APUS Library Capstone Submission Form

This Capstone has been approved for submission to and review and publication by the APUS Library.

| **Student Name [Last, First, MI]*** | Skinner Douglas |
| Course Number [e.g. INTL699]*** | PADM697 |
| Paper Date [See Title pg.] | January 2017 |
| Professor Name [Last, First, MI]*** | Bartman, Christi S |
| Program Name * | Public Administration |
| Capstone Type * | Capstone-Creative Project |
| Passed with Distinction * Y or N | Y |
| Security Sensitive Information * Y or N | N |
| IRB Review Required * Y or N | N |
| Turnitin Check * Y or N | Y |

* Required

Capstone Approval Document

The Capstone thesis/project for the master’s degree submitted by the student listed (above) under this title *

Countywide Bariatric Response Plan for Loudoun County, Virginia Fire and Rescue

has been read by the undersigned. It is hereby recommended for acceptance by the faculty with credit to the amount of 3 semester hours.

<table>
<thead>
<tr>
<th>Program Representatives</th>
<th>Signatures</th>
<th>Date (mm/dd/yyyy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signed, 1st Reader * [Capstone professor]</td>
<td>Christi Bartman</td>
<td>Digitally signed by Christi Bartman Date: 2017.01.18 11:07:24 -05'00'</td>
</tr>
<tr>
<td>Signed, 2nd Reader (if required by program)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommendation accepted on behalf of the program director *</td>
<td>Christi Bartman</td>
<td>Digitally signed by Christi Bartman Date: 2017.01.18 11:07:37 -05'00'</td>
</tr>
<tr>
<td>Approved by academic dean *</td>
<td></td>
<td>1/18/2017</td>
</tr>
</tbody>
</table>

* Required
Countywide Bariatric Response Plan for Loudoun County, Virginia Fire and Rescue

A Master Creative Project

Submitted to the Faculty

of

American Public University

by

Douglas P. Skinner

In Partial Fulfillment of the

Requirements for a Degree

of

Master of Public Administration

February 2017

American Public University

Charles Town, WV
The author hereby grants the American Public University System the right to display these contents for educational purposes.

The author assumes total responsibility for meeting the requirements set by United States copyright law for the inclusion of any materials that are not the author’s creation or in the public domain.

© Copyright 2017 by Douglas P. Skinner.

All rights reserved.
DEDICATION

I dedicate this masters creative project to my wife and family, for the understanding and support provided me during the master’s program, and to the past and future bariatric patients who have been or will be transported by ambulance and require the needs of such research in order to be safely transported and provided dignity as part of their experience.
ACKNOWLEDGEMENTS

I wish to thank the members of the Loudoun County EMS Operations Committee for allowing this project to occur. I thank the Loudoun County EMS Operations Bariatric Response Plan subcommittee, Captain Herb Rundgren and Assistant Chief Al Pacifico, for the collaboration, and reasoning, and for keeping me on track. I thank and acknowledge Deputy Chief Jose Salazar, for his direction in helping to get the bariatric response committee organized. I acknowledge and thank, Loudoun County Volunteer Rescue Squad Chief Anthony Mino, for his time and effort proof reading my drafts of the project. I acknowledge Mrs. Connie Clem and Ms. Hollise Avakian for their time and efforts in proof reading my drafts of the project. I acknowledge and thank all of my past course faculty members of the American Public University, for their efforts in helping me learn and critically think during my master’s program and helping me to excel ay my goals. Finally, I would like to thank my Masters Creative Project professor, Dr. Christi Bartman, for all the leadership and direction she provided to me in accomplishing a dream and goal of my life.

I have found the course work throughout the public administration program to be fulfilling, thoughtful, and stimulating, providing me with the tools with which to explore past and future projects and endeavors and to achieve life goals.
ABSTRACT OF THE CREATIVE PROJECT

Countywide Bariatric Response Plan for Loudoun County, Virginia Fire and Rescue System

by

Douglas Paul Skinner

American Public University System, February 15, 2017

Charles Town, West Virginia

Professor Christi Bartman

ABSTRACT

This paper on bariatric medical transport reports on a study, showing need for a bariatric transport program for Loudoun County, Virginia and then providing a best practice approach in designing and structuring a countywide bariatric transport plan, equipment cache, dispatch process, and training plan for Emergency Medical Services or EMS personnel. A preliminary search of population demographics showed that 30 percent of the United States population is obese, thus demonstrates a need for bariatric transport capabilities. A secondary search on bariatric best practice organizations and a continuous countywide committee process evaluated the current system and designed a process to initiate a new bariatric transport program. The best practice research and committee approach allowed for a collection of data from organizations that had successfully run bariatric transport systems throughout the world. This data was correlated within the committee with current Loudoun County Fire Rescue System operations, and then specific aspects of the best practices were adopted into the current system. Using the comparison and correlation process of the current services the committee provided a new bariatric transport program for Loudoun County by producing a policy, training and equipment manual, and presenting the program for approval by the EMS Operations Committee.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>9</td>
</tr>
<tr>
<td>II. LITERATURE REVIEW</td>
<td>10</td>
</tr>
<tr>
<td>Introduction</td>
<td>10</td>
</tr>
<tr>
<td>Meaning of “bariatrics” and obesity</td>
<td>11</td>
</tr>
<tr>
<td>Define an obese or bariatric patient</td>
<td>12</td>
</tr>
<tr>
<td>Prevalence of obesity on EMS</td>
<td>14</td>
</tr>
<tr>
<td>Impact of obesity and bariatric patients on EMS</td>
<td>17</td>
</tr>
<tr>
<td>Equipment challenges for bariatric patient safe care</td>
<td>19</td>
</tr>
<tr>
<td>Work environment issues when dealing with bariatric patients</td>
<td>29</td>
</tr>
<tr>
<td>Training for bariatric patient safe care and transport</td>
<td>31</td>
</tr>
<tr>
<td>Best practice for bariatric transport and response</td>
<td>32</td>
</tr>
<tr>
<td>Local challenges and needs for bariatric transport</td>
<td>34</td>
</tr>
<tr>
<td>III. METHODOLOGY</td>
<td>38</td>
</tr>
<tr>
<td>Data collection technique</td>
<td>39</td>
</tr>
<tr>
<td>Subjects and setting</td>
<td>40</td>
</tr>
<tr>
<td>Statistical analysis</td>
<td>41</td>
</tr>
<tr>
<td>Limitations of the study</td>
<td>42</td>
</tr>
<tr>
<td>IV. Results and Discussion</td>
<td>43</td>
</tr>
<tr>
<td>Define obese and bariatric, and define what constitutes a bariatric patient</td>
<td>44</td>
</tr>
<tr>
<td>Show prevalence of obesity and the need for a bariatric program</td>
<td>46</td>
</tr>
</tbody>
</table>
Define equipment needs and challenges for safe transport and care…………….48
Define proper positioning and dispatch of bariatric equipment in the County...54
Define work environment issues when dealing with bariatric patients..........57
Define training needs for the county EMS personnel..........................58
Define best practices for safe bariatric transport for Loudoun County……...60

VI. Summary and Recommendations.................................................63

LIST OF REFERENCES........................................................................67

APPENDICES....................................................................................72

Appendix A. Bariatric Policy.................................................................72
Appendix B: Equipment and Training Manual....................................75
Appendix C: Sub Committee Presentation power point.....................92
Appendix D: Loudoun County Volunteer Rescue Squad Bariatric Policy...99
Appendix E: Minutes of LC-CFRS Bariatric Committee Meetings.......103
<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Body Mass Index Chart. (U.S. Veterans Administration, 2016)</td>
<td>14</td>
</tr>
<tr>
<td>2. Self-reported obesity among U.S. adults by state and territory (US CDC, 2016a).</td>
<td>15</td>
</tr>
<tr>
<td>3. Virginia percentage of adults who are obese total. (U.S. CDC, 2016)</td>
<td>16</td>
</tr>
<tr>
<td>4. Hover Jack evacuation device. (Hover Tech Inc., 2016)</td>
<td>19</td>
</tr>
<tr>
<td>5. Stryker bariatric stretcher. (Stryker, 2016)</td>
<td>20</td>
</tr>
<tr>
<td>6. Hover Jack evacuation device. (Hover Tech Inc., 2016)</td>
<td>21</td>
</tr>
<tr>
<td>7. Stryker transfer flat or bariatric tarpaulin (Stryker, 2016)</td>
<td>22</td>
</tr>
<tr>
<td>8. Bariatric ramp system. (Picture taken by D. Skinner, 2016)</td>
<td>24</td>
</tr>
<tr>
<td>9. Iron-duct standard backboard. (Moore Medical 2016)</td>
<td>26</td>
</tr>
<tr>
<td>10. FERNO bariatric backboard. (FERNO, 2016)</td>
<td>26</td>
</tr>
<tr>
<td>11. Bari-Board (Moore Medical, 2016)</td>
<td>28</td>
</tr>
<tr>
<td>12. CPR Board (Moore Medical, 2016)</td>
<td>28</td>
</tr>
<tr>
<td>13. Map of Loudoun County current bariatric unit locations (Loudoun County Fire Rescue, 2016)</td>
<td>55</td>
</tr>
<tr>
<td>15. Map of Loudoun County proposed bariatric unit locations (Loudoun County Fire Rescue, 2016)</td>
<td>57</td>
</tr>
</tbody>
</table>
I. Introduction

A basic national focus for Emergency Medical Services or EMS systems throughout the United States is to provide an evidenced-based approach or best practices approach to adding or continuing programs that are adopted by local EMS systems. As part of this focus, many EMS systems are evaluating old and initiating new categories of enhancements to provide for patient-focused, financially responsible and medically accountable approaches to healthcare. Some approaches that are being included in EMS systems are requiring need assessments, researched scientific backing, or evidence-based material to support the needs and accountability of the medical systems. The key to these projects is to show the medical community, as well as the socialized community, a need for the specific medical policy or procedure to be added or continued, as well as to provide best practices enhancements to better manage and provide a financially accountable EMS system. One of the nationwide approaches to EMS systems is bariatric care, handling, and transport. New bariatric programs are being provided to handle the current and future numbers of bariatric patients in our society.

The current problems facing EMS systems in Loudoun County, and across the United States, are the increasing volume of bariatric patients and the need to safely and efficiently transport these patients to hospitals or other healthcare facilities. Additionally, bariatric patients provide unique problems due to the heavy weights involved, and the logistics of lifting these patients in a safe manner for the patient and EMS care providers. Furthermore, due to the historical nature of the lack of resources for this type of population, and the medical nature of the bariatric transport and care process, there is also a need to assure comfort and dignity for bariatric patients, to reduce additional negative effects to the patient’s medical status.
The purpose of this project is to conduct an analysis of the needs for bariatric transport services within the county of Loudoun, Virginia. Furthermore, to provide a best practices approach to a countywide bariatric response plan, including equipment, placement of equipment geographically in the county, training of personnel, dispatch of resources, and the use of bariatric equipment at the scene and during transport of a bariatric patient.

II. Literature Review

Introduction

The focus of the research is to evaluate the current best practices nationwide and internationally, as well as evaluate the current Loudoun County Fire and Rescue system to see the need to produce a bariatric response plan and program.

The online library search was utilized to identify scholarly, peer reviewed and best practices articles and studies, which helped to provide references for answering key questions of this project. The articles were limited to items within the last 10 years to ensure the most recent information and best practices were captured for the project. After working through the articles and materials from key-word searches, there were more than 200 articles produced with information related to the topic. The articles and materials were further analyzed and a total of 38 reports, studies, and articles provided references and sources of material related to the key focuses of EMS bariatric transportation.

From the articles and material analyzed, the topics were categorized and grouped into formal areas to allow for the research to answer the questions and issues provided within this project. The categorized topics and groupings are as follows:

1. Meaning of “bariatrics” and “obesity”.
2. Definition of an obese or bariatric patient.
3. Prevalence of obesity in the Loudoun community.

4. Impact of obesity and bariatric patients on EMS.

5. Equipment challenges for bariatric patient safe care.

6. Work environment issues when dealing with bariatric patients.

7. Training for bariatric patient safe care and transport.

8. Best practices for bariatric transport and response.

9. Local challenges and needs for bariatric transport.

The analysis of the articles and material proceeded to further develop the questions as additional information was identified. The analysis of the material within the categories further produced answers to address the specific questions and needs for the project.

**Meaning of “bariatric” and “obesity”**

The word “bariatric” is not well defined to many in the health care field, with most relating the term to a type of surgery. One of the specific issues present in the acceptance of a new program like a bariatric response plan is the need to understand the definition. In this case, Merriam-Webster dictionary defines obesity as a condition characterized by the excessive amounts of fat in the human body (Merriam-Webster, 2016a). As the last sentence states, the condition is called obesity, but what is truly needed is a definition on how we treat or deal with an obese patient, for we are specifically producing a plan to deal with obese patients during EMS situations. The word, “bariatric” is used to describe that we are treating or dealing with an obese patient. Merriam-Webster dictionary defines “bariatrics”, as relating to or specializing in the treatment of obesity (Merriam-Webster, 2016b). This definition alone helps to clarify that we are dealing with a specific specialty in treating a person with a specific condition. Thus, the definition related to obesity and bariatrics, provides a comparison to produce the naming of the
Countywide Bariatric Response Plan for Loudoun County, Virginia Fire and Rescue

plan as a bariatric response plan. This shows that the goal is for the Loudoun County Combined Fire Rescue system to provide a service and action to care for and transport obese patients and to have “bariatric transport service” capabilities.

**Define an obese or bariatric patient.**

One of the main questions that exists, is how the Loudoun County Combined Fire Rescue system defines a bariatric patient. During the analysis it was found that there are multiple accounts of how to define a bariatric patient. One account provided by Berger (2007, p. 444) in the *Annals of Emergency Medicine* defined a bariatric patient as someone who exceeds a body mass index or BMI of more than 40, or at least 100 pounds over the ideal body weight (Berger, 2007). Another source has the San Francisco EMS Agency (2014, p. 1) defining a bariatric patient as a person weighing more than 350 pounds and/or has a body habitus that exceeds the capacity standards for a normal ambulance stretcher in height, weight or both (San Francisco EMS Agency, 2014).

Taking into account multiple researched articles, other specifics had to be processed as part of this complex question. Two specific issues with regard to the definition, is how much weight a normal EMS crew can handle, and what does the International Classification of Diseases tenth edition or ICD10 code define as a bariatric patient due to the standards set for ambulance billing.

The issue with regard to how much weight a normal EMS crew can handle, is related to the duties defined and placed upon EMS crews based on Commonwealth of Virginia Office of Emergency Medical Services or OEMS regulations. The normal size crew on an ambulance in the Loudoun County, Virginia, is two emergency medical technicians. The Commonwealth of Virginia OEMS, that provides the rules and policies to all EMS agencies in the state, has
provided a position paper on how EMS personnel should function. The Virginia OEMS Functional Position Description for the Basic Life Support Provider EMT states that all EMTs must have the ability to lift, carry, and balance 125 pounds individually and 250 pounds with a second EMT, to a height of 33 inches, and carry that weight a distance of 10 feet (Virginia OEMS, 2012). This information allows a correlation as to how the plan should provide appropriate manpower for bariatric patients based on the weight of the patient involved and the capabilities of the crew size. It provides guidance on how many other resources should be dispatched to a bariatric patient response.

The ICD10 is an international classification of diseases, in its tenth edition, allowing an international understanding of and definition for both medical practices and insurance billing practices of medical procedures and disease patterns (ICD10Data, 2016). The ICD10 is based on the World Health Organization’s (or WHO), definition of what a bariatric patient is, i.e. the WHO defines any person who has a Body Mass Index or BMI greater than 30 is defined as obese, and those having a BMI greater than 40 are defined as severely obese (WHO, 2000). Haler (2002) also defines bariatric patients based on weight versus BMI, to include patients overweight by more than 100-200 pounds of body weight or greater than 300 pounds. (Hahler, 2002). Figure 1 shows the body mass index categories to clarify the differences of size as BMI increases.

In the past, the standard EMS facility weight capacity for patient-handling-equipment has been 250-350 pounds. Staff often activated bariatric protocols, guidelines, and/or similar actions when a patient's weight exceeded 350 pounds as a best practice guideline. Following what the WHO ICD10 (2000) classifications provided and a completed basic assessment of the EMS system, and taking into consideration the standard patient handling equipment capacities noted
Definition of Bariatrics by BMI

<table>
<thead>
<tr>
<th>International Standards</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
</tr>
<tr>
<td>Normal</td>
<td>18.5-24.9</td>
</tr>
<tr>
<td>Overweight</td>
<td>25-29.9</td>
</tr>
<tr>
<td>Obese (1)</td>
<td>30-34.9</td>
</tr>
<tr>
<td>Obese (2)</td>
<td>35-39.9</td>
</tr>
<tr>
<td>Obese (3)</td>
<td>&gt;40</td>
</tr>
</tbody>
</table>

Figure 1: Body Mass Index Chart. (U.S. Veterans Administration, 2016).

above, we were able to correlate what crew sizes and resources would be needed to safely handle a bariatric patient and declare the approximate weight for bariatric definition to be between 350 and 400 pounds (ICD10Data, 2016). Additionally, the functionality of the crew and resources, with the correlation of the national standards set by the WHO ICD10 helped to define and narrow what weights would be defined as a bariatric patient in the Loudoun County Fire Rescue System (ICD10Data, 2016). For the Loudoun County Combined Fire Rescue System any patient who is 350 pounds or more is defined as a bariatric patient.

