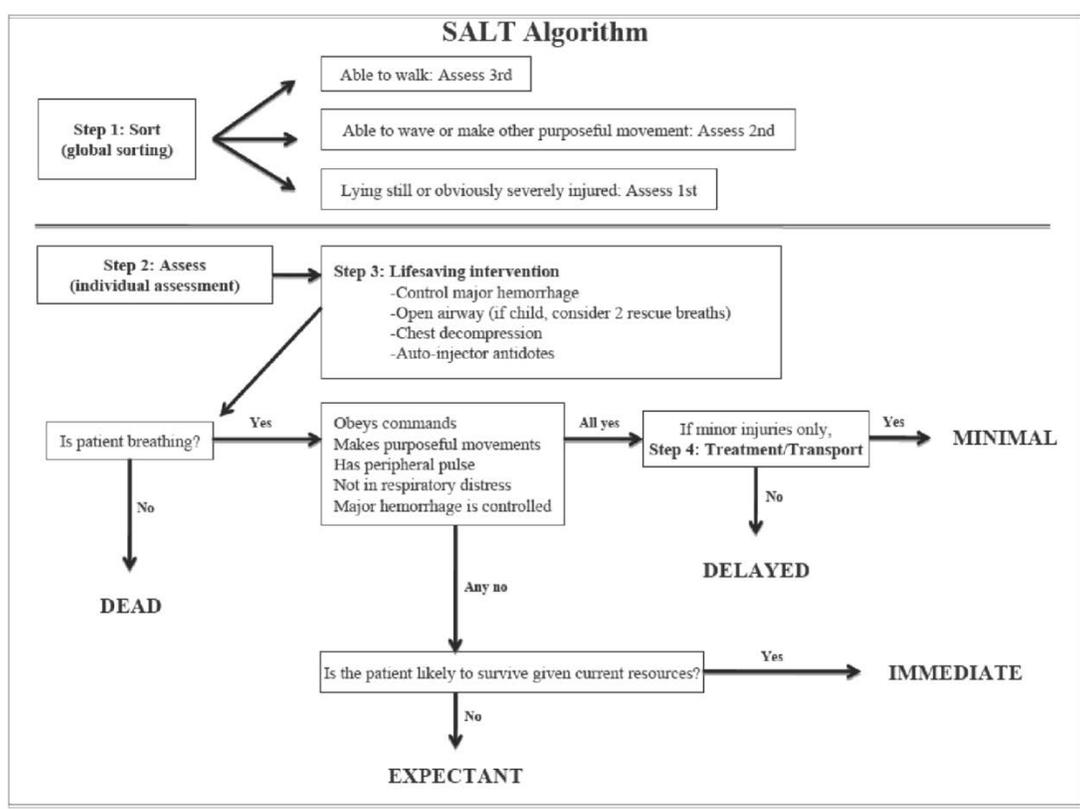
Appendix B

(Lee, 2010)



Appendix C

(Lee, 2010)



Appendix D

(Romig 2012)

