2002

Mapping horse trials and events: A survey of emergency response capabilities

Jennifer Wicks
The University of Montana

Follow this and additional works at: https://scholarworks.umt.edu/etd

Let us know how access to this document benefits you.

Recommended Citation
https://scholarworks.umt.edu/etd/5882

This Thesis is brought to you for free and open access by the Graduate School at ScholarWorks at University of Montana. It has been accepted for inclusion in Graduate Student Theses, Dissertations, & Professional Papers by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.
Permission is granted by the author to reproduce this material in its entirety, provided that this material is used for scholarly purposes and is properly cited in published works and reports.

**Please check "Yes" or "No" and provide signature**

Yes, I grant permission

Yes, I do not grant permission

Author's Signature: [Signature]

Date: [Date]

Any copying for commercial purposes or financial gain may be undertaken only with the author's explicit consent.
MAPPING HORSE TRIALS AND EVENTS:
A SURVEY OF EMERGENCY RESPONSE CAPABILITIES

By Jennifer Wicks
B.S. The University of Delaware, 1992

Presented in partial fulfillment of the requirements
for the degree of Master of Arts
The University of Montana
2002

Approved by
Chairperson
Dean, Graduate School

Date
11-26-02
Eventing is the triathlon of equestrian sports. Each horse and rider team must successfully complete the three phases: dressage, cross-country, and show jumping. Of these three phases, cross-country is considered the most challenging, exciting, and dangerous. There is a certain amount of risk and danger associated with participation in eventing, especially during the cross-country phase of competition. Accidents do occur and when they do, it is imperative that medical personnel reach the accident in a timely and efficient manner. For this to happen, qualified medical personnel must be physically present on the cross-country course or in close proximity to it. Communication must be in place to notify medical personnel when and where an accident occurs. They must be familiar enough with the course to efficiently navigate around it to any place a potential accident may occur. This involves knowledge of the spatial relationships between the physical features encountered on any given cross-country course. One tool for effectively communicating spatial relationships is the map. Maps have the potential to help facilitate understanding of the physical features encountered on a cross-country course and thus perhaps help improve response time to accidents that may occur.

All of the events included in this study provide cross-country maps of some kind. In addition to cross-country maps, it is recommended that events also provide overall site maps, maps showing routes to the nearest offsite medical facility, and maps showing emergency response routes to cross-country jumps. In many cases, improvements could be made to existing maps. Organizers, safety coordinators, and medical personnel listed features they would like included on maps. Many of these features are currently not included on existing maps. Inclusion of standard features such as a north arrow, legend, scale, date, and author should also be considered.
# CONTENTS

Abstract  ii  
Contents  iii  
List of Illustrations  v  
List of Tables  vi  
List of Abbreviations  vii  
1. INTRODUCTION  1  
2. BACKGROUND  9  
   Classification of Events  10  
   Horse Related Injuries  12  
   Recognition of Safety Issues  14  
      Medical personnel  14  
      Access and response time  16  
   Types of Emergency Medical Services  18  
   Safety Coordinator’s Manual  19  
   GIS and GPS Use in Sporting Events  22  
   E911  23  
   Summary  25  
3. METHODOLOGY  27  
   Data Collection Techniques  28  
   In-Person Interviews  30  
      Advantages  30  
      Disadvantages  33  
   Design of In-Person Interviews  37  
      Key issues  37  
      Draft interview questions  38  
      Pre-test  44  
      Final interview  45  
   Purposeful Selection  46  
   Summary  49  
4. RESULTS OF THE IN-PERSON INTERVIEWS  50  
   Interview for Organizers and Safety Coordinators  50  
      Event site  51  
      Emergency response  55  
      Maps  64  
      Attitudes about maps  66  
   Interview for Medical Personnel  73  
   Summary  80  
5. MAPPING TECHNIQUES  81  
   Existing Maps  81  
   New Maps  96  
   Recommendations  114  
   Summary  116  
6. SUMMARY AND CONCLUSION  119  