Prevalence of obesity on EMS

According to the WHO (2016) worldwide obesity has doubled since 1980, with more than 1.9 billion adults over the age of 18, being obese (WHO, 2016). The United States Centers for Disease Control and Prevention or CDC, proclaimed that 66 percent of the United States population had become overweight (Berger, 2007). The CDC additionally shows data that 30 percent of United States’ citizens are obese. Figure 2, shows the prevalence of self-reported obesity among adults in the United States. This highlights evidence of a countrywide health problem related to obesity. How the world and the United States produced a bariatric epidemic
over the last 20 years, goes to the fact that our world has modernized and made food readily available, that is high in calories and saturated fats, and produced a sedentary life style of little/no exercise, using electronic video games and cable television (WHO, 2016). Berger (2007, p. 443) pointed out that changes in our global society of prevalence to do more with less, to be more involved with the technology of comfort, and poor nutritional activity, have made the obesity and bariatric epidemic explode over the last 40 years (Berger, 2007, p. 443).

It is very evident that obesity is a growing concern with regard to healthcare in the United States, for more than 30 percent of the United States population is obese and has health related issues due to obesity. Furthermore, the US CDC (2016b) shows that the Commonwealth of Virginia follows the same trend that the country as a whole has followed, with an annual obesity rate either increasing or at the same rate of the prior year (US CDC, 2016b). Virginia, currently has 28.5 percent of the state population as obese, which is in line with the national average, but unlike many other states, Virginia has worked hard to slow the increase in obesity, by using
statewide health programs that encourage healthy eating and exercise to slow or prevent obesity. Figure 3 shows the percentage of adult Virginians who are obese, from 2011 to 2014 (U.S. CDC, 2016). The numbers are in correlation with the overall U.S. map above, and shows a constant overall percentage of just less than thirty percent of the population of the Commonwealth of Virginia being obese. Additionally, the overall population of the Commonwealth of Virginia per the 2015 census is 8,382,993 (U.S. Census, 2016). As per the 2014, U.S. CDC data in Figure 2 above, 28.5 percent of the state’s population is obese, which is approximately 2,389,153 people that are declared obese based on the US Census numbers for the Commonwealth of Virginia, the BMI standards, and the Commonwealth of Virginia statistics.

Via the Virginia Health Department, utilizing the County of Loudoun Health Department’s 2013 data, Loudoun County has 20 percent obese population. The current population is 363,050, thus 20 percent of the total is 72,610 people within Loudoun County who are obese (Virginia Department of Health, 2016).

Although, the numbers do not show a rapidly increasing percentage of the Loudoun population as obese, it does show that there currently is a large population within the Commonwealth of Virginia and Loudoun County who are obese. The numbers also show a

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>28.5</td>
</tr>
<tr>
<td>2013</td>
<td>27.2</td>
</tr>
<tr>
<td>2012</td>
<td>27.4</td>
</tr>
</tbody>
</table>

Figure 3: Virginia percentage of adults who are obese total. (U.S. CDC, 2016).
growth of approximately one percent over a three-year period, which shows as the obese population grows, more opportunities for contact with obese EMS patients will also increase.

**Impact of obesity and bariatric patients on EMS**

The impact of obesity and bariatric patients on EMS is an evolving issue that has grown with the call volumes of the EMS agencies throughout the country. As the obesity population grows, the chances of an EMS agency responding to a bariatric patient incident increases, but the population alone is not the only specific indicator producing obesity impacts on the country’s emergency medical systems.

Another indicator that produces and increases obesity and bariatric impacts on EMS is the increase in occurrence of obesity-related ailments. The Presence Regional EMS System (2015) lists multiple ailments for bariatric patients such as diabetes, heart disease, hypoventilation syndromes, elevated cholesterol, sleep apnea, skin infections, gallstones, infertility, depression, gout, and immobility to list a few (Presence Regional EMS System, 2015). The increase of bariatric-type ailments increases healthcare and transport services due to the need for definitive care during the transport. Additionally, some of these ailments alone, and others in combination produce acute health issues that need swift and proper care in order for the patients to survive. The increased weight and body surface areas on a bariatric patient increase the need for more healthcare providers to complete procedures on the patient or to move them from their house to an ambulance. The complexity of ailments as well as increased body weight necessitate EMS response and transport of these patients.

Another area of impact of bariatrics on EMS is the need to have appropriate equipment and training, and the financing to cover the costs of both. The ailments and large sizes of bariatric patients create a need for EMS personnel to be educated and trained to deal with these
aliments, as well as work with more personnel to complete medical procedures. Additionally, the typical everyday EMS system does not have equipment that has the capability to handle the weights of bariatric patients. The cost as per Stryker EMS (2016), of basic bariatric stretchers and moving equipment per each EMS unit is more than $30,000, plus maintenance and repair (Stryker EMS, 2016). This cost for many EMS systems is prohibitive and causes a huge impact on other EMS agencies to assist the agencies that cannot afford these types of devices.

Furthermore, ambulance service billing is not based on additional personnel at the scene to help the bariatric patient, or the cost of the proper equipment to move the bariatric patient. The Center for Medicare and Medicaid Services or CMS (2015) sets the standards and rules for ambulance billing, and bases the billing on the specific conditions of the patient in accordance to the ICD10 code, and then sets a level of care that allows for the specific ICD10 code (CMS, 2015). The levels of care set specific rates for cost recovery, and allow for mileage during the transport. There are five levels of care with a set billable rate for each. These levels of care are:

- Basic Life Support or BLS
- BLS Emergency or BLSE
- Advanced Life Support 1 or ALS1
- Advanced Life Support 2 or ALS2
- Specialty Care Transport or SCT (CMS, 2015)

The levels of care are in order from lowest acuity to highest acuity and thus, the rates go up with each level of care. The rates allowed for each level of care do not take into account additional personnel or equipment, only the set rate for care of the patient, if oxygen is used, and the mileage for the transport to the closest appropriate facility. The rates set for each level of care are associated with the basic care needs, not extraordinary circumstances such as bariatric
care. Thus, there is no process to recoup the cost of a bariatric EMS response, the extra personnel, the specialized equipment, or the extended periods of time spent on a bariatric EMS response. This shows that a majority of the cost of a bariatric type call is not billable per CMS guidelines (CMS, 2015).

**Equipment challenges for bariatric patient safe care**

Standardized EMS equipment is designed and purchased for generalized patient population contacts that an EMS system may encounter. Twaij (2013) discusses how standardized EMS equipment on an ambulance is not designed for a bariatric patient (Twaij, 2013, pg. 2113). There is a common misconception that bariatric patients can be accommodated by simply using a larger sized stretcher or other pieces of equipment that may be adjusted to fit a bariatric patient. Liebert (2007) further enforces the aspects that a larger sized stretcher alone is not acceptable, for many large sized EMS stretchers or EMS equipment devices are not oversized to fit the bariatric patient and thus specially designed bariatric equipment must be used (Liebert, 2007, p. 20).

Figure 4. Stryker Normal EMS Stretcher. (Stryker, 2015)
The normal EMS stretcher in Figure 4 above, is 23 inches wide and can support between 400 and 525 pounds and allow for up to six personnel to lift and manipulate the device. Unfortunately, bariatric patients can weigh more than 700 pounds and be more than 55 inches wide, or over twice the size of a normal EMS stretcher (Collopy, 2012). It is reasonable to assume that any patient over 350 pounds will not properly fit on a normal everyday EMS stretcher.

Solving the stretcher issue is clearly done by purchasing a bariatric EMS stretcher, seen in Figure 5 which can have a width of 30 to 40 inches and a capacity of holding 1,500 pounds. The issue with the purchase of a bariatric stretcher, is the cost. Stryker EMS (2015) provided a quote of $10,000 for each stretcher (Stryker Medical, 2015). There are then additional costs associated with other equipment needed to remove patients from a house, *i.e.* up and down stairs, through small doorways, etc. As a result EMS systems will need more than just the stretcher to remove a bariatric patient from a home, thus adding more costs by purchasing other devices to move patients.

When a bariatric patient is in a home or residence that a stretcher cannot be rolled into, and there are complex issues such as stairways, narrow door sizes, and a need to lift the patient to allow for movement of the patient to the stretcher, it is imperative to have other types of bariatric
moving equipment. In such cases, the University of Wisconsin Hospitals and Clinics (2009) recommends that other types of bariatric equipment must be available to allow for safe and dignified movement of the bariatric patient (University of Wisconsin Hospitals and Clinics, 2009).

Other types of equipment can include a Hover Jack EMS evacuation device seen in Figure 6 below and Hover Matt devices that use air mattress systems to lift and move patients from a specific location in a supine position. These systems provide a low center of gravity, and allow for a more controlled and less stressful movement for the patient and the EMS providers (University of Wisconsin Hospitals and Clinics, 2009). The Hover Jack Systems from Hover Tech International is a safe-patient-movement system, which has become a best practice in hospitals and other healthcare facilities. It has currently been adopted for EMS use in the prehospital setting (Haber, 2008). The Hover Tech Jack and Matt, as seen in Figure 6, are inflatable cushions that lift a patient to assist moving a patient from a floor or a bed to a

![Hover Jack Evacuation device and Hover Matt](Hover Tech Inc., 2016)
stretcher for further transport (Hover Tech, 2016). The Hover Jack requires no lifting by EMS personnel, just sliding and centering the patient onto the Hover Matt and Jack devices, and then using the pneumatic air systems to lift the patient to proper levels to move the patient to a stretcher device (Hover Tech, 2016). Additionally, the Hover Jack EMS Evacuation System (2016) can be used to move a patient from a home, down stairs, and over rough terrain to level areas where a stretcher can be deployed (Hover Tech, 2016). The cost factor for a Hover Jack EMS evacuation device is approximately $7,500 per unit as per a price quote from Quad Med Inc. (Quad Med Inc., 2015). The additional equipment can become a financial concern for many EMS systems. Although, Haber (2008) states that the Hover Jack system may be costly for an EMS system, he also states that the cost of preventing injuries may outweigh the cost of purchasing such a device (Haber, 2008).

Another device which is low tech compared to the Hover Jack system, is a PVC vinyl, canvas and seat belt webbing device called a ManSac or Bariatric Tarpaulin (Ludwig, 2012).

Figure 7: Stryker Transfer Flat or Bariatric Tarpaulin (Stryker, 2015)
Ludwig (2012) describes the Bariatric Transfer Flat as seen in Figure 7, as an easily used device that, can be handled by up to 10 EMS providers. So it is manpower intensive, but much cheaper than the Hover Jack (Ludwig, 2012). The cost per Stryker EMS (2015) is approximately $700 per unit. The down-side to using this device is that the patient must be moved in a supine position, which may cause compromised airway control and patient discomfort, which may stress the patient and cause other medical complications (Stryker EMS, 2015). The ManSac or Bariatric Tarpaulin may be cost effective and is an easily used device, but it has drawbacks involving stresses that cause health issues with regard to the patients, and is not the optimal choice in most cases for movement of a bariatric patient unless there is a time sensitive factor involving the patient health. Other issues with the ManSac include the fact that in the past it was used to move patients out of homes and then place them on the floor of the ambulance. Thus, producing a transport process that is not acceptable by state and national ambulance transport and care standards that produces unsafe practices for the patient’s health plus a liability for the ambulance service (Ludwig, 2012). Although, the ManSac is not an optimal choice, when time is of the essence and the patient needs to be rapidly moved due to critical healthcare issues, the ManSac or Bariatric Tarpaulin/Transfer Flat may be the appropriate choice.

Other devices that may be needed or obtained to assist with bariatric patients are air or hydraulic ambulance lift systems, ramp systems for ambulances, bariatric back boards, bariatric CPR boards, electric winching systems and specially designed ambulances. Barashansky (2012) discussed that basic ramp systems as seen in Figure 8 are the generalized devices purchased
by most EMS systems when setting up bariatric programs (Barishansky, 2012). They are easy to use and relatively low cost at approximately $7,500 per ramping system (Barishansky, 2012).

A ramp system consists of a set of ramps, with up to 2,000 pounds capacity, a ramp mounting plate, a winch with 2,400-pound capacity and a wire harness to power the winch. A basic bariatric-equipped EMS agency has a bariatric stretcher only, and therefore must use up to six personnel to lift the patient and stretcher into an ambulance. This could be a safety concern due to the process of lifting a patient and stretcher into an ambulance, and may cause other issues, such as when there is capacity fatigue of the EMS personnel, instability of the lift, and possibly injury to a patient or provider. A bariatric stretcher is usually handled by up to six EMS personnel to lift into an ambulance. This is because there is a physical limitation on the number of providers who can properly position themselves around the stretcher and subsequently stabilize, lift and move the patient. The limitations make for a liability to the EMS system and the patient, thus producing unsafe processes. Per the position description paper for EMT’s and basic life support providers from the Virginia OEMS, a single EMS provider can lift a maximum of 125 pounds (Virginia Office of EMS, 2012). Using the maximum personnel that can fit
around a bariatric stretcher as six, and accounting for the weight of the stretcher being 168 pounds, the maximum capacity for a lift is 650 pounds. Due to the lift capacities noted above, Collopy recommends that when EMS personnel encounter patients weighing more than 650 pounds, bariatric ramp systems be used to enhance the safety for the bariatric patients and the EMS personnel (Collopy, 2012).

Another device that has been used by many EMS systems for moving bariatric patients in specific medical conditions are backboards. The use of backboards for the general population has been a mainstay for years in the EMS world. Backboards have been used for patients that have had traumatic injuries including compound injuries, neck injuries and back injuries. Recent medical science has provided a new era for EMS that has produced less use of back boards for immobilization during specific traumas and other medical conditions. The National Association of EMS Physicians (2013) has provided a position statement that has slowed the use of backboards for the majority of trauma patients, due to untoward complications that backboards produce (NAEMSP, 2013). The complications are related to a patient being immobilized on a backboard that produces untoward affects, such as pain, agitation, respiratory compromise and decreased tissue perfusion, that can be life threatening or produce long-term disabilities (NAEMSP, 2013).

Additionally, the sizes of standard backboards as seen in Figure 9, are for non-bariatric patients. They are usually 72 inches long by 16 inches wide and can hold up to 400 pounds (FERNO, 2016). The standard backboards are small in size compared to a bariatric patient. The issues with the standard backboard are that they are too narrow, not capable of the weight capacity and do not provide appropriate positioning on or under a bariatric patient. Although,
the standard equipment is not made for bariatric patients there are medical supply businesses that provide bariatric type equipment. Bariatric or sports backboards as seen in Figure 10 are...
inches long and 26 inches wide with weight capacity of 1,000 pounds (FERNO, 2016). The bariatric backboards are wider and have a larger capacity than standard backboards, but 26 inches wide is still a smaller size than many bariatric patients and will involve the use of more strapping and padding to immobilize the patient to the backboard. Furthermore, the Washington State EMS Office (2006) has stated that use of backboards for bariatric patients is not recommended due to the complication issues. Instead they recommend the use of the Hover Jack, Hover Matt and other packing material to effectively reduce movement of c-spine and back (Washington State EMS Office, 2006).

Another device that can be used is a Bariatric CPR board or Bari-Board, for CPR situations. The Bari-Boards are 27 inches long and 19 inches wide as seen in Figure 11. The Bari-Boards are designed to fit the anatomy and physiological contours of a bariatric patient’s physical characteristics, providing support for the spine and torso (Moore Medical, 2016). This support of the torso and spine during chest compressions allows for more effective chest compressions during cardiac arrest. Standard CPR boards for non-bariatric patients are only 23 inches by 17 inches, as seen in Figure 12, with no specific weight limit and would not fit the contours of a bariatric patient’s torso or spine, because the design is for standard non-bariatric patients (Moore Medical, 2016).
In some demographic areas of the United States that have high call volumes for bariatric patients, some EMS systems have purchased fully equipped bariatric ambulances with air or hydraulic lifting systems. At a cost of approximately $250,000, this would be financially irresponsible for most EMS systems (Barishansky, 2012). Barishansky (2012) provides another option that is less costly for EMS systems that already have a bariatric stretcher and Hover Jack system. Providing a retrofit process to set ramps and ensure space in the patient compartment of an older ambulance in their fleet can be completed for approximately $5,000 (Barishansky,
This provides a more cost effective option, but other issues come with ambulance transportation standards and the capabilities of older ambulance units due to wear and tear. The overall bariatric ambulance can be an option for some systems that have high call volumes for bariatric patients and the financial capabilities to purchase such units, but can be a large challenge for most EMS systems due to cost and lack of call volumes.

Again, the challenge with bariatric devices becomes the cost of purchasing and a need for additional manpower over the normal ambulance crew size to safely use the devices to move the patients. Cost to EMS agencies will drive the availability of such devices, but will not stop the need to have these devices in times of emergency. It is incumbent upon the EMS agencies to make purchases and/or enter into an agreement with mutual aid agencies to help serve bariatric populations.

**Work environment issues when dealing with bariatric patients**

The work environment for EMS personnel is an area that needs to be addressed and discussed for there is just a small amount of information available on this topic. The Australian Safety and Compensation Council (2009) advocates for EMS personnel when dealing with safety factors (Australian Safety and Compensation Council, 2009). The work environment for EMS personnel can be in any atmosphere and environment imaginable, due to the nature of humans being anywhere, at any time, even when health crises occur. The degree of control in any work environment can influence the outcomes for both the patients and the EMS providers (Australian Safety and Compensation Council, 2009). Due to the large facet of environments that EMS personnel may be put into when dealing with bariatric patients, it is necessary to remember that EMS personnel safety and patient safety is imperative to any situation.
When encountering bariatric patients in the prehospital setting, EMS personnel should expect to deal with environmental factors, including dwelling and building limitations, poor atmospheric conditions, entrapment conditions within structures or in vehicles, entrapment in other objects, and patients in other uncontrolled environments (Australian Safety and Compensation Council, 2009). The need for equipment to be portable, diverse, and capable of use in a multitude of environments is key to a good bariatric transport program. The equipment must also have the capacity to function appropriately to safely move bariatric patients. Transport vehicles, such as ambulances need to be capable of handling extra weight and have sufficient space for the patient and the EMS crews (Australian Safety and Compensation Council, 2009).

Additionally, O’Hara (2015) discusses that an environment of education, training, and patient/provider focus of safety must be provided to ensure up-to-date operational algorithms and care plans for bariatric patients (O’Hara, 2015). O’Hara further encourages EMS systems to ensure and encourage continuous training and educational programs to enhance critical decision making skills in regard to bariatric care and transportation interactions (O’Hara, 2015). Critical thinking skills and decision making will assist the personnel at a bariatric EMS incident to make appropriate decisions on how to properly care for and transport the patient to the hospital.

Lansing (2009) encouraged an environment of respect and sensitivity towards any patient which includes not allowing prejudice to enter into the behavior of providers during a bariatric patient encounter (Lansing, 2009).

The protection of the dignity and privacy of a bariatric patient is another best practice to follow to help ensure that a patient is not discriminated against or put off by being embarrassed due to their health circumstances (Lansing, 2009).
Training for bariatric patient safe care and transport

As it is with any medical and EMS practice, personnel need to have primary and continuous education and training to keep up-to-date and sharp with their psychomotor and critical thinking skills to properly treat and transport patients. Internet research on the topic of training for bariatrics produced very few true articles based on the specifics of bariatrics, but provided a broad scope of education and training articles involved in EMS practice and many bariatric articles that had some basic comments on how to train for bariatric transport. The articles provided a direction for educational and training programs and using the national EMS education standards any EMS agency could design a training and education program for bariatric transport.

The National Highway and Traffic Safety Administration or NHTSA, is the leading federal agency for EMS programs in the United States. NHTSA has produced the National Emergency Medical Services Education Standards for all levels of EMS providers (NHTSA, 2009). The EMS education standards for a special needs patient population with special challenges includes bariatric type patients (NHTSA, 2009). NHTSA’s educational standards provide basic topics to lecture and provide in the classroom, as well as some basic skills using the equipment that is available at the specific agency. The standards are very broad to cover the scope of bariatric care practices and are provided so local EMS agencies can narrow down the educational offerings based on the needs of the specific agency and the equipment they choose.

Due to the difficulty and challenges in transporting bariatric patients, many groups recommend that EMS personnel undergo proper initial and yearly training, including the use of specific equipment, proper lifting techniques and overall bariatric medical pathologies and practices (Indiana Department of Homeland Security, 2009). The basic cognitive material and
psychomotor skills for the use of EMS bariatric equipment and a scenario and skills practice should be provided as an initial program so that EMS personnel can achieve competency in bariatric care and transport skills (NHTSA, 1996, pg., 23).

Additionally, the companies who sell and provide bariatric equipment have education and training materials that can be used in the training sessions. Stryker EMS has online videos that show the uses of the stretcher and bariatric tarpaulin, and Hover Tech has videos showing complete operations of the Hover Jack and Matt systems. Each of these videos have been made for use by owners of the specific equipment to train personnel on the use of the devices. The use of the videos or web-based media can enhance opportunities for all personnel, thus allowing the initial cognitive material to be provided in a web based format, and then provide in-person skill sessions to cover psychomotor skills. This process is called a blended learning model, and is a best practice that has been adopted as an alternative means of educating people in the medical field by multiple EMS certifying agencies including the National Registry of EMTs (NREMT, 2016). Furthermore, continuing education through regular station trainings and EMS refreshers should be provided to ensure that the personnel keep up-to-date with the use of the equipment, new skills, and cognitive material on bariatrics.

**Best practices for safe bariatric transport and response**

Patient and personnel safety is the key to any EMS program. Bariatric patients are especially challenging due to their size and the awkward shapes of their bodies creating a lack of hand holds when lifting and moving the patient, as well as the medical conditions they present. Galinsky (2010), in an article in *Rehabilitative Nursing*, discusses how bariatric patients are high risk type patients, with increased risks for both the patient and the medical personnel involved in the patient’s care (Galinsky, 2010). Bariatric patients are often in need of medical care due to an
acute medical issue, and additionally need transport to a medical facility for definitive care. Unfortunately, the moving process of a bariatric patient could complicate the current condition of the patient, which adds risk to the patient’s wellbeing.

As for the EMS or medical personnel, they are at risk of overexertion injuries when lifting and moving such large weights and must be properly prepared to deal with such incidents. Galinsky (2010) explains that patient handling and lifting tasks are the number one cause of back injuries among healthcare workers, even under the best circumstances (Galinsky, 2010). This information is key to assuring that safe practices and proper equipment are used when moving and transporting bariatric patients.

Galinsky (2010) in his article advocates for the use of proper equipment, which has shown decreases in injuries for both healthcare workers and patients and produces less stress on bariatric patients during times of illness or injury. Additionally, Nelson (2006) discusses the need to use proper lifting and moving techniques as well as having sufficient proper resources, such as manpower, to help prevent injuries. It is evident that the key to bariatric programs is to push for safe practices, including acquiring proper equipment, training personnel appropriately, and making a culture of safety within the organization.

One of Haber’s (2008a, p. 74) primary safe practices is for EMS personnel to realize one’s own personal capacities, and realizing that it is important to ensure that the capabilities of the combined staff at an incident can handle the weights of the patients put in front of them for care and transport (Haber, 2008a, p. 74). Additionally, EMS personnel need to ensure that when the capabilities of the crews on a call are not able to handle the size of the patient, additional manpower, help, or other resources should be requested.
Another process for safe practice for bariatric transport is using work control practices and strategies, to ensure the use of proper mechanical devices to assist in moving patients, versus handling patients with equipment not designed for bariatric use (Nelson, 2006, p. 369). Additionally, as part of the bariatric patient moving process, assessing the patient’s capability to ambulate on their own or with assistance, versus lifting and carrying the patient is important. This can be beneficial if the patient is stable and able to ambulate, thus reducing further risk on personnel and the patient (Presence Regional EMS, 2015). Furthermore, before attempting to move the patient, EMS providers should ask the patient for their input on what has been the best way to move him or her.

Another safe practice for EMS personnel to decrease the risk of tipping stretchers over while loaded with a bariatric patient, is to ensure that the patient does not hang over the sides of the stretcher. To ensure that the patient is not hanging over the sides of the stretcher, Collopy (2012) advocates for the use of the proper sized capacity stretcher, deploying proper strapping systems, and using binder devices to hold the patient on the stretcher.

Another safe practice that Collopy advocates is planning out the lift and move of the patient, and ensuring that the path is clear and capable of allowing the patient and crew to pass through (Collopy, 2012). This includes using safety officers to assist in directing the lifting and carrying crews to ensure they can move through specific pathways unfettered.

Local challenges and needs for bariatric transport

The primary challenges that affects Loudoun County, Virginia, are similar to the challenges affecting the remainder of the United States. The Loudoun County Health Department set up a Community Health Plan for the county and has been working through community groups to improve health practices in the county. The County Health Department did
a countywide survey and found that 20.9 percent of the respondents stated that obesity is a health concern in the county (Loudoun County Health Department, 2016). Obesity increases the prevalence of many medical conditions, and thus, increases the call volumes for EMS responses to bariatric patients. With the increase in call volumes comes the increased need for training and education to ensure that all EMS personnel are up-to-date on bariatric emergencies and how to transport and move bariatric patients. Additionally, each call for a bariatric patient will become more complicated, for more people are calling EMS and for more acute and critical medical reasons (Collopy, 2012).

The Virginia Health Department (2013) provides data that Loudoun County, Virginia, has a 20 percent obese population of the stated total population in 2013 of 349,679, which is a total obese population of 69,935 people living in Loudoun County (Virginia Department of Health, 2016). The data also showed a yearly increase of approximately one percent for each year starting from 2011 to 2013 (Virginia Department of Health, 2016). This shows a steady increase of obese patients and thus increases the possibilities of EMS interacting with obese patients.

A 2015 collection of data from the Loudoun County Volunteer Rescue Squad or LCVRS, EMS call logs, showed 1,600 total EMS calls run by the volunteer members, of which 185 involved patients that weighed more than 350 pounds. This represents 12 percent of calls, showing a need for bariatric equipment and transport policies (LCVRS, 2015) and which represents one out of 16 fire and EMS agencies in Loudoun County. The big issue related to further data for bariatric patients or weight numbers, is that before 2015, LCVRS did not require weight data collection for each patient. This data could be a beneficial piece of information that could drive other programs and enhance our research on further needs of a bariatric program.
Although we are lacking data countywide, we can use the total number of EMS calls countywide for 2015, which was approximately 21,000 (Loudoun County Fire Rescue), and use the 12 percent number from the one agency, LCVRS weight collection data, and thus we can surmise that approximately 2,520 patients can potentially be bariatric patients in Loudoun County in a one year time period. This number of 2,520 bariatric patients constitutes a large number of EMS runs and will impact the community and EMS system substantially.

Another challenge for local EMS personnel in Loudoun County will be the need to understand and realize that bariatric type patient care scenarios will slow down scene operations. Personnel will need to realize that additional help and resources will be required to move and treat these types of patients. The calling for and setting up of the proper resources alone will add time to a bariatric incident. Then there will be a need to add additional time to move the patient safely to the ambulance and transport the patient to the hospital. Call length for a bariatric response will increase normal call lengths by three or four times (Collopy, 2012).

A further challenge is the fact that each call will require more resources, both equipment and personnel for each incident. An average EMS response in Loudoun County is a single ambulance with two personnel, and an engine or truck company with three personnel, equaling five personnel. A usual bariatric call response will need at least four to five more personnel in addition to the primary EMS response manpower levels, to deal with the care and transport of a bariatric patient based on aspects related with the Virginia Office of EMS (2012) Functional Position Description for the Basic Life providers (Virginia Office of EMS, 2012).

Additional challenges include the need to have an organized plan, proper equipment, dispatch algorithm, and training approach to initiate a bariatric response plan, none of which are currently in place. The plan and approach are being discussed and researched within this project
Proper equipment is a requirement of any bariatric program in order to provide safe EMS practices. There currently is an equipment supply within the countywide system at three EMS stations, one at Station 13, one at Station 15 and one at Station 23. Each set of equipment is similar, with a Stryker bariatric stretcher, a Hover Tech Evacuation Jack, a Hover Matt, the air system for the Hover Tech units, and additional straps and packaging material. Additionally, the set up at Station 15 has a ramp system, and the other two do not. Knowing the current equipment supply we will need to evaluate the need for other equipment or whether to add additional ramp systems to the other two stations.

Another need is to have a dispatch algorithm to ensure proper dispatch procedures of the closest bariatric equipment and the proper quantity or resources. The Loudoun County Fire and Rescue Communications Division is a centralized dispatch center for the county, and is currently using a GPS dispatch program to set up the dispatch cards and algorithm. They are doing this by adding in the new bariatric equipment locations into the algorithm to achieve a proper dispatch process. The dispatch process will be ready soon and will become part of the overall plan process. Nelson (2006) advocates the use of preplanning, proper plans and administrative controls to ensure proper management and safe practice of bariatric programs. The above algorithm is a key administrative control to ensure safe and proper EMS and bariatric practices.

Training challenges will be a small but significant part for the Loudoun County Fire and Rescue system upgrade to bariatric response. LCFR has a large quantity of training and educational programs and uses state of the art Learning Management Systems or LMS. Using Stryker Stretcher and Hover Tech videos, we can place them online to allow for web based video training and then allow time for in-person skills practice, while personnel are on duty. This process may be challenging due to adding two to three hours of training time per each member of
the system, which is more than 1,000 people, but it can be incorporated into the generalized EMS
training program, thus decreasing cost issues for career personnel.

Due to the comprehensive research on this topic it is felt that bariatric planning or LCFR
is well-understood (i.e. all challenges identified), however we will keep an open eye to watch for
challenges as the bariatric program evolves and matures.

III. METHODOLOGY

The purpose of this project is to conduct an analysis of the need for bariatric transport
services within Loudoun County, Virginia, and to provide a best practices approach to a county-
wide bariatric response plan. This plan outlines the equipment, placement of equipment
geographically in the county, training of personnel, dispatch of resources, and the use of bariatric
equipment at the scene and during transport of a bariatric patient. Thus, the collected research
will be used to show the need for a bariatric transport program and to provide the details of an
organized county-wide bariatric transport program that is brought into action using best practices
and national standards.

To assess the need for and design of an EMS bariatric transport program for the Loudoun
County, Virginia, Combined Fire Rescue System, this study uses qualitative research methods to
examine best practices for bariatric medical transportation. The focus of the research is to
provide evaluation of programs from international, national and local sources. The research is
based on current best practices for bariatric transport and its variables, with regard to bariatric
transport equipment and policies. Additionally, the research examines both the currently
available resources within Loudoun County, and resources that can be acquired for a bariatric
transport program. Furthermore, the research evaluates the current bariatric response policies
used by individual fire-rescue companies within Loudoun County to provide a consensus of
current practices. Additionally, the research evaluates dispatch algorithms for bariatric transport, and evaluates and designs, a county-wide policy and training program for bariatric transport.

**Data Collection Technique**

The research design and methodology for this project is based on qualitative data collection from multiple peer reviewed, scholastic, and professionally researched best practice literary sources; from specific EMS and medical organizations; and throughout international, national, State of Virginia, and Loudoun County organizations. The documents studied for this project are documents, reports, studies, and journals, found in the public domain.

Additionally, information on current EMS practices within the Loudoun County Fire Rescue system is correlated with research data to allow for building concepts for the policy and training program design to be acceptable and adaptable to the Loudoun County Fire Rescue System. This process provides data from multiple government, healthcare and private organizations related to bariatric care, which allows for correlation and analysis of the data and topics, and sets the direction of the plan. Multiple sources related to EMS and healthcare are used to relate topics of bariatric transport, lifting and moving, as well as bariatric care, to set the themes for the data and allow correlation with set subjects to be analyzed.

Multiple internet searches using multiple word combinations with regard to bariatric, EMS, medical, transport, and care were completed, and specific documents with primary topic material were used to provide references for the research. More than 200 documents were found in the primary searches that provided relevance to the study, and of these more than 70 were used for the project. Additionally, Loudoun County data was provided by Loudoun County Fire Rescue stations and companies, allowing for a full evaluation of bariatric equipment and correlation of current county assets, as they relate to other programs internationally.
Subjects and Setting

The study process was placed into categories to be used as assessment tools to conduct the qualitative process, addressing the following topics to help produce the study:

1. Show that there is a need for bariatric response based on national statistics and local demographics.
2. Define levels, types, and quantity of equipment that should be included in a response plan based on local needs and national best practices.
3. Define the proper use and dispatch of properly located resources within the county.
4. Establish a dispatch algorithm for resource requests or automatic dispatch based on local needs and geographic placement of assets.
5. Define the criteria for which patients require a bariatric automatic response, based on national best practices and local data.
6. Define what expectations are needed for the county in reference to bariatric EMS response.
7. Define the training needs for county personnel.
8. Define standard operating guidelines for bariatric response.
9. Set a timeline to accomplish this plan.

The use of these categories as evaluation tools, helped to define the words used in the internet searches and to better narrow the overall research documentation. Additionally, using the above stated specific overall categories, separate, but similar context categories were used in the literature review to further define specific parts of the research. The literature review categories broke down the categories above into more conceptual categories to provide more basic concepts.
of the research. The literature categories for analyzing the data and to reach our goals were as follows:

1. Meaning of “bariatric” and “obesity”.
2. Define an obese or bariatric patient.
3. Prevalence of obesity in the Loudoun community.
4. Impact of obesity and bariatric patients on EMS.
5. Equipment challenges for bariatric patient safe care.
6. Work environment issues when dealing with bariatric patients.
7. Training for bariatric patient safe care and transport.
8. Best practices for bariatric transport and response.
9. Local challenges and needs for bariatric transport.

The primary set of categories correlate to the secondary set of categories to fully define the specific material studies, and to match the goals of the research and project to thus define the goals of this study.

**Statistical Analysis**

The analysis included using the data and reference material to comparatively examine best practice concepts being used currently or historically in other EMS systems. The categorization assessment tools of the specific topics allowed for an in-depth analysis of each topic area being studied and provided for a comprehensive review and correlation of concepts of bariatric transport and current EMS practices and how they can be used in the Loudoun County Combined Fire Rescue System.
Limitations of the Study

A few limitations were identified during the examination of the data and research documents. First, the main information of this study is based on newer material and studies, compared to other medical areas of study. EMS is a new field within medicine with a history of approximately 50 years and bariatric transport programs have an even shorter history, with approximately 25 years. The scientific study of bariatric transport programs, has been based around empirical data versus scientific data, thus the majority of the data on bariatric EMS transport is based on historical experiences, and each author or researcher could interpret the same data differently based on their personal viewpoints. This was witnessed in some of the documents that were researched and provided some directional moves to work within specific documents and rule out other sources.

Another limitation is related to the first limitation, for a percentage of the data collected for this study did not originate in the EMS field, but in other medical, public safety or public health fields. The research was not directed at EMS processes, but on the broader scale of healthcare. This was a good limitation, in that it provided a broader scope of practice and the integration of healthcare as a whole, but on the other hand, limiting the research material to non-EMS topics and concepts provides limited scientific EMS references, and puts some of the policies in question by professional EMS personnel.