iii
ILLUSTRATIONS

Figure 1: United States Eventing Association Areas 11
Figure 2: Existing Map of Cam-Plex Facility 84
Figure 3: Existing Map of Arrowhead Site 85
Figure 4: Existing Map of Jackson Hole Facility 86
Figure 5: Existing Map of Powder Basin Cross-Country 87
Figure 6: Existing Map of Herron Park Cross-Country 88
Figure 7: Existing Map of Arrowhead Cross-Country 89
Figure 8: Existing Map of Juniper Hill Cross-Country 90
Figure 9: Existing Map of Jackson Hole Cross-Country 91
Figure 10: Existing Map of Fair Hill Roads and Tracks 92
Figure 11: Existing Map of Fair Hill Site and Cross-Country 93
Figure 12: Existing Map of Camino Real Roads and Tracks 94
Figure 13: Existing Map of Camino Real Cross-Country 95
Figure 14: New Map of Powder Basin Novice Course 99
Figure 15: New Map of Powder Basin Training Course 100
Figure 16: New Map of Herron Park Training Course 101
Figure 17: New Map of Herron Park CIC** Course 102
Figure 18: New Map of Warfield Equestrian Park 103
Figure 19: New Map of Arrowhead Cross-Country 104
Figure 20: New Map of Juniper Hill Training Course 105
Figure 21: New Map of Jackson Hole Training Course 106
Figure 22: New Map of Jackson Hole CIC** Course 107
Figure 23: New Map of Jackson Hole Advanced Course 108
Figure 24: New Map of Fair Hill CCI*** Course 109
Figure 25: New Map of Fair Hill Site 110
Figure 26: New Map of Camino Real Site 111
Figure 27: New Map of Camino Real CCI** Roads and Tracks 112
Figure 28: New Map of Camino Real CCI** Course 113
# Tables

<p>| Table 1: | Types of Emergency Medical Service Providers by State | 20 |
| Table 2: | Events with a Site Map | 51 |
| Table 3: | Events with a Cross-Country Map | 51 |
| Table 4: | Emergency Vehicle Route to Offsite Medical Facility Map | 51 |
| Table 5: | Frequency of Changes Made to Cross-Country Routes | 53 |
| Table 6: | Medical Personnel on Site During Cross-Country | 56 |
| Table 7: | Number of Medical Personnel on Site for Each Event | 56 |
| Table 8: | Emergency Routes Determined at Horse Trials | 62 |
| Table 9: | Emergency Routes Determined at Three-Day Events | 62 |
| Table 10: | Types of Maps Available at Horse Trials and Three-Day Events | 64 |
| Table 11: | Organizers and Safety Coordinators Correctly Listing Available Maps | 65 |
| Table 12: | People Who Created Maps Used by Events | 65 |
| Table 13: | Features That Should Be Included on Maps at Events According to Organizers and Safety Coordinators | 67 |
| Table 14: | Types of Maps Organizers and Safety Coordinators Think Should Be Available at Events | 68 |
| Table 15: | Methods of Obtaining GPS by Events | 70 |
| Table 16: | Obstacles Faced by Events in Using New Technology | 72 |
| Table 17: | Number of Events Medical Personnel Worked Including the Current Event | 74 |
| Table 18: | Whether or Not Medical Personnel Received Certain Types of Maps | 75 |
| Table 19: | How Medical Personnel Use Maps at Events | 76 |
| Table 20: | Features That Should Be Included on Maps at Events According to Medical Personnel | 76 |
| Table 21: | Medical Personnel Who Planned Emergency Response Routes to Jumps on the Cross-Country Course | 77 |
| Table 22: | Methods Used by Medical Personnel to Plan Emergency Response Routes to Jumps on the Cross-Country Course | 78 |
| Table 23: | Medical Personnel’s Level of Familiarity with the Cross-Country Course | 79 |</p>
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHSA</td>
<td>American Horse Shows Association</td>
</tr>
<tr>
<td>ALS</td>
<td>Advanced Life Support</td>
</tr>
<tr>
<td>ATV</td>
<td>All Terrain Vehicle</td>
</tr>
<tr>
<td>BLS</td>
<td>Basic Life Support</td>
</tr>
<tr>
<td>CCI</td>
<td>International Three-Day Event</td>
</tr>
<tr>
<td>CCIO</td>
<td>Official International Three-Day Event</td>
</tr>
<tr>
<td>CCN</td>
<td>National Three-Day Event</td>
</tr>
<tr>
<td>CH</td>
<td>International Championship Three-Day Event</td>
</tr>
<tr>
<td>CIC</td>
<td>International Horse Trial</td>
</tr>
<tr>
<td>EMS</td>
<td>Emergency Medical Services</td>
</tr>
<tr>
<td>EMT</td>
<td>Emergency Medical Technician</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>RN</td>
<td>Registered Nurse</td>
</tr>
<tr>
<td>USCTA</td>
<td>United States Combined Training Association</td>
</tr>
<tr>
<td>USEA</td>
<td>United States Eventing Association</td>
</tr>
<tr>
<td>*</td>
<td>One Star Level of Competition</td>
</tr>
<tr>
<td>**</td>
<td>Two Star Level of Competition</td>
</tr>
<tr>
<td>***</td>
<td>Three Star Level of Competition</td>
</tr>
<tr>
<td>****</td>
<td>Four Star Level of Competition</td>
</tr>
</tbody>
</table>