A final limitation that was identified was the lack of EMS documentation and data related to patient weights to show the need for a bariatric program in the Loudoun County Combined Fire Rescue system. When looking to study Loudoun County’s patient care reports to pull specific data for the annual call volume of bariatric patients, it was found that less than 10 percent of patient care reports county-wide showed patient weight. This limitation pushed the
data collection to be broader to one extent, using population and health system data from the United States census and state health department data to show potential call volumes based on correlations of population and population categories, such as obese populations for the specific geographic area of Loudoun County. Then using the population correlation with percentages of obesity from state and nation-wide geographic areas, a presumed prevalence of obese patients per year and per geographic area was provided. Additionally, one specific EMS agency, Loudoun County Volunteer Rescue Squad, had captured weights during 2015 in their patient care reports. This specific single company, with a call volume that is approximately 10 percent of the county-wide total call volume, was correlated using ratios to show that there is a need for a bariatric transport program. This limitation also provided a part of the overall proposed policy, as seen in Appendix A, by making one of the policy statements that signifies that all EMS personnel will document patient weights on their patient care reports.

IV. Results and Discussion

The overall project involved a twofold process, including the use of literature review research and analysis of best practices by the author, and the use of a committee process as part of the Loudoun County EMS Operations Committee to ensure involvement of the stakeholders involved with the EMS operations and transparency of the countywide EMS policies and procedures. The committee was designated the Bariatric Response Sub-Committee of the EMS Operations Committee for the Loudoun County Combined Fire Rescue System. The committee consisted of three people, one from each station that would have bariatric equipment as a part of their response package. The author of this document was appointed the chairman of the committee, and was responsible for the majority of the research, while the other two members would provide direction and input from their specific stations and companies to allow for a
project that was transparent and included involvement across the companies involved and the county-wide EMS system. This process provided for an organized approach to make changes to a large county-wide fire and rescue system and allow for buy-in from the companies involved in a more informed manner.

The results of the study were broken into nine categories for the literature review and then each of these categories broadened to nine more categories to achieve the goals of the study and project. The first nine questions have been correlated with the second nine categories and placed into seven specific discussion point categories to allow for analysis of the data and a discussion of the results.

**Define obese and bariatric, and define what constitutes a bariatric patient.**

The first discussion point category that was examined was to define the words “bariatric” and “obese”. The need to provide a definition for these words is a starting point of understanding of the overall project and study. The study used basic dictionary and medical dictionary definitions to define these two words. The medical dictionary and general dictionary had no differences in definition. Furthermore, the use of the words within the EMS system and medical community correlated with the definitions, and thus for the study Merriam-Webster’s Dictionary (2016b) provided the definition for “obese” and “bariatric”.

The reason to define the words “bariatric” and “obese” was to set the standard and assist in defining what constitutes an obese and bariatric patient. Also, to set the standard of the category allows for standardization of the study and bases this on a set national best practices related to the same definitions, thus preventing some limitations of the data for study.

Using material from the study, we pulled multiple best practice documents from practice programs on bariatrics, and looked at how these groups defined what constitutes a bariatric
It was found that all of the EMS and healthcare groups used the World Health Organizations or WHO, tenth edition of the International Classification of Diseases or ICD10 to set the standards defining bariatric patients. Having the information from multiple best practice agencies and research studies, the data showed that the use of the ICD10 definition is an international best practice standard for defining what constitutes a bariatric patient and thus provides a means for the Loudoun County Combined Fire Rescue System to use the same definition. Furthermore, the ICD10 codes, provides a mechanism for ambulance billing, since the Center for Medicare and Medicaid Services or CMS uses the ICD10 codes to set billing standards for the insurance industry (CMS, 2015).

The ICD10 defines a bariatric patient in multiple levels of weight and body mass indexes or BMI, to include three obese levels as it relates to healthcare. The WHO defines a BMI greater than 30 as obese, and greater than 40 as severely obese (WHO, 2000). The BMI correlates with body weights in excess of 100 pounds at the low end to over 300 pounds of body weight at the upper levels. This ICD10 process for medical billing and use of some medical equipment provides a standard for healthcare, but when defining acceptable standards for any EMS agency there is no set definition through the ICD10 codes. Thus the data from best practice bariatric groups like San Francisco EMS produced data points that most EMS agencies use 350 pounds and 26 inches in width as the definition of a bariatric patient (San Francisco EMS Agency, 2014). Each of the EMS agencies use the ICD10 data as a starting point, correlated BMI and weights of bariatric patients, and then examined the capacity of bariatric equipment and the capabilities of EMS personnel as it is based in the regulated position descriptions. Although the San Francisco EMS (2014) and ICD10 data corresponded with each other, a true clarification
based on what is declared a bariatric patient was not clear, thus the study looked at the operational process of lifting a patient.

The Commonwealth of Virginia Office of EMS sets the position description for EMS personnel, that each EMS personnel must be able to lift 125 pounds and 250 pounds with a second person (Virginia Office of EMS, 2012). This data helped to clarify setting 350 pounds as the defined weight for a bariatric patient. For a typical crew for an EMS call has three to four personnel, 350 pounds would be the highest weight that a four-person crew could safely move with normal EMS equipment and set by the position description set by the office of EMS. Additionally, the normal equipment provided for everyday EMS use has capacities much less than bariatric equipment and was also reviewed as part of the research and help to support using the 350 pound weight as a defined bariatric patient. Furthermore, using the width of the patient was also looked at, for it relates to the width of stretchers and equipment used, and found that everyday equipment has a mean width of 26 inches, while the bariatric equipment is wider.

The process of providing a definition of obesity and bariatrics set the pace of the study, and helped to set a definition of what a bariatric is, by using the variables to be correlated and then checked by best practice groups in order to ensure a best practice approach for Loudoun County Combined Fire Rescue.

**Show prevalence of obesity and the need for a bariatric program.**

The second discussion point and data category outlines the primary questions of prevalence of obesity in the community and needs of a bariatric program within the Loudoun County, Virginia. In the data and analysis of this category and question, data was collected related to prevalence of obesity in the Loudoun County community as well as the impact of obesity and bariatric patients on EMS.
It is very evident that internationally obesity has become a health issue, for 1.9 billion adults over the age of 18 are obese (WHO, 2016). The CDC shows that obesity is at 35 percent of the United States population, and has been an issue for over 20 years (Berger, 2007). The CDC also shows that the Commonwealth of Virginia currently has 28.5 percent of the population as obese, which is in line with national averages (U.S. CDC, 2016). Furthermore, per the Virginia Health Department, Loudoun County has 20 percent of the population that is obese. The numbers within the Commonwealth of Virginia and Loudoun County have also shown growth patterns of one percent per year over the last three years (Virginia Department of Health, 2016). The growth patterns and obesity numbers show significant numbers of the populace within the specific geographic areas that are obese and shows increasing and moderate prevalence that EMS personnel will encounter bariatric patients. This prevalence of obesity population increase correlates with other locations nationwide, as there is an increase in bariatric EMS calls due to the growth of obesity in the United States.

Another indicator as part of prevalence and increased population of obesity, is the increase in acute ailments from obesity. Obesity impacts the human body in various ways, including increases in heart disease, elevated cholesterol, sleep apnea, diabetes, infections, gallstones, depression, gout and immobility. These ailments increase the need for healthcare and transport of obese patients, thus increases the prevalence of bariatric needs for EMS systems.

A further indicator as a part of the need for a bariatric program is the need for appropriate equipment. Obese patients are larger in size and weight than normal everyday patients and need equipment that can accommodate the sizes of the patients. The normal day-to-day EMS equipment does not have the capacity or width to accommodate obese patients over 350 pounds and over 26 inches wide. To have equipment that is smaller in size can be uncomfortable and
complicate medical conditions, as well as place the patient and EMS providers at risk for injury.

An inventory of the Loudoun County Combined Fire Rescue system showed that there are three sets of bariatric equipment available at three stations throughout the county, for a system-wide bariatric response program. The sets of equipment have similar but different components, but are designed to cover the needs to provide bariatric response. Unfortunately, there were no set training programs, no policies for use, no dispatch algorithms and no coordination for county-wide use.

The data related to prevalence and then the evaluation of the Loudoun County Fire Rescue System showed that there is a definite need for a bariatric EMS transport program in Loudoun County, Virginia. The combination of potential patient contacts based on populations and increases in medical conditions for obesity, has proven that there is an increase of bariatric calls for EMS systems. Additionally, the evaluation of the Loudoun County Combined Fire Rescue system showed a current attempt to provide a bariatric service, but with no true need shown or any attempt to provide an organized system. To this point, the data has proven the need for an organized bariatric system that covers policy, dispatch, training, and collection of data for accountability and quality improvement to better enhance the EMS system within the county.

**Define equipment needs and challenges for safe transport and care.**

The research provided what types of bariatric equipment are available to be purchased from commercial medical companies. Due to bariatric transports being a new technology, there are few companies and fewer types of specific bariatric equipment available to be purchased, unlike multiple companies and types of equipment for normal EMS patients. Collecting the data on equipment showed the differences between everyday EMS equipment like stretchers,
backboards and other transport equipment, which showed the need for acquiring appropriate equipment with the capacity to deal with bariatric patients. Liebert, reinforced the need for proper equipment by saying, “using the aspect that a larger size stretcher will do, is not acceptable, for many large sized EMS stretchers or EMS equipment devices are not oversized to fit the capacity of bariatric patents and thus specially designed bariatric equipment should be used” (Liebert, 2007, p. 20). This evidence provided proof that specific bariatric stretchers should be used for bariatric patients. Each of the best practice systems including Presence Regional EMS System (2015), Washington State EMS (2006), Fairfax Fire and Rescue Department, and University of Wisconsin Hospitals and Clinics (2009), specifically use bariatric stretchers for bariatric transport.

Reviewing the data on specific bariatric equipment such as stretchers and transfer flats, as well as normal stretchers and transfer flats, then taking into consideration weights of patients above 350 pounds, it is evident that specific bariatric equipment is needed to provide sufficient capacity to deal with the extreme weights.

Additionally, it was evident from some best practice organizations like the University of Wisconsin Hospitals and Clinics, the appropriate bariatric equipment also provides safety and dignity for the patient when transporting them (University of Wisconsin Hospitals and Clinics, 2009). Furthermore, the use of proper equipment provides a safer work environment for EMS personnel, thus preventing injuries and risks that could affect personnel. The factors of providing a safer practice will benefit patients and personnel and thus provide a more cost effective and beneficial service to all involved.

Another part of the equipment best practices is to introduce new technologies using engineering as a matter for change and safer work environment that hadn’t been used before in
normal every day EMS functions. The use of engineering concepts to lift people versus using the brute strength of personnel allows mechanisms to prevent injuries, provide patient dignity, and provide a safer environment. A recent nationwide best practice for lifting and moving bariatric patients is the use of a Hover Jack and Matt system, by Hover Tech industries (Hover Tech Inc., 2016). The Hover Jack and Matt system includes inflatable cushions that lift a patient and assist in moving the patients from specific locations to a stretcher and ambulance. The use of the Hover Jack system limits EMS personnel from doing the lifting themselves and uses the engineered equipment as the device to take the weight of the patient, thus producing a safe environment for both the patient and the EMS providers. Additionally, the Hover Jack has the capability to move bariatric patients down stair-cases or over rough terrain, with minimal manpower, versus multiple people exerting themselves to manually move a patient (Hover Tech Inc., 2016).

Furthermore, due to the multitude of circumstances that bariatric patients are found in, having a tool box of other devices is desirable to provide proper transport and handling of bariatric patients. One device is a Transfer Flat or ManSac, a flat tarpaulin device with 12 handles around the device with a capacity of 1000 pounds (Stryker, 2015). In cases that the patient needs to be moved extremely fast and are in extreme conditions, this device can be rolled under the patient quickly and then the patient can be lifted by multiple EMS personnel to move to a better work environment. It is important that the EMS personnel understand that there are drawbacks to the use of this device involving stressors upon the patient that can cause untoward health conditions. Although, the Transfer Flat is manpower intensive, and could cause untoward health issues, having it available can be a benefit for circumstances that include rapid removal
and in cases where the Hover Jack cannot be deployed, which makes it a needed tool in the box for a bariatric transport program. It is considerably less expensive than other equipment.

Another device that should be part of a bariatric transport program is a bariatric ramp and winch system. The research has shown that multiple best practice agencies use bariatric ramp systems as a part of their bariatric transport tool boxes. The bariatric ramp system when deployed has a capacity of 2,000 pounds and can be used in a safe manner without lifting a patient into an ambulance and thus not exerting bodily force from the EMS personnel. Again, this tool is another engineered device to cut down on EMS personnel lifting and bodily stress, as well as provide a safe work environment for EMS personnel and patients. It was found that best practice agencies including the University of Wisconsin Hospitals and Clinics, use bariatric ramp systems when the patient exceeds 650 pounds (University of Wisconsin Hospitals and Clinics, 2009). The set weight of 650 pounds was used, because when a patient’s weight exceeded this, it also exceeded the capabilities of six EMS providers, which is the maximum that can effectively fit around a bariatric stretcher for lifting. Additionally, it was found that using the bariatric ramps also provided a more stable and easy move for the patient and did not place the patient and EMS personnel under undue bodily stress. This data was supported by Collopy, for he recommended that when EMS personnel encounter patients weighing more than 650 pounds it is recommended that bariatric ramps systems be used to enhance safety for the bariatric patient and the EMS personnel (Collopy, 2012).

Two other devices were researched and data collected on the use of backboards on bariatric patients. The data was from best practice groups and companies who make and sell the equipment. It was found that the general use of backboards for moving bariatric patients was not an acceptable practice, due to lack of capacity of the boards, being not of sufficient width, and
complication issues with regard to an increase of untoward health issues with the patients. The Washington State EMS Office made recommendation as a state-wide protocol that backboards not be used for bariatric patients due to health complications, but recommend the use of the Hover Jack with a collar or blank roll for cervical spine protection (Washington State EMS Office, 2006). Additionally, the Loudoun County Fire and Rescue Operations Medical Director recently published a new spine injury protocol that significantly cuts down on the use of backboards for all EMS patients, due to national trauma practices that have shown that most patients do not need backboards and the use of backboards can cause untoward medical issues to the patient (Loudoun County EMS, 2016). The data from the best practice groups and the policy form the LCCFRS Medical Director provides guidance that no backboards should be used as a device for bariatric transport.

Another issue that was produced by taking the use of backboards away for bariatric transport, was the need at times to have some type of rigid support under the patient’s body when doing cardiopulmonary resuscitation or CPR. To address this issue, research was provided to look at other best practice groups and what they are using for such circumstances. The Washington State EMS Office recommends that in cases of cardiac arrest and doing CPR, to use the Hover Jack device. When inflated at its lowest level it will be hardened and allow for a stiff surface on which to provide CPR (Washington State Office of EMS, 2006). Additionally, Moore Medical Company provides a bariatric CPR board or Bari-Board, which is a new concept and designed to fit the anatomy of a bariatric patient and provide support to the patient’s torso during CPR (Moore Medical, 2016). In researching the use of the Bari-Board it was found that it is new technology and is a reasonable device in cases of CPR and should be part of a bariatric equipment cache to provide another tool to provide best practices for bariatric transport.
In reviewing the data on equipment needs and challenges it was found that having the proper equipment is the safest and easiest process for providing quality care to bariatric patients. The safety concepts of this equipment benefit both the patients and the EMS personnel. One of the challenges of dealing with bariatric equipment was the cost factors of purchasing such equipment. A usual set of bariatric equipment will include a bariatric stretcher, Hover Jack and Matt system, a Transfer Flat, stretcher extension straps, bariatric ramp and winch system, and a Bari-board. This set of equipment costs approximately $30,000 per set and can be a stretch for many EMS agencies without outside help to purchase the devices. On the other hand, not having the equipment can be a liability upon the EMS agency, by denying a patient a safe practice, risking injury of personnel and possibly being liable for producing stress upon a patient and producing further health issues. The purchase and use of bariatric equipment will cut risk for the system, and provide best practices for bariatric patients and show the quality of care the EMS system has.

The evaluation of the Loudoun County Combined Fire Rescue System, showed that there are currently three sets of bariatric equipment available for response at three different locations. Each of the equipment locations has a bariatric stretcher, a Hover Jack and Matt system, a Transfer Flat, stretcher extension straps and accessories to adapt equipment to the ambulance. One location has a bariatric ramp and winch system and none have a Bari-board. The data from the best practice groups, and supported by Barishansky (2012), recommend that each bariatric set of equipment should have a bariatric stretcher, a Hover Jack and Matt system, a Transfer Flat, at least three stretcher extension straps, accessories to adapt bariatric equipment to the ambulance and a bariatric ramp and winch system (Barishansky, 2012). To meet these recommendations two sets of ramp and winch systems should be obtained for the two locations.
Define proper positioning and dispatch of bariatric equipment in the county.

The location of the bariatric resources need to be assessed to ensure that the equipment is readily available in strategically positioned locations to allow for rapid and appropriate response to bariatric calls. Loudoun County is 521 square miles of land mass, with a population of 375,629 in the Northern Virginia and National Capital area of the United States (Loudoun County Government, 2016). The county is bordered to the north by the Potomac River and the State of Maryland, on the south by Prince William and Fauquier counties in Virginia, the west by Clark County in Virginia and Jefferson County in West Virginia and the east by Fairfax County in Virginia. The county is made up of suburban and rural geographic areas, with the eastern most areas being suburban and having more populace, versus the western sections of the county being rural and more farm community.

Currently there are three locations of bariatric equipment stations, one in the Leesburg area of the county, which is in the middle of the county and two stations in the eastern part of the county within two miles of each other, one being in the Sterling area and the other being in the Broadlands area of the county, see Figure 13 below. This shows that Stations 13, 15/35 and 23 have bariatric equipment assigned for response. Each station is run by different EMS agencies.

The issue with the location of the equipment is that two locations are within two miles of each other and a large portion of the western part of Loudoun County is covered by one company that would have long response times. Taking into context that Station 13 houses Company 13 and is a volunteer organization, and only runs out of one station, and is in the middle of the county, this location should be left in place as a best strategic location. The Station 15/35 houses Company 15 and is a volunteer organization, which covers the Sterling area of the county which is in the eastern most part of the county. This location would also be strategic to leave the
Figure 13. Map of Loudoun County Current Bariatric Unit Locations (Loudoun County Fire Rescue, 2016)

bariatric equipment at that location. The Station 23, location houses Loudoun County Fire Rescue equipment and paid staff and can readily be moved to other Loudoun County Fire Rescue stations throughout the county. Being that there is a void of coverage on the west side of the county near the Round Hill or Purcellville area, and there are Loudoun County Fire Rescue Stations in Round Hill and Purcellville, it would be appropriate to move Station 23’s bariatric equipment to Loudoun County Fire Rescue Station 4 in the Round Hill section of the county or to the Purcellville Station 2/14 in the Purcellville. Additionally, using the communications dispatch division computer-aided dispatch geographic program, we found that having the two bariatric sets of equipment in the east provided multiple areas of the county being covered by two primary agencies. The best practices approach would be to have primary coverage for the complete county in a swift and comprehensive manner, versus packing one specific area with
resources and none in another area. The communications dispatch box system allows for closest resources based on box and geographic location and thus it will only allow dispatching the closest bariatric resources. This is seen below in a segment of the box alarm system excel spreadsheet. The algorithm shows a box or geographic area and then the first through ninth due rescue companies and bariatric unit response companies. The yellow outlined box is the closest bariatric units:

<table>
<thead>
<tr>
<th>Box</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
<th>7th</th>
<th>8th</th>
<th>9th</th>
</tr>
</thead>
<tbody>
<tr>
<td>60100</td>
<td>LCFR/LHC</td>
<td>LCFR/613</td>
<td>LCFR/620</td>
<td>LCFR/617</td>
<td>LCFR/605</td>
<td>LCFR/699</td>
<td>LCFR/622</td>
<td>LCFR/LHL</td>
<td>LCFR/614</td>
</tr>
<tr>
<td>60101K</td>
<td>LCFR/LHC</td>
<td>LCFR/601</td>
<td>LCFR/617</td>
<td>LCFR/605</td>
<td>LCFR/613</td>
<td>LCFR/620</td>
<td>LCFR/614</td>
<td>LCFR/699</td>
<td>LCFR/610</td>
</tr>
<tr>
<td>60102K</td>
<td>LCFR/LHC</td>
<td>LCFR/613</td>
<td>LCFR/617</td>
<td>LCFR/605</td>
<td>LCFR/620</td>
<td>LCFR/613</td>
<td>LCFR/622</td>
<td>LCFR/699</td>
<td>LCFR/617</td>
</tr>
<tr>
<td>60103K</td>
<td>LCFR/LHC</td>
<td>LCFR/601</td>
<td>LCFR/613</td>
<td>LCFR/617</td>
<td>LCFR/605</td>
<td>LCFR/614</td>
<td>LCFR/602</td>
<td>LCFR/699</td>
<td>LCFR/622</td>
</tr>
<tr>
<td>60104K</td>
<td>LCFR/LHC</td>
<td>LCFR/601</td>
<td>LCFR/613</td>
<td>LCFR/617</td>
<td>LCFR/605</td>
<td>LCFR/610</td>
<td>LCFR/614</td>
<td>LCFR/602</td>
<td>LCFR/699</td>
</tr>
<tr>
<td>60105K</td>
<td>LCFR/LHC</td>
<td>LCFR/601</td>
<td>LCFR/620</td>
<td>LCFR/613</td>
<td>LCFR/610</td>
<td>LCFR/622</td>
<td>LCFR/614</td>
<td>LCFR/602</td>
<td>LCFR/617</td>
</tr>
</tbody>
</table>

Figure 14. Dispatch algorithm. Provided by: LCFR Communication Division (Loudoun County Fire Rescue, 2016).

Due to the need to have coverage county-wide and proper coverage to the whole population of Loudoun County, the proposed locations are seen in Figure 15 below, which make the response system more strategically located to allow for swifter response for the western parts of the county and provide a more comprehensive coverage of Loudoun County for bariatric care and transport. The use of the box alarm geographical computer aided dispatch system seen in figure 14, by the county Communications Division, allows for a strategic and comprehensive dispatch of the closest and most appropriate EMS equipment for each call for help. Currently the dispatch system is programmed to dispatch bariatric equipment from the three locations at
Figure 15. Map of Loudoun County Proposed Bariatric Unit Locations (Loudoun County Fire Rescue, 2016).

Stations 13, 15 and 23. If and when the equipment at Station 23 is moved to the west side of the county as per this study’s recommendation, the county Communications Division can make a quick adjustment to the computer aided dispatch program and the system will then change the algorithm to include the new location of the bariatric equipment. This technology is currently used for all assets of the Loudoun County Combined Fire Rescue System and is very important to the placement and dispatch algorithm for this project. It should be accepted as the process for dispatch of any response addition to the fire rescue response system.

**Define work environment issues when dealing with bariatric patients.**

There was little information on this topic but, this topic was needed in order to address the needs of safety for the EMS personnel when dealing with bariatric patents. The information that was based on best practices for safety and work environments comes from an international source in Australia. As noted in earlier parts of the document, there is minimal documentation of this type of material, for the history of bariatrics in EMS is a short lived, and research on the
topic has been limited. In Australia, the Australian Safety and Compensation Council is actively researching EMS issues and advocates for EMS personnel when dealing with safety factors (Australian Safety and Compensation Council, 2009). EMS personnel can be in any atmosphere and environment imaginable, due to the nature of human behavior and what crises can occur. The Australian Safety and Compensation researched all aspects of environmental issues when EMS encounters bariatric patients and provides the following information. EMS personnel have multiple limitations put upon them when dealing with bariatric patients, and should use engineered equipment that is provided for bariatric use to cut down on the risk to the patients and the EMS personnel (Australian Safety and Compensation Council, 2009). The Australian Safety and Compensation Council advocates the use of proper equipment and transport vehicles to prevent safety hazards during a bariatric call for help.

Additionally, they advocate enhancing critical thinking skills of personnel to assure proper management for bariatric patients. Furthermore, they advocate the protection of the dignity and privacy of the patient to allow for patent care best practices. The overall intent is to provide a professional and quality driven bariatric program and to prevent injuries for patients and personnel. This information supports the need for proper bariatric equipment as well as for proper education and training for EMS personnel.

**Define training needs for the county EMS personnel.**

The research related to bariatric training is based in the national EMS Education Standards and national EMS Scope of Practice set by the National Highway and Traffic Safety Administration (NHTSA, 2009). The standards under special challenges patients cover bariatric type patients and provide for basic care and transport standards for all levels of EMS providers. The standards provide basic skills and lectures that are very broad as they relate to bariatrics and
it is seen that a more narrow focus of education and training is needed to ensure that the local bariatric programs goals are reached.

Due to the complexities of a bariatric response program, and challenges regarding transporting and moving bariatric patients, many best practice groups recommend that EMS personnel undergo an initial training program including awareness of bariatric lifting, moving and transport as well as a one to two-hour session involving hands-on use of the equipment and scenarios to allow for critical thinking processes. The Indiana Department of Homeland Security EMS Section supports bariatric transportation education initiatives, to ensure that best practices are provided for bariatric patients (Indiana Department of Homeland Security, 2009). The basic cognitive and psychomotor skill material would help to achieve primary competency with regard to bariatric lifting, moving and transport. As a part of training and educational programs, there should also be an annual refresher training program of at least one hour to ensure that EMS personnel retain cognitive and psychomotor skills related to bariatric patients. The use of the initial and refresher training can be used as a part of recertification continuing education as per NREMT standards (NREMT, 2016).

Due to the increased need for education and training topics that are required of EMS personnel, it is recommended that Loudoun County use a blended learning module type education program to provide initial and refresher training. The lecture and cognitive material can be provided via a web-based interactive learning system and then the psychomotor skills can be taught in a face-to-face setting, while working shift work. This will allow for staff to complete the web-based section at convenient times, before the skills training.
Define best practices for safe bariatric transport for Loudoun County.

Bariatric patients can be very complex when they need medical care, due to the comorbidities that the weight adds to a human body. Additionally, the main complexity is the excessive weights that this type of patient has, which becomes very manpower intensive and at times impedes the care of a patient. The excessive weight makes simple care practices like clearing and opening an airway very difficult. It will usually take one EMS provider to do these simple procedures, but due to the excessive weight it will take up to four providers to adjust the patient’s position to allow for manipulation of the airway to make corrections. Another part of the patient weight issue also relates to EMS provider overexertion injuries when lifting and moving such large weights. Although this does not necessarily directly affect the patient, it does cause personnel injuries and can be costly to the EMS organization as well as to the EMS provider, including the disability of an EMS provider. These two specific issues noted above drive the best practices for bariatric response programs, by emphasizing patient and personnel safety.

Addressing best practices for Loudoun County Combined Fire and Rescue System, our primary concerns will be related to the safety of patients and EMS personnel. The approach to ensure safe practices is based on three aspects, policies, engineered safety aspects, and training. The policies will set a standard for the whole system, the engineering aspects will ensure the use of equipment over brute strength, and training will ensure competencies of personnel. Haber (2008a, p. 74) emphasizes the need to ensure that our personnel know their own capabilities, before lifting and handling patients to ensure safety of the patient and the specific provider (Haber, 2008a, p. 74).
Using the first aspect of safe practices as policy, the use of the research within this document has assisted in the design and writing of a bariatric response policy as seen in Appendix A. The policy sets standards for bariatric response for the complete county-wide system, thus ensuring that all personnel are on the same focus and complete the aspects of the policies in a standard manner. Additionally, the policy provides direction of safe practices, communications/dispatch directions, equipment related policies, general deployment policies, and training requirements, which should be followed when dealing with bariatric type responses. As part of the communication and dispatch section of the policy in Appendix A, a deployment matrix was set in place to strategically set locations for bariatric equipment for maximum coverage of the county in a swift and timely manner.

The engineering safety aspects part of the project is based on the research that provided options of best practices used at specific healthcare organizations internationally, and provided as consideration for use in the Loudoun Fire Rescue System. In reviewing the equipment standards based on best practice groups, it was found that due to a combined fire and rescue system, all three locations within the county should have the same equipment. This is to standardize the equipment and make it easier for personnel to train on the equipment and for the equipment to be compatible across the system. Additionally, when researching the equipment, it was the intent to ensure that the equipment would take the risk of injury off the EMS providers, and provide a safe atmosphere for the patients. In part, the equipment needs to be capable of dealing with the weights that may be encountered, thus the sturdiest and best-made products should be used, based on best practice organizations. Taking specific information from four different best practice groups, including Presence Regional EMS, Fairfax County Fire and Rescue, San Francisco EMS, and Washington State Office of EMS, the LC-CFRS Bariatric
Countywide Bariatric Response Plan for Loudoun County, Virginia Fire and Rescue

62

Committee researched, tested and discussed the equipment best practices and decided on the specific equipment to be placed at each location. As a part of the policy and the equipment and training manual the specific equipment with the capacities are listed and provided for all system members to review. This provided for a standardization of county-wide equipment, and provided a process for specific equipment to be used versus use brute strength when encountering and needing to lift and move bariatric patients. See the Bariatric Response Policy in Appendix A, and the Bariatric Response Equipment and Training Manual in Appendix B.

The third and final aspect of the project was the training and educational process. As it is with all medical career paths, there is a specific need for education and training on new technologies to stay up-to-date on specific medical practices. In this area of the project the current education and training system was evaluated and it was found there was a lack of bariatric type training. That, along with the introduction of new technology, all called for new initial educational and training opportunities and additional continuing education on an annual basis. Based on the NREMT’s continuing educational standards it was proposed in the policy and the equipment and training manual to have an initial training of at least two hours, of which one hour is didactic and knowledge-based and the other hour being practical skills training to allow for hands on use of the new equipment. This allowed for each EMS provider to earn continuing medical education hours for their own certification while helping to enhance the EMS system.

The use of the process of using policies, engineered safety aspects, and training as a way to approach the needs of the system for bariatric response allowed for the coverage of the needs for the system and the goals set by this project and the county EMS Operations Committee. The three aspects covered the writing of the policy, covering the training and equipment needs, and
achieving goals of safe patient and personnel environment and thus provided for a best practice bariatric program.

VI. Summary and Recommendations

The use of the literature review and best practices analysis of the current Loudoun County EMS system using a committee process brought together a diverse EMS system. The process allowed for a research project that was based on answering specific questions to bring together a conclusion for the needs and operations of a countywide bariatric transport program.

The research process used evaluations of the current Loudoun County EMS system, and compared the outcomes with multiple national and international best practice organizations, to provide a consensus of needs for Loudoun County. Additionally, specifics of the research and the evaluation process highlighted more questions to be researched and sought out to define the needs of a new system, as well as a path to operations. The committee process, literature research and comparison of best practices organizations provided an overall consensus that a bariatric transport program is needed for Loudoun County and should be based on international bariatric best practices.

The basis of need for a bariatric transport program for Loudoun County, was determined by evaluating the current countywide EMS system and its equipment, as well as call volumes and international trends of obesity and bariatric patients. The population increases in Loudoun County showed a large number of obese people within the county and comparing the local numbers of obese people with nationwide numbers showed a correlation of prevalence of increased bariatric patient call volumes, thus producing the need for a bariatric transport.

After defining a need for a countywide bariatric response program, the information was provided to the Loudoun County EMS Operations Committee, who in turn appointed the
Bariatric Response Sub-Committee to research and plan out the bariatric response needs of the county. The committee was designed to define operations needs and outline the complete process of initiating a new response component in the countywide EMS system. A primary part of the committee was to provide an operational definition of “obesity” and “bariatric”, for the system. The definition provided a way to how the committee would proceed with the research and what was acceptable standards for best practices for the Loudoun County EMS system.

The prevalence of obese patients and the definition set the bar for the EMS system and provided more questions to research in defining the needs and challenges for safe transport of bariatric patients. The process was to use best practices to introduce new technologies and provide a safe atmosphere for patients and EMS personnel. The outcome of the best practices research provided an approach of setting up a bariatric transport program by providing policies, training, and appropriate equipment to overcome the challenges. The part of arranging appropriate equipment was to engineer out the use of brute force by EMS personnel to prevent injuries for the EMS work force, as well as to ensure safer lifting conditions. The use of engineered bariatric equipment provides best practices for safer patient experiences as well as safer EMS personnel experiences, thus keeping safety in mind and a healthier work-force.

The overall process for equipment needs was to ensure that there is sufficient equipment to cover the geographic area of Loudoun County. The need to allow for strategic and swift response is based on where the equipment is to be located and the need to have equipment in multiple locations to cover the complete county. Currently, there are three stations or locations that have bariatric equipment caches, but one of the locations is within one mile of another regional location and there is no equipment located in the western region of the county. It is the recommendation of the Bariatric Sub-committee to move the Station 23 set of equipment to one
of the stations in the western geographical area of the county to ensure that coverage is equal and strategic to allow for swift response.

Another part of the equipment best practices is to acquire appropriately engineered equipment that is specifically made for bariatric patent lifting and movement, versus using equipment not made for bariatric use. Additionally, the equipment at each station needs to be the same design and have same process for use. This is to set a standard for exchange of equipment within the system as well as cutting down on training needs. Having standardized equipment will allow the system personnel to adapt to other stations when assigned to stations with bariatric equipment. The setting of the equipment needs and standards was placed into the new bariatric response policy in Appendix A. Furthermore, an equipment and training manual was produced as seen in Appendix B, to ensure standardized training and equipment needs for the system.

Training needs were evaluated as a twofold process, and related to the equipment process as well as other related EMS provider educational needs. The system educational division will provide educational opportunities to cover bariatric care and lifting, and equipment and specific bariatric transport training is included in the equipment and training manual in Appendix B and the Bariatric Response Manual in Appendix A. All training enhancements were based on best practices from international EMS organizations as well as NREMT standards.

Further operational best practices for the county system were defined by evaluating the current EMS system operational components and then incorporating best practices from other organizations with bariatric transport programs. The focus was always to provide a needed service to the community, provide safety and dignity to the patients and safety for EMS personnel. These best practices are outlined in the new bariatric response policy in Appendix A.
The overall outcome of the research literature questions and committee process produced a collection of information that signified a need for a bariatric response program for Loudoun County. The committee system was used as a process based from the Loudoun County Combined Fire and Rescue system, and is a part of its governance and required when making changes within the system to cover transparency and multiple agencies to have input towards the operations of the system. The committee helped in evaluating the current system behaviors and attributes, as well as the cultural effects the changes will have. The committee further worked in designing the countywide operations for the bariatric transport program. The need was evident for the program based on researched numbers and the prevalence of obesity internationally and the need for safety for patients and EMS personnel. The operational objectives and equipment needs were provided based on the best practices organizations researched and helped to define the specifics of the project.