vii
CHAPTER 1

INTRODUCTION

The equestrian sport of eventing is a challenging, thrilling and often dangerous competition. It began with the cavalry’s quest for the perfect charger – a horse “that was fast, brave, enduring, and obedient to the end.”¹ Eventing was first introduced at the Olympic Games in Stockholm, Sweden in 1912:

The tests of this newly organized equestrian competition were patterned after the training and testing of military chargers – precision, elegance, and obedience on the parade ground; stamina, versatility and courage on marches and in battle; cross-country jumping ability and endurance in traveling great distances over difficult terrain and formidable obstacles in the relaying of important dispatches; and jumping ability in the arena to prove the horse’s fitness to remain in service. Spread over consecutive days, it was a complete test for the Army horse.²

In time, the cavalry was replaced with mechanized vehicles and equipment. Eventing shifted from a military sport to a civilian one. In 1959, the United States Combined Training Association (USCTA) was born as a non-profit organization to promote and develop the sport of eventing in the United States.

Eventing is the triathlon of equestrian sports. At its core are three distinct phases: dressage, cross-country, and show jumping. Together, the three phases challenge the ability, versatility, and preparedness of horse and rider. In dressage, the objective is for the horse to be “calm, supple, loose and flexible, but also confident, attentive and keen,

thus achieving perfect understanding with his rider.”\(^3\) This phase takes place in either a standard arena (20 x 60 meters) or a small arena (20 x 40 meters) on the flat with no jumps. Depending upon the level of competition, horse and rider are required to perform a set pattern of movements. The purpose of dressage is “to insure that the proper foundation has been laid for the broader demands of the complete competition.”\(^4\) Of the three phases, dressage is the second most influential in determining the final score of each horse and rider partnership.

Cross-country measures the speed, endurance and jumping ability of the horse over natural obstacles. It demonstrates the rider’s knowledge of pace and the use of his horse across country.\(^5\) It is a timed event over a pre-determined course ranging from just under one mile to more than ten miles in length. The rider walks and studies the course prior to riding it for the competition. The horse, however, is not afforded the same luxury and sees the course for the first time when asked to negotiate it for the competition. The jumping efforts include logs, ditches, banks, water, and other similar obstacles. Solid in nature, they do not give if a horse hits them. Considered the most dangerous phase, cross-country poses the highest risk of injury and even death for horses as well as riders. Of the three phases, cross-country is the most influential in determining the final results of the competition.

Show jumping is “designed to prove the suppleness, obedience, and jumping ability of the horse.”\(^6\) It is a timed phase in which the rider has the opportunity to walk


and inspect the course prior to riding it. It takes place in an arena and includes stadium type fences such as wooden rails, gates, barrels and potted flowers. These jumps are designed to fall if a horse hits them. Horse and rider are less likely to experience serious injury while participating in show jumping, however the possibility does exist. Of the three phases, show jumping is the least influential in determining the final placing of the horse and rider.

The winner is the rider and horse combination completing the entire event with the fewest penalty points. Dressage movements are scored subjectively on a scale from 1 to 10, with 10 being the highest. Each competitor’s dressage score is converted into penalty points. Ideally horse and rider finish the event on their dressage score implying no penalties were incurred in either of the jumping phases. During the cross-country, penalties accrue for refusal to jump an obstacle, fall of horse or rider, going off course, or exceeding the time allowed. Show jumping has all of the same penalties with the addition of penalties for knocking down a jump or any portion of a jump.