The outcome of the committee and research report was that a countywide bariatric transport program is needed as is outlined in the policy provided in Appendix A and this project document. Additionally, the standardization of training and equipment is outlined in the equipment and training manual in Appendix B. Furthermore, a station bariatric policy was formatted and provided to cover station policies and an addition of the countywide policy, is provided in Appendix D. The committee report, outcomes and proposal that was provided to the EMS Operations Committee was provided in Appendix C. This process is documented to provide references to all parts of the process, including the minutes of the Sub-Committee meetings in Appendix E, that show the complete process of design, research, comparisons of best practices, and the process to an agreement of the sub-committee and adoption of the policy by the EMS Operations committee, to utilize the program as provided in this document.
References


Haber, C. (2008a). *Bariatric Transport Challenges: Part 2*. Emergency Medical Services Magazine; May 2008; 37, 5; ProQuest Central pg. 73-75


Appendix A. Bariatric Policy

<table>
<thead>
<tr>
<th>TITLE</th>
<th>Bariatric Response Care and Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>SECTION</td>
<td>Operations</td>
</tr>
<tr>
<td>SWP#</td>
<td></td>
</tr>
<tr>
<td>ISSUED</td>
<td></td>
</tr>
<tr>
<td>REVISED</td>
<td></td>
</tr>
<tr>
<td>APPROVED</td>
<td>System Chief</td>
</tr>
</tbody>
</table>

**PURPOSE**

To establish a best practices approach for a countywide bariatric response; to respond responsibly and swiftly; to use the appropriate equipment; to lift bariatric patients safely; to provide comfort and dignity to the patients; and provide this service with a culture of safety for all Loudoun County Combined Fire Rescue System or LC-CFRS, responders.

**SCOPE**

This policy applies to all members of the LC-CFRS.

**DEFINITIONS**

*Bariatric Agency:* A station and company who owns the bariatric equipment.

*Bariatric Patient:* Any patient requiring transport whose physical attributes, not limited to size, shape, and mobility that exceeds 350 pounds and/or more that 26 inches wide that pose a significant challenge to personnel and may require specialized equipment.

*Bariatric Unit:* A vehicle equipped and carrying a bariatric stretcher, Hoover Jack EMS Evacuation System, Bariatric Transfer Flat and/or bariatric ramp system with a winch assembly.

*Bariatric Response:* A bariatric response should include the primary EMS response units (BLS or ALS Ambulance and Engine or Truck Company), the closest Bariatric Unit, an EMS Supervisor and a Specialty unit (Rescue or Truck Company).
POLICY

This policy provides guidance for Communications and Fire Rescue providers concerning the dispatch, triage, extrication, care, and transport for bariatric patients.

PROCEDURES

Dispatch/Communications
1. When LC-CFRS Communications receives a call for a bariatric patient as defined above, the LC-CFRS Communication Division should dispatch an EMS response assignment appropriate for the nature of the call (i.e. ankle injury, chest pain, illness, etc.), and add on the closest Bariatric Unit, EMS Supervisor, and a specialty unit (Rescue or Truck Company) or Bariatric Response.
2. When Communications initiates an EMS response, and has no information related to size and weight of a patient and the initial EMS assignment arrives at the location to find a need for specialized bariatric equipment, the EMS providers on-scene can request a bariatric response through LC-CFRS Communication Division.
3. Additional manpower and resources can be requested at any time through the LC-CFRS Communication Division. For significant extrications, consider requesting a Safety Officer and Command personnel.

Equipment and Equipment Related Responsibilities
1. Each Bariatric Unit will have at minimum a Stryker bariatric stretcher rated at 1600 pounds, a Hover Jack EMS Evacuation System rated at 1100 pounds, a Bariatric Transfer Flat rated at 1100 pounds or more, and appropriate strapping and accessories to properly move a bariatric patient. A ramp and winch system when available, should also be part of the equipment package.
2. The Bariatric Unit agency personnel will be responsible for cleaning and disinfecting the equipment prior to returning it to service.
3. The Bariatric Unit agency will be responsible for maintenance of the bariatric equipment and ensuring its readiness for response. When the equipment is out of service, the Bariatric Unit agency should advise LC-CFRS Communication of the status of the “out of service” status.

General Deployment
1. Each Bariatric Response Unit agency (station), will set guidelines with regard to how the bariatric equipment is carried to the scene. Those local guidelines will complement this SWP.
2. The Bariatric Unit should have at least one person responding with bariatric equipment (or already on scene) who is trained on its use.

3. The primary responding EMS unit will maintain responsibility for primary care of the patient.

4. Provide patient care as outlined in Loudoun County EMS Protocols.

5. Bariatric patient scenes should have a minimum of 10 personnel at scene.

6. As part of scene management and patient care, complete a risk assessment considering risk factors related to LC-CFRS personnel and the patient. Assess patient factors, including weight, shape, size, and acuity of medical condition. Additionally, assess space and design of the building and vehicles including space, clearance, doors, stairs, corridors, floor surface and safe working loads. Furthermore, assess equipment capabilities, and effectiveness of communications and team management.

7. Set a proper plan for management of the patient’s move and transport.

8. Destination management should be considered to ensure that the selected destination has the capabilities for the patient and to avoid double transportation. Early in the planning process, advise the receiving facility of the need for bariatric care and equipment at the facility upon EMS arrival.

9. Parking of the transport ambulance at the scene should be on level ground whenever possible. The area behind the ambulance should have sufficient space to accommodate the placing and lifting of the stretcher or placement of the ramping system, without causing undue obstruction to surrounding roadways. Always set the ambulance parking brake, ensure the ambulance does not tilt to either side, and ensure that the air dump system has been deployed to the lowest level.

10. Ensure the patient is adequately covered with blankets, sheets, or clothing to provide dignity for the patient.

11. When using the Hover Matt and Jack EMS Evacuation system, ensure that the devices are used as per the manufacture’s best practices and have sufficient personnel (at least 4) around each device to ensure patient safety. Allow the Hover Matt and Jack to do the lifting.

12. When loading and unloading the stretcher into ambulance, ensure that there is at least 6 personnel around the stretcher for lifting or guiding the patient into or out of the ambulance. This applies whether lifting or using the ramp system to load the patient.

13. The patient should be loaded on the bariatric stretcher in the lowest possible position and moved on the stretcher in the down position while moving the patient to the ambulance. The stretcher should be kept in the lowest position at all times except for lifting the patient into or out of an ambulance.

14. When encountering a patient who weighs more than the capability of 6 personnel, or over 650 pounds, use of the ramping and winch system is recommended.
15. Transport of bariatric patients to the hospital shall be via a Virginia Office of EMS Certified patient transport vehicle.

16. At the conclusion of every call, ensure that the EMS Electronic Patient Care Report identifies the estimated weight of the patient. Also ensure that the report signifies that this was a bariatric call.

Training

1. Each Bariatric Unit agency (station) should have sufficient personnel trained in the use of the bariatric equipment.

2. LC-CFRS Training Division will include at least 1 hour of bariatric training via the Target Solutions Learning System. This training should include Stryker Stretcher and Hover Tech videos.

3. Each Bariatric Unit agency (station) personnel should attend the Target Solutions Presentation including the Stryker Stretcher and Hover Jack Videos and be supplemented with in-person practical sessions to provide competency for use of the specific Bariatric equipment. It is recommended that a refresher be provided every two years.
Appendix B: Equipment and Training Manual

Loudoun County Combined Fire Rescue System

Bariatric Equipment and Training Manual

January 2017
Table of Contents

Policy……………………………………………………………………………3

Equipment and optional accessories………………………………………3
- Bariatric Stretcher…………………………………………………...3
- Push Pull Handles…………………………………………………...4
- Pull Out Handles…………………………………………………...4
- Hover Jack…………………………………………………………..5
- Hover Matt………………………………………………………….5
- Transfer Flat………………………………………………………...6
- Stretcher Strap Extenders…………………………………………...6
- Ramp System………………………………………………………..7
- Winch System………………………………………………………..10

General Deployment…………………………………………………………...14

Maintenance and Cleaning…………………………………………………….15

Training………………………………………………………………………...15
Policy

This equipment and training manual works in conjunction with the bariatric response policy. All material included in this manual is intended to be used in correlation with the approved bariatric response policy. Please refer to the policy when in need of guidance it can be found on the LC-CFRS web site.

Equipment and Optional Accessories

Each bariatric response should have the following equipment. Items marked with an “∗” are required.

1. Bariatric Stryker Stretcher∗ – rated at 1600 pounds in down position, up to 850 pounds in all other positions.

![Figure 1: Stryker Bariatric Stretcher](image)

- Push/pull handles allow ease of moving stretcher in lowest position and should be a part of the stretcher package.
Figure 2: Stryker Bariatric stretcher push/pull handles

- Pull-out handles allow more responders to grip the cot for lifting.

Figure 3: Stryker bariatric stretcher pull-out side handles

- Increased length straps should also be part of the package to allow for securing patient on the stretcher.

MX Pro Bariatric Stryker Stretcher

- 29 inch width.
- Weight limit – 1600 pounds in down position, 850 pounds in up positions.
- Stryker [www.ems.stryker.com](http://www.ems.stryker.com) 1-800-784-4336
2. Hover Jack EMS Evacuation System*- rated at 1100 pounds with independent air system.

Figure 4: Hover Tech Hover Jack Evacuation System

Hover Jack Evacuation System

- Weight limit – 1200 pounds.
- Width – 39 inches.
- Length – 70 inches.
- Heights – 30 inches inflated.
- Hover Tech International – www.hovermatt.com 1-800-471-2776

3. Hover Matt System* – no weight limit, with independent air system.

Figure 5: Hover Tech Hover Matt System.
Hover Matt

- Weight limit – 1200 pounds.
- Width – 50 inches.
- Length – 78 inches.
- Hover Tech International – www.hovermatt.com 1-800-471-2776

4. Electrical extension cords to allow for the use of the Hover Jack Air System.*

5. Bariatric Transfer Flat* – rated at 1100 pounds.

Figure 6: Bariatric transfer flat

Stryker Bariatric Transfer Flat

- Weight limit – 1600 pounds.
- Width – 60 inches.
- Length – 108 inches.
- Stryker www.ems.stryker.com 1-800-784-4336

6. Stretcher strap extenders * (at least 3).

Figure 7: Stretcher Strap extenders.
Stryker EMS Stretcher Strap Extenders

- Metal buckles and nylon webbing.
- 4000 pound rating.
- Length 2 feet.
- Stryker www.ems.stryker.com  1-800-784-4336

If available, each bariatric response unit should include the following equipment.

7. Ramp System.

When a ramp system is used, the transport ambulance must be configured properly to mount the ramp transition plate and winch tie downs. Not all system ambulances have the proper floor-mount configurations. The ramp system is also compatible with the power load systems.

A. **Ramp transition receiver plate.** Serves as the transition point between the ramps and the ambulance floor. It lies flat on the floor near the rear entrance to the ambulance’s action area. It is secured with three hand tight fasteners into threaded floor plates. A roller in the center of the plate is designed to ease hard bends for the winch’s wire rope. **This plate must be removed for transport in order to close the rear doors.** To deploy the transition plate, lay the plate over the stretcher safety hook and lay flat on the floor. Align the three pre-drilled holes and then tighten the fasteners. (See figure 9)
Ramp system

- 12 foot long
- Weight limit – 1500 pounds or greater.
- Winch capacity – 2400 pounds.
- Each ramp weighs 41 pounds.
- Transafe Ramps – www.transafesystems.com 1-844-977-2400

B. **Ramps deployed.** (See figure 10) Ramps include two ramps that are 12 feet long and 1 foot wide. The 1 inch sides prevent the stretcher from rolling off the edge. Ramps are either hinged and fold in thirds, or telescope out like a ladder to be fully extended. The foot of each ramp has a beveled landing where it comes in contact with the ground. The
upper ends are slotted underneath and across the width, this allows for hooking ramps onto the transition plate horizontal rods. The ramps should be fully extended, and then place the ramp into the transition ramps rod.

![Figure 10: Ramps deployed](image)

C. **Ramp angles:** The only thing holding the stretcher down on the ramps is gravity. When the center of gravity shifts, the stretcher is no longer stable and may tip. Ensure that the ramp angles are parallel lengthwise and level across the width. Remember, four of the stretcher wheels should remain in contact with the ramps.

D. **Ramps folded for transport** (see figure 11). The trifold ramp system folds in three. The newer style ramps telescope like a ladder to be more compact for transport.
E. **Winch system** (See figure 12). Inspect the winching system and tow package before winching. The winch box is mounted inside a box to guard against injury. The winch box is held down to the threaded floor plates in front of the captain’s chair, using two hand tight screws.

Make sure to attach winch system to power outlet (see figure 13) and test that the system works appropriately. Note that the power outlet is a specialty design power connection for winch systems and is directly wired to the electrical system, with one connection and the other connection part of the winch system.
F. Winch Hand Controller (See figure 14). The winch operator must operate through the side entrance to the ambulance during loading and unloading. At least four providers should remain with the patient loaded on stretcher in order to guide stretcher up or down the ramps. Ensure that the winch power cable and remote control cable don’t come in contact with the winch cable. The winch operator is responsible to watch the cables path and listen to those who are guiding the stretcher. No one should occupy the action area between the stretcher and the winch while winching up or down.
G. **Stretcher Hook** (See figure 15). Inspect the stretcher tow package, before winching.

![Figure 15: Stretcher hook and tow package](image)

Attach the wire rope from the winch to the stretcher before loading. Run the wire rope under the antlers on a manual load stretcher system or over the top of a power load system. Ensure that the wire-rope runs across the roller on the transition plate and not to the side of the roller (See figure 16). Align the stretchers wheels with each ramp landing. While other personnel hold the foot end of the stretcher to stabilize the stretcher, clip the hook down onto the stretchers tow ring (see figure 17). Before winching, inspect the entire wire ropes length for fraying. Ensure no items are in the way when winching.

![Figure 16. Winch wire over roller on transition plate](image)
Figure 17: Stretcher tow ring, attached to winch hook

Ramps in use, with stretcher and push pull handles.

Figure 18: Stretcher in use with ramps and winch
When loading the stretcher, begin winching by moving the toggle switch (see figure 14) forward and guide the stretcher to the right side as it moves up the ramps (see figure 18). It is recommended that the push/pull handles be in place to guide the stretcher into the ambulance. Once all wheels are on the inside on the ambulance you should stop using the winch from pulling and remove the push/pull handles to allow space for the crew and to close the rear doors. Disconnect the hook from the tow ring and manually roll the stretcher into the antlers and hook stretcher into lock or MCI bar. Do not winch the wire rope in tight. Unloading the stretcher is completing the procedure in reserve order.

**General Deployment**

The policies and guidelines associated with general deployment of the bariatric equipment is SWP xxx, Bariatric Response Care and Transport policy which correlates with the general deployment section noted below.

1. Utilization is designed for patients that exceed 350 pounds (159 kg) and or more than 26 inches wide that pose a significant challenge to personnel and require specialized equipment.
2. The primary responding EMS provider maintains responsibility of patient care and completes a risk assessment considering risk factors related to the patient and LC-CFRS personnel.
3. Bariatric calls should have a minimum of ten personnel.
4. Destination management should be communicated early in the call, to ensure appropriate equipment is at the receiving facility, and avoid double transport.
5. Provide patient care as outlined in the Loudoun County EMS Protocols.
6. Set a plan for proper movement of patient.
7. Ensure that the path within and from any structure is clear before moving patient.

8. Ensure patient is adequately covered with blankets, sheets, or clothes to provide dignity for the patient.

9. When parking transport ambulance at scene it should be on level ground whenever possible. Allow sufficient space behind ambulance to use ramp system and allow for the loading of the patient.

10. When using any equipment, ensure the devises are used as per the manufacturer’s best practices.

11. When moving the bariatric stretcher to and from the ambulance with a patient loaded on the stretcher, never roll the bariatric transport stretcher in a raised position, unless it is absolutely necessary. Lower it to the lowest position as soon as possible after loading, but before moving. Moving a bariatric patient in a raised position places the stretcher at risk of tipping over.

12. Loading a patient without ramps, ensure at least 6 providers around the stretcher.

13. Any patient over 650 pounds, use ramping and winch system.

14. Ensure that at the conclusion of any bariatric call that the Patient Care Report signifies that this was a bariatric call.

**Maintenance and Cleaning**

All equipment should be cleaned with the appropriate disinfectants following EMS protocols, policies, and manufacturer’s recommendations. All equipment should be maintained and ready for response. After equipment is cleaned and ready for response ensure to place the equipment as originally found in the carry cases and vehicles used for response.
The Bariatric Unit Agencies personnel are responsible for cleaning and disinfecting the equipment prior to returning it to service. The Bariatric Unit Agency will be responsible for all maintenance of the bariatric equipment.

**Training**

LC-CFRS Training Division will include at least 1 hour of bariatric training for all system members. This training will be via Target Solutions Learning System. This training should include Stryker Stretcher and Hover Tech Videos. This training is to provide an awareness level for all members of the Fire and Rescue system.

Each Bariatric Unit agency (station) personnel will have supplemental (additional) equipment training. This will include at least 1 hour of in person practical sessions to provide competency for use of the specific bariatric equipment. It is recommended that there be refreshers on the use of bariatric equipment on a two year basis.
Appendix C: Sub Committee Presentation power point

Loudoun County Combined Fire Rescue System
EMS Operation Committee
Bariatric Sub-Committee Report

“Countywide Bariatric Response”

County Wide Bariatric Response Committee

• Representative of each Bariatric Unit
  • Al Pacifico – Assistant Chief Sterling Rescue Co 15.
  • Herb Rundgren – Captain Loudoun County Fire Rescue Co. 23
Main Goals

• To evaluate the current resources in the county system.