Eventing is an inherently risky sport. Accidents do and will happen, most notably on the cross-country course. In the last few years, much attention was directed toward assuring safety on cross-country courses. Many people question whether the sport has become too dangerous. Just as many people are quick to defend the sport, suggesting the sport itself is not dangerous, but other factors contribute to accidents, such as inexperienced riders, overfaced horses, or poorly designed jumps.

\[^7\] Overfaced is a term used to refer to a horse and/or rider who is asked to jump a jump that they are not prepared to do. They may be lacking in one or a combination of such things as proper training and experience.
Safety is being addressed from several fronts. Licensed course designers are evaluating cross-country courses, at the preliminary level and above, with safety as one of the criteria. This is not to say that courses should be made easier. Easy courses give riders a false sense of security in thinking they have mastered the current level and are ready to move up to a higher, more difficult level. In fact, cross-country courses should be challenging and ask appropriate questions for the level being ridden. They should make riders think, teaching them how to ride while providing a positive experience for the horse.9

It is important to instruct cross-country course designers and builders regarding safety, with emphasis placed on building safe jumps. The galloping track between jumps must also be given consideration. In addition, organizers, officials and competitors must be educated regarding overall course safety. Riders in particular must be encouraged not to overface their horses or themselves when entering competitions. It is essential both horse and rider gain sufficient experience and mastery of the level currently being competed before moving up to a higher one. Despite everyone’s best efforts to ensure safety, accidents will occur and when they do, an efficient and effective emergency response system must be in place, ready to respond.

Because of the high risk of injury or death to horse and rider, competitions recognized by the USCTA require appropriate medical personnel be present on the grounds of the competition and be able to respond quickly and efficiently to any accident that may occur. Qualified Emergency Medical Services (EMS) must be able to quickly determine a direct, passable and fast route to any particular site on the cross-country

---

course. In order for EMS to respond to an emergency, they must understand how the course is laid out, where the jumps are located and what terrain is suitable for their vehicle to drive over.

National regulations define the responsibilities and qualifications of medical personnel at all sanctioned events. Securing medical services is generally not a problem. Events have medical personnel on site with suitable equipment. Problems occur with the coordination and response time of medical personnel to emergencies. Both the USCTA and the International Eventing Safety Committee emphasize the need to establish a maximum acceptable response time to accidents as well as the best route to any accident.\(^\text{10}\) It is imperative that EMS be able to determine the fastest, most direct and passable route to any given point on the cross-country course where an accident may occur. An injured rider’s health and survival are dependent upon the quick response of EMS.

Mapping is one method for providing accurate information. The USCTA Safety Committee recommends a minimum of three maps for each competition site: a map of the emergency vehicle route to the closest hospital, a map of the competition site and a map of the cross-country course.\(^\text{11}\) Unfortunately, guidelines and procedures do not currently exist to assist the event organizer or the safety coordinator in creating these maps. Most event officials and volunteers are not cartographers nor do they have adequate funds available to hire cartographers to produce quality maps. The information to be included


on event maps needs to be defined. What kinds of features would EMS personnel suggest are important in helping them perform their duties? A list of suggested features would provide a reference for organizers and safety coordinators. Methods for creating or improving maps should be offered. Most likely, event officials or volunteers will create and update maps associated with their respective competitions. Lacking a cartographic background, some of these people may find suggested methods for making maps helpful. Finally the maps should be utilized to answer various geographic questions. Some possible applications include planning access routes to cross-country jumps for EMS personnel, highlighting jumps resulting in the highest numbers of refusals or eliminations, or planning for future improvements to the cross-country course.

**Purpose Statement**

*The purpose of this study is to understand how emergency response is currently handled in the equestrian sport of eventing. How the sport of eventing utilizes maps with respect to emergency response will also be examined.*

In order to improve emergency response, we must first understand how accidents are currently managed at equestrian events. To accomplish this, event organizers, safety coordinators and medical personnel were personally interviewed using one of two surveys. One survey was designed specifically for organizers and safety coordinators while a second one was developed for medical personnel. Of particular interest in this study are the three maps mentioned in the Safety Coordinator's Manual: Map of the Emergency Vehicle Route, Map of Competition Site, and Map of Cross-Country Course. Are these maps even provided at events? Are all or just one or two of them made
available? If available, what information is presented on the map(s)? What information should be mapped? What information do medical personnel need in order to make them better able to respond to accidents? What information would be helpful to organizers and safety coordinators? How are the maps currently created? These are examples of the types of questions asked of event organizers, safety coordinators and medical personnel.

The USCTA is a national organization, which oversees all recognized competitions in the United States. This study was limited to events falling under the jurisdiction of the USCTA. The USCTA divides the country into ten geographic regions called Areas. These closely correspond to the following regions: New England, Mid-Atlantic, Southeast, two Areas in the Midwest/Plains, South-Central, Southwest, Northwest and Alaska, Rocky Mountains and California/Hawaii. A purposeful sample of seven events was selected from different Areas in the United States. The objective in selecting events was to include as many geographic regions as possible as well as a cross section of levels of competition.

Since commencing this thesis, two prominent organizations in the sport of eventing officially changed their names. The United States Combined Training Association changed its name to the United States Eventing Association on December 1, 2001. The American Horse Shows Association changed its name to USA Equestrian on July 10, 2001. This thesis references both organizations prior to and after their change of names. References to the United States Eventing Association after December 2001 will use the new name with the acronym USEA. References prior to December 2001 will use the old name with the acronym USCTA. References to USA Equestrian after July 2001 will use

12 See page 11 for a map showing the ten geographic areas defined by the United States Eventing Association.
will use the new name. References prior to July 2001 will use the old name with the acronym AHSA.
CHAPTER 2
BACKGROUND

Eventing began as a sport for the cavalry. It was designed to test the qualities desired in the perfect cavalry charger. Making its debut at the 1912 Stockholm Olympics, eventing was open only to the military. Civilians were excluded. Cavalry officers continued to compete and represent the United States in international eventing competitions through 1948. Civilians first competed in eventing at the 1952 Olympics in Helsinki.¹³ Once the US Cavalry disbanded, officers continued to compete. They also began to coach civilians new to eventing. There was a need for civilian horses and riders to gain experience and training in preparation for Three-Day Events. In 1959, the United States Combined Training Association (USCTA) was formed to address this need.¹⁴

The USEA is a non-profit organization that oversees the sport of eventing in the United States, serving several administrative tasks. National standards guarantee consistency in the levels of competition offered, from entry-level all the way up through the most advanced. A grading system ensures systematic training and development of the horse. Rules and regulations promote fairness and safety. Officials are trained and licensed. The USEA also provides educational material and activities that support officials and competitors.

¹⁴ Effective December 1, 2001, the United States Combined Training Association officially changed its name to the United States Eventing Association (USEA).
The first civilian event in the United States took place in Bryn Mawr, Pennsylvania in 1949. The sport established roots in the eastern portion of the United States. Over the years, it spread throughout the entire country. In 2001, recognized events were held in forty states. In order to better serve the membership spread throughout such a large geographic area, the USEA divides the country into ten areas. See Figure 1 for a map of the ten areas.

Classification of Events

Events are categorized as either Horse Trials or Three-Day Events. Both Horse Trials and Three-Day Events include dressage, cross-country, and show jumping. The same general rules and policies apply to both types of eventing competitions. There are several major differences, which will be discussed. A summary of the levels of competition offered at both Horse Trials and Three-Day Events will follow.

Horse Trials take place over one, two, or three days and comprise the distinct phases of dressage, cross-country and show jumping. Dressage must be ridden first. Cross-country and show jumping follow in any order, although it is preferred that cross-country precede show jumping. Three-Day Events must take place over a minimum of three days. Dressage must be ridden on the first day, followed by cross-country on the second day and show jumping on the third day. The most significant difference between Horse Trials and Three-Day Events is the structure of the cross-country phase. In Three-Day Events, cross-country includes four phases: Phase A, roads and tracks; Phase B, steeplechase; Phase C, roads and tracks; and Phase D, cross-country obstacles. Horse Trials only include Phase D, cross-country obstacles. Other differences worth mentioning

---

United States Eventing Association Areas

Figure 1:
United States Eventing Association Areas

Legend
- Area I
- Area II
- Area III
- Area IV
- Area V
- Area VI
- Area VII
- Area VIII
- Area IX
- Area X
are Three-Day Events are restricted to the upper levels of competition and all horses must pass veterinary inspections in order to compete.

The levels of competition for Horse Trials, ranging from lowest to highest, are: novice, training, preliminary, intermediate, and advanced. Novice introduces horses and riders to the sport of eventing. Training level further develops competitors who have some experience with eventing. Preliminary, intermediate and advanced Horse Trials prepare horse and rider for the corresponding level of competition in Three-Day Events. The majority of events in the United States fall into the category of Horse Trials. Most participants in the sport compete at novice and training level.

Three-Day Events are classified by category and level. Categories indicate the extent of foreign participation and include: National Three-Day Event (CCN), International Three-Day Event (CCI), International Championship Three-Day Event (CH), and Official International Three-Day Event (CCIO). The following indicates level: One Star (*), Two Star (**), Three Star (***) and Four Star (****). One Star (*) competitions serve as an introduction to Three-Day Events while Four Star (****) competitions are reserved for the most experienced and successful horses and riders. For example, a Three-Day Event might be classified as CCI** (International Three-Day Event Two Star) or CCN* (National Three-Day Event One Star). Any combination of category and level is possible.