• Set criteria of what defines a bariatric patients for the county system.

• Provide process for bariatric response countywide.

• Set a dispatch algorithm.

• Make recommendations for the countywide EMS system.

Mission - Purpose

• To establish a best practices approach for a countywide bariatric response; to respond responsibly and swiftly; to use the appropriate equipment; to lift bariatric patients safely; to provide comfort and dignity to the patients; and provide this service with a culture of safety for all Loudoun County Combined Fire Rescue System or LC-CFRS, responders.
Reasons why we need a bariatric response plan

- Increase number of bariatric patients nation, state and countywide.
- Lift and moving bariatric patients safely
- Comfort of the patient
- Dignity of the Patient
- Safety of the providers
- Duty to provide service to community
- Best EMS Practices

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>28.5</td>
</tr>
<tr>
<td>2015</td>
<td>27.2</td>
</tr>
<tr>
<td>2016</td>
<td>27.4</td>
</tr>
</tbody>
</table>

Current Equipment

- Companies 13, 15, and 23 have Bariatric equipment assigned.
- All three companies have: Stryker bariatric stretcher, Hover Tech hover jack & hover matt, and a bariatric flat/tarp.
- Co. 15 has 1 set of bariatric ramps capable of fitting on any of Co 15 ambulances. * Needs special hooks. (Co. 13 looking into ramps now)
- Co. 23 has the MAB with a ramp*(needs VA OEMS Transport Cert)
Current Locations of the Bariatric Units

Definitions

- *Bariatric Patient*: Any patient requiring transport whose physical attributes, not limited to size, shape, and mobility that exceeds 350 pounds and/or more that 26 inches wide that pose a significant challenge to personnel and may require specialized equipment.

- *Bariatric Unit*: A vehicle equipped and carrying a bariatric stretcher, Hoover Jack EMS Evacuation System, Bariatric Transfer Flat and/or bariatric ramp system with a winch assembly.
Bariatric Response

- **Bariatric Response**: A bariatric response should include the primary EMS response units (BLS or ALS Ambulance and Engine or Truck Company), the closest Bariatric Unit, an EMS Supervisor and a Specialty unit (Rescue or Truck Company).

- Minimum of 10 personnel on scene.

- Specialty Units provide rigging capabilities and manpower.

- EMS Supervisor is a EMS Command Officer and assistance for safety.

---

**Dispatch Algorithm**

<table>
<thead>
<tr>
<th>Box</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
<th>7th</th>
<th>8th</th>
<th>9th</th>
<th>10th</th>
<th>11th</th>
<th>12th</th>
<th>13th</th>
<th>14th</th>
<th>15th</th>
<th>16th</th>
<th>17th</th>
</tr>
</thead>
<tbody>
<tr>
<td>40010</td>
<td>LCFR/1HC</td>
<td>LCFR/1B</td>
<td>LCFR/1E</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
</tr>
<tr>
<td>40100K</td>
<td>LCFR/1HC</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1E</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
</tr>
<tr>
<td>40200K</td>
<td>LCFR/1HC</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
</tr>
<tr>
<td>40300K</td>
<td>LCFR/1HC</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
</tr>
<tr>
<td>40400K</td>
<td>LCFR/1HC</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
<td>LCFR/1B</td>
</tr>
</tbody>
</table>

Provided by: Mike Carter, LCFR Communication Division
General Deployment

- Each bariatric station will have their own guideline for the company.
- Primary EMS provider maintains patient care.
- Scene assessment for deployment is key.
- Destination management needs to be early.
- Parking transport vehicle important.
- Use devices as per the manufactures best practices.
- When moving patient on stretcher stay in lowest position.
- If over 650 pounds use ramp system.

Equipment and Training

- Transport via VA Certified EMS transport unit.
- At conclusion of call – PCR and clean equipment.
- Training: All system members 1 hour Target Solutions Awareness level.
- Bariatric Unit Company personnel 1 hour Target Solution Awareness and hands on training with bariatric equipment. With yearly competency updates.
Recommendations

• Move the Co 23 Bariatric Equipment to a west side fire house like Purcellville or Round Hill, to allow for proper system-wide coverage.

• Provide ramp systems for each set of bariatric equipment. (Co. 13 in progress.)

• Approve this policy and program.

• Question???
Appendix D: Loudoun County Volunteer Rescue Squad Bariatric Policy

<table>
<thead>
<tr>
<th>EMS xxx</th>
<th>Bariatric Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authority:</strong> General Orders</td>
<td></td>
</tr>
<tr>
<td><strong>Origin:</strong> Lieutenant Douglas Skinner</td>
<td><strong>Date:</strong></td>
</tr>
<tr>
<td><strong>Reviewed By:</strong> Senior Officers</td>
<td><strong>Date:</strong></td>
</tr>
<tr>
<td><strong>Approved By:</strong></td>
<td><strong>Date:</strong></td>
</tr>
<tr>
<td><strong>Date (Revision)</strong></td>
<td><strong>Changes</strong></td>
</tr>
<tr>
<td>Rev 1</td>
<td></td>
</tr>
</tbody>
</table>

**Applicability:** All members

**Purpose:** To establish a best practices bariatric response guideline in correlation with the Loudoun County Combined Fire Rescue System System-wide policy.

**Goals of the Policy:**

To respond responsibly and swiftly, to use appropriate equipment, to safely lift and move bariatric patients, provide dignity to our patients, and provide a culture of safety for all patients and personnel.

**Definitions:**

* **Bariatric Patient:** Any patient requiring transport whose physical attributes, not limited to size, shape, and mobility that exceeds 350 pounds and/or more that 26 inches wide that pose a significant challenge to personnel and may require specialized equipment.

* **Bariatric Unit:** A vehicle equipped and carrying a bariatric stretcher and associated bariatric equipment.

* **Bariatric Response:** A bariatric response should include the primary EMS response units (BLS or ALS Ambulance and Engine or Truck Company), the closest Bariatric Unit, an EMS Supervisor and a Specialty unit (Rescue or Truck Company).
Guidelines:

1. Bariatric Capabilities: Loudoun County Combined Fire Rescue System (LC-CFRS) has established bariatric response policies and guidelines that will apply System-wide. This Loudon County Volunteer Rescue Squad (LCVRS) Standard Operating Guideline or SOG will provide guidance for the company level operations, in correlation with the LC-CFRS policy.

1.1. LCVRS maintains the following bariatric equipment which is pre-staged in Utility 613 (UT613).

- Stryker Bariatric Cot
- Stryker Transfer Flat
- Hover Matt Air Transfer System
- Evacuation Hover Jack II
- Air Supply (pump)
- Miscellaneous supplies

1.2. Other than the cot, all gear is in a large gray Rubbermaid-style tub staged in the back of UT613. The cot is also staged in the back of UT613.

2. Bariatric Response: The following response guidelines apply to the 'dispatch' and use of the bariatric equipment.

2.1. Depending on the situation the LC-CFRS Emergency Communication Center (ECC) may dispatch a Bariatric Response (see definition) as part of the initial dispatch. If not crews can self-dispatch with the bariatric equipment when needed.

2.2. If during the initial dispatch it is announced that crews are going to be dealing with a bariatric patient then bring the equipment with them in the ambulance or bring the equipment in UT613. In this case notify the ECC that you are responding with the bariatric equipment and UT613 (if necessary). Additionally, responding to the scene in UT613 with lights and sirens may be appropriate. Coordinate with the on-scene Attendant-in-Charge or AIC, to determine if lights and siren response is required.

2.3. If during the initial dispatch there is no announcement about dealing with a bariatric patient, but you determine based on past experience (i.e., previous calls to this address required use of the bariatric equipment), crews may self-dispatch the bariatric equipment. Similar to in Paragraph 2.2, crews can bring the equipment with them in the ambulance or have someone bring the equipment in UT613. In this case notify the ECC that you are responding with the bariatric equipment and UT613 (if necessary). Additionally, responding to the scene in UT613 with lights and sirens may be appropriate. Coordinate with the on-scene AIC to determine if a lights and siren response is required.
2.4. If crews arrive on scene and subsequently determine that the bariatric equipment is needed, they should follow the guidelines below.

- Ask the ECC to upgrade the dispatch to include a Bariatric Response (see definitions).
- If there are personnel available at Station 613 to respond, the following additional guidelines apply. These guidelines do not cover every situation and are meant to provide a framework for a bariatric response using in-Station personnel.
  - If there is a second EMS transport unit in service, they may temporarily go out-of-service in order to bring the bariatric gear (UT613) to the scene. Once the equipment is on-scene they will return in-service. Responding to the scene in UT613 with lights and sirens may be appropriate. Coordinate with the on-scene AIC to determine if a lights and siren response is required.
  - If there is a released driver available at the Station to respond with UT613, the driver-only can respond with Utility 613, versus taking an in-service transport unit out-of-service. Responding to the scene in UT613 with lights and sirens may be appropriate. Coordinate with the on-scene AIC to determine if a lights and siren response is required.
  - If there is not a released driver available at the Station to respond with UT613 and the on-scene AIC determines that an emergency response for the bariatric equipment is not required (i.e., red lights and siren not required), then ask the ECC to dispatch UT613 to the call "non-emergency". *In this case respond non-emergency, no lights and siren. NOTE: For non-emergency response, any member over age 21 who is not on “driver restriction” can drive U613.

2.5. Prior to responding with the bariatric equipment, crews need to ensure that at least one crew member has been trained on the use of the equipment. That crew member will direct actions with regards to use of the equipment.

2.6. In all cases, if UT613 is responding to the scene ask ECC to notify R620 that UT613 is temporarily committed to another call.

3. **Bariatric Operations**: The following provides guidelines on proper on-scene operation related to a bariatric response. These guidelines do not cover every situation and are meant to provide a framework for response operations.

3.1. When arriving at the scene of a bariatric call, ensure to park appropriately leaving the closest parking location to the incident open for the bariatric transport unit.

3.2. The primary responding EMS unit will maintain responsibility for primary patient care.

3.3. Bariatric Response Crew (Engine or Truck Company, EMS Supervisor specialty unit) should assist with the care and moving of the patient.
3.4. The crew members from Station 613 using the bariatric equipment are responsible for cleaning and disinfecting the equipment prior to returning it to service.

3.5. When using the Hover Matt and Hover Jack Evacuation system, ensure that the devices are used as per the manufacture’s best practices and have sufficient personnel (at least 4) around each device to ensure patient safety. Allow the Hover Matt and Hover Jack to do the lifting.

3.6. The patient should be loaded on the bariatric stretcher in the lowest possible position and moved on the stretcher in the down position while moving the patient to the ambulance. The stretcher should be kept in the lowest position at all times except for lifting the patient into or out of an ambulance.

3.7. When encountering a patient who weighs more than the capability of 6 personnel, or over 650 pounds, use of the ramping and winch system is recommended. Currently LCVRS does not have the ramp system. If needed, Sterling Rescue (Company 15) does have the ramp/winch equipment. Request they respond if necessary. The Medical Ambulance Bus (MAB) at Station 623 also has the ramp/winch system; however the MAB is not a licensed transport unit. As such contacting Company 15 for their ramp/winch system and an associated transport unit is more appropriate.

3.8. At the conclusion of every call, ensure that the EMS Electronic Patient Care Report identifies the estimated weight of the patient. Also ensure that the report signifies that this was a bariatric call.

3.9. LCVRS personnel are responsible for maintenance of the bariatric equipment and ensuring its readiness for response. When the equipment is out of service, advise LC-CFRS Communication of the status as “out of service” status.

3.10. Prior to responding with the bariatric equipment, crews need to ensure that at least one crew member has been trained on the use of the equipment. That crew member will direct actions with regards to use of the equipment.

4. Bariatric Training: Training will consist of one hour of awareness lecture, video, or web based training and a one hour hands on practical session. This training will occur on a yearly basis.

5. Direct any questions to EMS Operations (emsops@lcvrs.org)

End of Guideline
Appendix E: Minutes of LC-CFRS Bariatric Committee Meetings

Loudoun County EMS Operations Committee – Bariatric Operations Sub Committee

Meeting Minutes

Date: August 23, 2016
Meeting started: 1850
At: Loudoun Rescue Co. 613.

Attendance: Herb Rundgren, LCFR; Al Pacifico, Co 615; Doug Skinner, Co. 613

Meeting started with general introduction and discussion of the goals that the committee would be working on.

All discussed the need to get call volume for bariatric type calls within the county to use as a starter in the process to show the need of the resources and process.

Action (Doug Skinner): Contact QA/QI for numbers and see if there are any specific sizes and weights that correlate to the bariatric needs.

----------------------------------------------------------------------------------------------------

Discussed the reasoning why we need to use Bariatric Equipment.

1. Lift and moving bariatric patients safely
2. Comfort of the patient
3. Dignity of the Patient
4. Safety of the providers

All will work to use the above as a guideline to the committee’s business as we go forth.

----------------------------------------------------------------------------------------------------

Resources: Current resources within the county.

Company 613: Has 1 Stryker Bariatric Stretcher with push pull bars (1200 lb. capacity), 1 Hover Jack and 1 Hover Mate with inflation system, and 1 large 1000 lb. carry tarp. All equipment on Utility 613 and can be placed on an ambulance when needed.

Company 615: Has 1 Stryker Bariatric Stretcher with push pull bars (1200 lb. capacity), 1 Hover jack and 1 Hover Mate with inflation system, 1 large 1000 lb. carry tarp and 1 set of ramps with winch. The ramps and winching system are set up for use with Medic 635. All equipment is on a specialized trailer which is to be pulled by a utility type vehicle to a call.

Company 623 (LCFR): Has one Stryker Bariatric Stretcher (1200 lbs. capacity), 1 Hover Jack and 1 Hover Mate with inflation system, 1 large carry tarp, and a binder-type device to help with
holding patient to allow for easier moving. All equipment is available at the station, for an ambulance or the MAB to respond. MAB 623 is ramp-capable.

All discussed that the equipment is reasonable and standard, and that all have same primary equipment, but there are specific options for larger and complex patients. (Example: Ramps.)

Discussed whether the Ford 350 or Ford 450 ambulances could handle the bariatric stretchers, it was discussed that the F550 vehicles and larger International type vehicles are better options based on space and weight needs.

**Action (Al Pacifico):** Discuss with logistics number of 350 or 450 ambulance chassis and what the capabilities are and if they can handle the additional weight.

Provided a demonstration of room capabilities, for how a bariatric stretcher fits in the ambulance box. This showed that when a Stryker Bariatric is loaded in an ambulance, there is no loss of space on the driver side of the box of the ambulance, and about 6 to 7 inches of total space on the passenger side. This was to ensure proper room for EMS provider operations.

**Action (Al Pacifico):** Discuss with logistics types and room capabilities of all ambulances in the system.

Training: current training for units in the county.

**Company 613:** Has some crews trained on the current equipment and is continuing to complete training for volunteer and career personnel. Additionally, have plans for training Co 1, 10, 20, and 17 personnel soon.

**Company 615:** Has some crews members trained and is working to complete training for more crew members. Co 615 will be working, to accomplish the completion of training for volunteer and career staff at companies 11, 15, 18, 24, 25, and 35.

**Company 23 LCFR:** Has provided training to many of the career personnel, especially out of Co 623 and 609. LCFR will be providing more training as crews and companies need the training.

All discussed that due to the societal norm of more bariatric patients that we should recommend that training be provided during the EMT or ALS Original and Refresher courses on this topic.

How the Bariatric Equipment is currently deployed or requested?

All stated the same for request: if the EMS units at scene needed the resources, they would call dispatch to have it dispatched to the scene, no generalized set guidelines.
Additional discussion on how to provide a call down, or to get the bariatric equipment to the scene when crews not in quarters. Co 613 discussed the process of having career personnel in station or using Company 620 or 601, as they do with the boat responses.

It was discussed that the geographic layout of the county Co. 615 has the 615 and 606/622 areas, Co. 623 has companies 603, 607, 609, 623, 619 areas, and Co 613 has the 613, 610, 614, 612, and 626 areas. This can be worked more, once communications has input.

This as one area to work further on, and will provide additional guidance and policy as bariatric planning progresses. Each member is going back to his or her stations and ensuring that the alternate processes of response can be set up as part of the response system.

Action (Doug Skinner): Contact Communications to discuss call down and process to dispatch based on geography locations of the bariatric equipment, and what is needed to move the patient safely.

Discussed how many people are needed on a scene for a bariatric patient. It was felt that due to the need to have sufficient personnel, additional resources can be initially dispatched, and if not needed they can be cancelled. All discussed the need to have a specialty unit dispatched, like a truck or rescue, as well as the initial EMS units, to accommodate the need for additional personnel. Also discussed that the EMS Supervisor should also be placed on these calls. Further discussion to come on this item.

---------------------------------------------------------------------------------------------------

Definition of who is considered a Bariatric Patient.

A discussion on experiences with past bariatric calls undertaken and discussed the ICD 10 and need to ensure the definition sits within the Ambulance Billing Guidelines. Additionally, discussed the ICD 10 and obesity guidelines. We discussed setting a standard near 400 lbs. as a reasonable trigger for communications to dispatch the bariatric equipment automatically.

Action (Herb Rundgren): Contact LCFR Ambulance Billing Group about billing guidelines. Contact other agencies to compare their guidelines to decide what is reasonable for the County. Research the obesity and bariatric guidelines and bring back to next meeting.

-----------------------------------------------------------------------------------------------------

Timeline to complete the process.