Horse Related Injuries

According to a study completed by Shelley Otoupalik, research has been done and data exists documenting human injuries sustained while participating in horse related

---

activities. Most of the research addresses the types of injuries sustained while participating in equestrian activities. Extremity injuries are the most common followed by head injuries. Head injuries account for most of the deaths associated with horse related accidents.\textsuperscript{17} Otoupalik's study addresses the demographics of people who sustain horse related injuries. For the group of people younger than their mid-forties, women outnumber men in the number of injuries reported. For the group of people aged mid-forties and older, a shift occurs and men outnumber women in injuries reported. Horse related injuries are not limited to riding accidents. A large number of injuries are sustained by people who are not riding but who are otherwise directly involved with horses in some fashion.\textsuperscript{18}

Otoupalik's study of horse related injuries in western Montana was completed in the spring of 2001. This study was not limited to the sport of eventing. It included all horse related activities in western Montana. This research examined all of the horse related injuries that resulted in a visit to St. Patrick's Hospital Emergency Room in Missoula, Montana between 1995 and 2000. This study found that 37\% of injuries involved extremities, 20\% involved the face and head, 13.2\% involved neck and spinal injuries, and one fifth of the remaining injuries were considered life threatening and involved other parts of the body such as the chest and abdomen.\textsuperscript{19} The study focused on head injuries since they result in the majority of deaths in horse related accidents.

Whether or not protective headgear was worn was considered. Nationally, regular use of protective headgear is low for all equestrian activities. Otoupalik suggests that education

\textsuperscript{17} Shelley Smith Otoupalik, "Horse Related Injuries and Deaths in Western Montana" (Master of Science in Nursing, University of Wisconsin-Eau Claire, 2001), 2.

\textsuperscript{18} Otoupalik, "Horse Related Injuries," 3.

\textsuperscript{19} Otoupalik, "Horse Related Injuries," 52,54.
about the proper use of protective headgear would go a long way in preventing many of the head injuries seen in horse related accidents. The USEA requires all riders to wear protective headgear while riding at any time throughout the duration of all competitions.

Another interesting aspect of the study was the number of horse related injuries seen at St. Patrick’s Hospital. “Over the six year study period, horse related injuries accounted for almost five percent of all patients seen in this Emergency Department.”20

Equestrian activities are risky and dangerous. Although many times, minor injuries are sustained, serious or life threatening injuries can and do occur as well. To date, research has focused on the nature, extent and causes of horse related injuries. Evidence exists to suggest that horse related injuries can be of a very serious and life threatening nature demanding prompt medical attention. “Although many horse related incidents result in minor injuries, the actual mechanism of injury related to horse accidents (blunt trauma) demands priority attention from health care providers prepared to intervene in a timely and aggressive manner.”21 Time appears to be an important factor in treating certain injuries. Little if any research has been done in the area of improving response time to horse related accidents. This study seeks to address the problem of improving emergency response time by looking at the issue spatially through the use of maps. This study narrows its scope to include only the sport of eventing rather than all equestrian activities.

**Recognition of Safety Issues**

*Medical Personnel*

Recognition of the need to address safety issues at equestrian events is occurring on a national level as well as at the international level, following the death of five British

---

20 Otoupalik, "Horse Related Injuries," 55-56.
21 Otoupalik, "Horse Related Injuries," 56.
riders during the 1999 competition season.\textsuperscript{22} The USCTA and the American Horse Shows Association (AHSA) approved a recommendation made by the USCTA Safety Committee that became effective April 1, 1999. The recommendation called for a safety coordinator and medical personnel to be present at every recognized event in the United States:

All competitions shall furnish a safety coordinator, who shall have no other duties during the jumping phases, responsible for the establishment and coordination of medical services, including the transportation of injured riders.\textsuperscript{23}

It is the job of the safety coordinator to arrange for the EMS and any other medical personnel to be present at the event and to make sure they have the information available to perform their required duties.

Qualified medical personnel with no other duties and suitable medical equipment must be present during the scheduled schooling sessions over fences and during all scheduled performances. Qualified medical personnel are defined as a person who is currently certified or licensed in the profession and trained in pre-hospital trauma care. EMT/Paramedics who are pre-hospital-trauma trained is the minimum requirement.\textsuperscript{24}

The new 2002 USA Equestrian Rules for Eventing make no changes to the safety coordinator's responsibilities and the medical personnel's qualifications and responsibilities. There are a few changes in the wording, but this serves to clarify understanding rather than change the meaning and intention of the rules. There is, however, a significant addition regarding access for medical personnel.