It was felt that collecting the information and vetting the material and to provide a generalized plan would be complete for presentation by January 2017.

-----------------------------------------------------------------------------------------------------

Other Actions:

Herb Rundgren to contact Fairfax and Arlington Fire Departments for bariatric policies
Doug Skinner to get PTS and VMT bariatric policies
Al Pacifico researching the BMI and weight guidelines.

Meeting Adjourned at: 2015.

Next meeting will be scheduled for the first week of October, to allow for vacations and medical issues. This meeting will be at Co. 623 to allow for review of 623’s equipment.

August 28, 2016: Al Pacifico provided the researched information below from the World Health Organization or “WHO”, defining bariatric or obese patients. It is recommended that we set a trigger for bariatric dispatch between 350-400 lbs. as the committee had discussed at the meeting, this is based on the science provided in this article. Discussion will occur, at next meeting to set the trigger weights, for initial dispatch.

“**Bariatric Definitions:** Bariatrics is the science of providing healthcare for those who have extreme obesity. Both a patient's weight and the distribution of this weight throughout the body are involved in determining whether one is a bariatric patient. The most commonly accepted and consistent language for identifying and defining bariatric patients has been through the use of the Body Mass Index or BMI. The World Health Organization describes people who have a BMI greater than 30 as obese, and those having a BMI greater than 40 as severely obese (WHO, 2000). Other definitions of bariatric include overweight by more than 100-200 pounds or body weight greater than 300 pounds. (Hahler, 2002). In the recent past, standard facility weight capacity for patient-handling-equipment lifts has been 250-350 pounds. Staff often activate bariatric protocols, guidelines, and/or similar actions when a patient's weight exceeds 350 pounds.”

**Bibliography:**


Loudoun County EMS Operations Committee – Bariatric Operations Sub Committee

Meeting Minutes

Date: October 13, 2016

Meeting started: 1800

At: Loudoun County Station 23.

Attendance: Herb Rundgren, LCFR; Al Pacifico, Co 15; Doug Skinner, Co. 13

Meeting started with general discussion of the goals and then reports of assignments and information to questions.

Reasoning why we need to use Bariatric Equipment.

1. Lift and moving bariatric patients safely
2. Comfort of the patient
3. Dignity of the Patient
4. Safety of the providers

Call Volume for Bariatric Patients:

Doug Skinner reported, he had spoken with T. Lane in QA/QI about call volume for bariatric type calls within the county, and the lack of current data collection from the Field Bridge EMS Reporting system. All members discussed the need to have an increase in ensuring that providers place patient weights in the Field Bridge EMS reporting system. This is to track this patient population, but also all patient populations, to help provide support when quality changes are needed. Additionally, it would be beneficial to add the same questions to the EMD and CAD systems to allow for a clear dispatch and algorithm, as well as to help build a CAD note for each bariatric patient’s location, to assist in dispatch processes. (See more in dispatch area).

Resources: Bariatric Gear:

Equipment Checkout (Work load) issue:

All discussed a question related to a concern about checking the new bariatric gear and whether that would add more work to all involved. It was felt that this was not an issue with regard to everyday operations that the gear is not a large issue or time-consuming issue to deal with - probably a few minutes a day to check that the equipment is present and in working condition.
MAB Question:

All discussed that Co 15 has ramps and Co 23 has the MAB. It was discussed, that due to the MAB not being a licensed transport unit, except when a MCI has been declared, it can be an issue transporting a bariatric patient in the MAB. The committee discussed the approach on the MAB during bariatric calls, for it has a ramp, and if it would be better to run the MAB or place the bariatric gear on an ambulance instead of the MAB, to deal with the license issue. Additionally, we want to see about licensing the MAB and if the county wants to do so. It was felt that the MAB being licensed would be difficult for a small call volume related to bariatric patients, and would add to workload due to the need to have additionally EMS equipment on the MAB, and to assure it is checked daily to be qualified as a transport unit. (H. Rundgren to discuss with EMS Command to see if they wish to way they wish to proceed.)

Ramp questions:

Committee discussed the process of how to respond from the individual stations. It was recommended that it would be based on the individual stations guidelines or policy as long as the primary mission was to provide the bariatric equipment as per the county dispatch and response policies. Examples: Co 15 will have the bariatric trailer, with an ambulance to accommodate the ramps. They will have the bariatric trailer out of Company 35, to better deal with the Sterling and part of the Ashburn response areas. Co 13 would have the bariatric equipment on UT613 a pickup truck and will either respond with the utility and/or ambulance with the bariatric equipment. Co 23 will have the bariatric equipment on the MAB and can respond with the equipment on the MAB or on an ambulance, depending in the needs at the scene. One part of the discussion included that if there is a need for the ramps for very large patients over 650 pounds, it would be recommended to have a unit with the ramps to be dispatched. This is due to the overall lift capabilities of a single patient on a stretcher is based on 6 people lifting the stretcher. The VAOEMS Position Description for an EMS Provider: states that a provider is to be able to lift 125 pounds or 250 pounds with a partner. If a patient weighs more than 650 pounds then a ramp system would be needed to safely place them in an ambulance. (This takes into the equation the weight of the stretcher).

Training:

Committee discussed the need for training system-wide. Recommended that the two videos, one from Hover Jack and Mat systems, and one from Stryker be placed on the Target Solutions and then provide a training manual for the bariatric system, to include a one to one and a half hour practical skills training session. The total training time would be two to two and half hours. Also, recommended to have the Original and Refresher Courses at the Training Center have at least the Target Solutions part of the training provided to all providers. Committee members to discuss with EMS Training. D. Skinner working on training manual.
Hospitals receiving patients:

Committee discussed issues regarding hospitals and bariatric patients coming in from EMS. It is recommended that the destination hospital be contacted before time to assure that the hospital Emergency Department can accommodate the patient.

Herb Rundgren, contacted the hospitals and reported back the following:

Stone Springs has a dedicated trauma bay for bariatric patients. DR. Cook did advise that the CT scanner table has a max weight of 350. She did not know what they would be able to do with a patient beyond 350. One thing to note, Stone Springs does not want us to bring bariatric patients who are having complications from stomach surgery.

INOVA, spoke with Dr. Romani and he was advised that INOVA ED’s will take any bariatric patient.

Committee recommended that the primary EMS provider on a bariatric patient call should contact the receiving hospital prior to transport to advise them of the situation and get approval of the transport to that facility.

Deploying or requesting Bariatric Equipment:

To accommodate each individual company with bariatric equipment, it was recommended that the company level would set guidelines in house, how they wish to run the bariatric gear out of their stations. Currently, County Communications shows company 615 as a bariatric trailer in the CAD out of station 15. Company 13 was not shown as in the CAD as a bariatric unit on Utility 613, thus Chief 13 will have to advise Communications that Co 13 is bariatric capable. Co 23 is currently in the CAD as bariatric capable on the MAB. Each company can change the equipment off the specific units and place the equipment on an ambulance or other vehicle to get it to a scene.

Communications:

Action (Doug Skinner): Contact Communications to discuss call down and process to dispatch, based on geography locations of the bariatric equipment, and equipment needed to move the patient safely. Will be contacting Communications over next week, and discussing algorithm and dispatch process. Additionally, speak with Chief 13 to officially advise Communications that company 13 is bariatric equipped.
Follow-up: D. Skinner contacted Mike Carter at Communications, working with him on a dispatch algorithm. The EMD items need to go to Patty Turner next week, for she has been out on training.

Dispatch:

Discussed how many people are needed on a scene for a bariatric patient. It was recommended that due to the need to have sufficient personnel, additional resources will be initially dispatched, and if not needed they can be cancelled. It is recommended that, there needs to be a specialty unit dispatched, like a truck or rescue, and an EMS Supervisor, as well as the initial EMS units, to accommodate the need for additional personnel.

Also recommended that EMS provides, who encounter specific bariatric patients that they input in the CAD notes, signifying locations of bariatric patients that are regularly responded too.

Definition of who is considered a Bariatric Patient.

The committee recommended that the definition for a bariatric patient would be a 350 pound as per the ICD 10 Obesity Guidelines and the World Health Organizations definitions.

Additionally, it was recommended to use the 350 pounds as a trigger for communications to dispatch the bariatric equipment automatically as long as the communications division, can place the weight process into the CAD and EMD system. *D. Skinner to follow up with communications for EMD processing.*

Ambulance Billing Issues with regard to bariatric transports.

Herb Rundgren contacted Danielle Brosan of the LCFR Ambulance Billing Group about the billing guidelines that could affect bariatric transports to see if there would be billing issues. Danielle stated that LCFR could only bill for the ambulance transport (level of care and mileage) for the patient. No additional bill would result due to change of stretcher type or additional personnel.

Timeline to complete the process.

It was felt that collecting the information and vetting the material and to provide a generalized plan would be complete for presentation by January 2017. We will try to have a draft plan for the November or December EMS Ops Committee meeting.
Other Actions:

Herb Rundgren contacted Fairfax Fire Departments for bariatric policies. He presented the information from Fairfax and the committee analyzed it. Fairfax allows the EMS Providers at the scene to request the bariatric equipment verses automatic dispatch. Fairfax has two sets of bariatric equipment one at station 414 and the other at station 421, which also house rescue units. Fairfax dispatches a medic, and squad or engine with the bariatric equipment. The equipment fits in all ambulances. The medic on the original call keeps care of the patient throughout transport. Fairfax has the same equipment as Loudoun units. Fairfax transports patients to the closest appropriate hospital for the patient’s condition. Dispatch is based on the closest bariatric equipment is dispatched as per Fairfax Department of Public Safety Communications. Having the rescue on scene also ensures proper additional equipment, such as rigging and so forth. Fairfax’s policies states, that bariatric patients must be transported in a licensed EMS vehicle with the appropriate level of care supporting the patient and contact with the hospital must be completed before transport to a destination hospital.

Doug Skinner researched multiple other bariatric policies. Committee discussed City of Winter Fire Rescue bariatric policy, Fitchburg Fire Bariatric Policy, Leon County EMS Bariatric dispatch policy, San Francisco Fire/EMS Bariatric Policy, and New York City’s Medical Evacuation Transportation policy. Multiple ideas and best practice noted from each policy noted to the committee to use in devising the policy and training.

Action: D. Skinner will start the drafting of the policy and training manual to be sent out to the committee for amending.

Meeting Adjourned at: 1925.

Next meeting will be scheduled for the first week of November. This meeting will be at Co. 35 to allow for review of Co 15’s equipment.

Loudoun County EMS Operations Committee – Bariatric Operations Sub Committee

Meeting Minutes

Date: November 30, 2016

Meeting started: 1830

At: Sterling Rescue Station 35.

Attendance: Al Pacifico, Co 15; Doug Skinner, Co. 13.

Absent: H. Rundgren, LCFR – advised via email that he was detained to the training center due to testing.

Meeting started with general discussion of the goals and any information and issues since the last meeting.

Our overall primary goals.

Reasoning why we need to use Bariatric Equipment.

1. Lift and moving bariatric patients safely
2. Comfort of the patient
3. Dignity of the Patient
4. Safety of the providers

---------------------------------------------------------------------------------------------------------------

Policy and Training:

Draft Policy: D. Skinner presented the draft policy. Reviewed the policy and discussed the process for presentation at the next EMS Ops meeting. It was felt that the policy was ready for presentation except a small amendment to be added related to transporting patients in a state certified transport vehicle. This amendment will be completed and sent to all involved. This line is added due to the questions and issues related to the use of the MAB for transporting bariatric patients.

Draft Equipment and Training Manual: D. Skinner presented the draft equipment and training manual. Discussed that he has contacted Earl Hall of the training division about have a 1 hour Target Solution Bariatric Awareness course for all system members, and then for the companies that have the bariatric equipment they will need to do in person hands on training. The manual would also be on the Target Solutions. Discussed the draft and accepted it as a tool for the program. This will be presented at the EMS Ops meeting also.

Dispatching: D. Skinner discussed his discussion with Mike Carter from the communication division and the box card excel spreadsheet showing the dispatch matrix to cover all the boxes
countywide with a bariatric unit. This is all based on bariatric units being stationed at Co. 13, 23 and 35. The matrix can be changed anytime other bariatric units are added or if there is a change in location of current bariatric units. Further communications information has not been forthcoming, due to emails not being answered by Communication Manager, due to specific questions related to dispatch EMD capabilities. It is felt that once the policy, training, and dispatch process is approved then communications will fall into place under the policy.

At end of meeting policy and equipment and training manual sent to H. Rundgren for comments.

Other Actions:

Discussed presenting the policy, equipment and training manual, and dispatch matrix at next EMS Ops meeting and it was agreed to go forth with that plan. D. Skinner will send out the draft material to EMS Ops Chair Andrews and Dep. Chief Salazar.

Meeting Adjourned at: 1900.

Next meeting will depend on the EMS Ops Committee needs.

Meeting Minutes

**Date:** December 20, 2016

**Meeting started:** 1830

**At:** Loudoun Rescue Station 13.

**Attendance:** Al Pacifico, Co 15; Doug Skinner, Co. 13; Herb Rundgren, LCFR.

LCFR Communications: Dep. Chief Corey Parker, Manager Patty Turner, Specialists Mike Carter.

Meeting started with general discussion of the issues and questions from the December EMS Operations meeting.

---

**Policy:**

*Draft Policy:* D. Skinner presented the draft policy issues from the EMS Operations Meeting.

There was four issues or questions brought from the EMS Operations Committee members, which they asked for answers and/or amendments with regard to the Bariatric Response Policy.

1. A dispatch trigger.
2. Dispatch of support unit at the receiving facility.
4. Issue with taking MAB out of the resources available for Bariatric Response.

**Dispatch Trigger:** The committee and Communication personnel discussed the question of a need for a dispatch trigger for bariatric calls. Reviewed proposed Bariatric Response Policy. It was the consensuses of the group, that to add another question to the EMD would increase the time from call received to dispatch, and thus increase total dispatch times. Additionally, it was discussed that currently and in recent past, when people call 911 for an emergency and have a large patient at the location they tend to provide that information on their own, thus it can be added in the CAD and a part of the dispatch. If the information is provided then a bariatric response can be dispatched. The other part of the dispatch question included; if there was too many resources or equipment on an initial response? The group discussed this point and felt that current practices for similar type calls including medivac calls, box alarm calls, and tanker area calls, all place additional response resources and allow for the coverage of the worst case scenario. It also allows the first arriving units to assess the scene and needs at the scene, and to cancel any response not needed. Furthermore, it was estimated that the quantity of bariatric calls was currently significantly low, approximately 6 to 10 a month, and wouldn’t adversely affect the response system.
As part of this issues, communication liked the definition provided in the policy, but recommended that under the Dispatch/Communications section, part 1, that we change this part to: “When LC_CFRS Communications receives a call for a bariatric patient as defined above in the definitions section, the LC-CFRS Communications Division should dispatch a Bariatric Response.” This was acceptable by the committee and communications group. Patty Turner will run the information by Dr. Morgan OMD, to ensure his agreement with the process involved with the EMD and dispatch process.

Support Unit at receiving facility: The issue with dispatching a support unit to the receiving facility was discussed and was a good recommendation. It was the consensus to place an additional part to the Dispatch and Communication Section of the policy to ensure that the EMS units request an engine or truck be sent to the receiving facility to provide manpower and lifting assistance.

The Bariatric Committee wishes to thank the Communication Division for their time and work on these issues. It was a professional process and provided to be informative all involved.

Destination determination: Under the general deployment section, part 8, there was a question related to why not the closest hospital, versus the most appropriate hospital. The discussion of the committee was that part 8 is written to answer that question by contacting the facility before transport, to alleviate any issues with the transport. When the Bariatric Committee researched this question, Captain Rundgren met with all the receiving facilities and discuss what the capabilities they have to handle bariatric patients. INOVA hospitals had no issues, and Stone Springs had one caveat that if the patient was a bariatric surgery patient they needed to go to Reston Hospital. Although all hospitals could receive and deal with a bariatric patients, it was also discussed that to provide the best quality care for such patients and prevent further stress upon the patient, it would be appropriate to contact the receiving hospital and ensure that they could deal with the patient and prevent further stress upon the patient. It was the consensus that no amendment of the policy in regard to this issue was needed.

MAB: The committee discussed the issue with regard to the use of the MAB for transport of single bariatric patients. The issue brought form the EMS Operations Committee was that a couple people felt taking the resources out of the capabilities of bariatric transport would cut the capabilities of the MAB. Additionally, it was noted that the LCFR bariatric equipment on the MAB was provided as a part of the grant from the federal UASI program, and is a part of the MAB unit for the region wide mass transportation response. Additionally, it was discussed that the county Fire Rescue received a letter from the Virginia Office of EMS, advising that the MAB is not a licensed transport unit and shouldn’t be used as a unit on a regular basis for single patient transport, unless it is extenuating circumstances and or a Multiple Causality Incident or MCI. It was the consensus that due to the need to provide best practices for our EMS system, that the primary transport vehicles for bariatric patients should be in Virginia Office of EMS Certified
patient transport vehicles, and only in extreme cases that the MAB could be used. The wording of the General Deployment Section, part 15 will be amended to signify that the MAB is an available resource but should only be used in extreme cases or when an MCI has been declared.

**Other Actions:**

Discussed presenting the policy with amendments to EMS Operations Committee at next meeting. D. Skinner will send out the draft material to EMS Ops Chair Andrews, Dep. Chief Salazar, OMD Dr. Morgan, Dep. Chief Parker, Manager Turner and Specialist Carter for further comments before next EMS Operations meeting.

Meeting Adjourned at: 1930.

Next meeting will depend on the EMS Ops Committee needs.