The designated medical personnel should have the capability of rapid deployment to any part of the arenas or courses in adverse conditions. Should this access not be available, the Ground Jury, on the advise of the Technical Delegate and the

\textsuperscript{23} Committee, \textit{2000 AHSA Rules}, 68.
\textsuperscript{24} Committee, \textit{2000 AHSA Rules}, 68.
Course Designer, must consider alternatives including removal of the inaccessible portion.\textsuperscript{25}

This addition emphasizes the importance access plays in responding to accidents. All the medical personnel in the world will do no good if they are unable to reach a person in need of their immediate care and attention. This is particularly true on cross-country courses.

Access and Response Time

There are three important elements that affect access and response time on cross-country courses. First, medical personnel must know when an accident occurs. Second, medics must be able to locate an injured person and navigate the course to reach an injured person. Third, they must be able to physically move around the course, by ambulance, four-wheel drive truck, all terrain vehicles, bicycle, foot, or some other means.

Communication is key in making sure medics know when an accident occurs. Two-way radio, CB, HAM radio, cell phone, and personal interaction are examples of types of communication available. Which method or combination of methods is used will vary from event to event. Many variables that affect the choice of communication method include: acreage encompassed by the course, terrain, event budget, number of medical personnel, and size of the event. A hilly course surrounded by mountains may experience limited cell phone or radio coverage. A new event just getting started may not have the funds to purchase radios. Large events with numerous officials, jump judges, and medical personnel may require a radio system supporting multiple channels with one channel

\textsuperscript{25} USA Equestrian Eventing Committee, 2002 \textit{USA Equestrian Rules for Eventing} (Lexington, Kentucky: USA Equestrian, Inc., 2001), 25.
dedicated to emergency response. These are just a few possibilities for communication. There are as many potential scenarios as there are events.

Ideally, medical personnel will walk or drive the entire cross-country course prior to the start of the competition in order to familiarize themselves with the course and how to navigate all areas of the course. Maps are another means by which medics may familiarize themselves with the course. They offer an overview of the entire course at a glance. Medical personnel may refer to maps throughout the day for the purpose of refreshing their memory of where things are located on the course. This might be particularly useful when there are few or no accidents and the medics have not been out on the course since the start of the competition. For those instances when medics are unable to inspect the cross-country course prior to competition, maps are invaluable in helping determine access to the course. Maps also provide a means for pre-planning fast, passable routes to individual jumps or clusters of jumps. If these routes are marked on a map, the medical personnel may refer to them, decreasing their response time. This is particularly important for injuries in which time is of the essence.

Cross-country courses are designed and built with a galloping horse and rider in mind. In most areas of the United States, grass and turf are the preferred footings for cross-country courses. In drier climates, courses consist of soil sparsely covered by vegetation such as prairie grasses, sage, cactus and non-native weeds. The ground on which horses gallop impacts their soundness, performance and longevity. It is very important to minimize the amount of shock absorbed by the horse’s legs. The harder the surface of the galloping track, the more shock that is absorbed by the horse. This tends to
affect the bones and joints of the horse and may even shorten his competitive career. The goal is to provide a springy, shock-absorbing surface for cross-country courses.

A springy, shock-absorbing surface is not the ideal surface on which to drive a standard ambulance. Smooth, hard materials, such as a paved road, provide the desired surface. This is not to say that ambulances cannot navigate cross-country courses. They can under ideal conditions. If, for example, the course is wet, slippery, muddy, or steep, it may not be accessible by ambulance. Horse events run, rain or shine. Cross-country courses are not always subject to perfect conditions. A course that is acceptable for a horse to gallop over may not always be acceptable for an ambulance to drive over. This factor needs to be considered when planning for emergency response to the cross-country course. In some circumstances, four-wheel drive ambulances are available. Where they are not available, alternatives such as four-wheel drive trucks or all terrain vehicles equipped with the required medical supplies should be considered.

Types of Emergency Medical Services

Clarification in the types of Emergency Medical Services (EMS) available is worth mentioning. There are generally two types of EMS: Advanced Life Support (ALS) providers and Basic Life Support (BLS) providers. “ALS providers are usually Paramedics or Advanced Emergency Medical Technicians who can provide an advanced airway to the victim and administer life-saving drugs and procedures.” An ALS provider is the minimum required to serve at events. BLS providers are generally “

Basic Emergency Medical Technicians who are trained in basic procedures such as first

---

28 Committee, 2002 USA Equestrian Rules for Eventing, 25.
aid and CPR." BLS providers may provide initial assistance to victims; however an Advanced Emergency Medical Technician or Paramedic must provide final care and assistance.

Emergency Medical Services vary throughout the United States. In some instances, individual states regulate EMS for the entire state, while other areas regulate by regions, counties, or cities. Events included in this study took place in five different states with one event covered by EMS personnel from two states. Administration and licensing of EMS personnel occurs at the state level in all of these cases. For a list of EMS personnel by state, refer to Table 1.

Air support is available in each of the states included in this study. Modes of air transport include rotor-wing and fixed-wing aircraft. Air support services are associated with medical facilities equipped to handle trauma situations. In most cases, these medical facilities are based near larger populations. Air ambulances may be able to access most events, however, if they must travel a great distance from their base, a ground ambulance may have a faster response time, especially if it is based in close proximity to the event. Location of the horse event and its proximity to an air support service will determine how beneficial this service might be.

Safety Coordinator's Manual

In October 1999, the USCTA Safety Committee published a manual to assist Safety Coordinators. It offers direction and a set of guidelines designed to help plan for the medical care required at USCTA recognized events. Everything from the Safety Coordinator’s duties, locating and arranging for EMS coverage, types of equipment, the

---

29 Lowe, "Emergency Medical Care,” 40.
30 Lowe, “Emergency Medical Care,” 40.
### TABLE 1
TYPES OF EMERGENCY MEDICAL SERVICE PROVIDERS BY STATE

<table>
<thead>
<tr>
<th>Delaware</th>
<th>Maryland</th>
<th>Montana</th>
<th>Texas</th>
<th>Washington</th>
<th>Wyoming</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Responder</td>
<td>Emergency Medical Dispatch</td>
<td>First Responder</td>
<td>Emergency Care Attendant</td>
<td>First Responder</td>
<td></td>
</tr>
<tr>
<td>EMT – Basic</td>
<td>Basic EMT</td>
<td>EMT – Basic Intermediate EMT</td>
<td>EMT – Basic Intermediate</td>
<td>EMT – Basic Intermediate Life Support Technician</td>
<td>EMT – Basic Intermediate EMT</td>
</tr>
<tr>
<td></td>
<td>Cardiac Rescue Technician</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cardiac Rescue Technician (NREMT-I99)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paramedic</td>
<td>Paramedic</td>
<td>Paramedic</td>
<td>Certified Paramedic</td>
<td>Paramedic</td>
<td>Paramedic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Licensed Paramedic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

role of weather, and developing a communication plan are covered. The manual also mentions the need for three different maps: Map of the Emergency Vehicle Route, Map of Competition Site, and Map of Cross-Country Course. These pages are blank except for the title. No other information regarding the maps is discussed. This presents an obvious gap that needs to be addressed. There are many factors that must be considered when creating such maps. Offering suggestions and examples rather than blank pages might be more useful.

The skill level of the map user must be considered, as emergency situations place increased stress on an individual with the need to respond quickly because a life may be at stake. The ability to read, understand and analyze information from a map, whether it be hard copy or in digital format, will vary from person to person. Relevant information needs to be presented in an easy to understand format that can be grasped quickly. The skill level of the map creator must also be addressed. If the eventual goal is for event organizers and safety coordinators to develop maps for their events with, or without, the assistance of a cartographer, appropriate technology and methods must be considered.

Two key components to ensuring the maps meet the needs and skill levels of the users are communication and cooperation. It is essential that the event organizer, safety coordinator, EMS, and local hospital personnel work together to provide the best possible care for victims of any accident that may occur during an event. Each person has his own goals for ensuring a safe, positive experience for each rider and horse at the event. For example, the organizer is interested in maintaining quality footing in the galloping lanes.

---

They will not want ambulances, ATVs or other vehicles driving over the course compacting and chewing it up or even rutting the ground in wet conditions. Yet EMS needs access to an accident by the most direct route without worrying about how they might impact the ground. A compromise encouraging vehicle passage in designated places would meet the needs of both. These sorts of things need to be communicated and understood by all affected personnel.

GIS and GPS Use in Sporting Events

GIS and GPS are beneficial tools for planning and implementing emergency response during the cross-country phase at equestrian events. GIS used to position EMS and other personnel allows for their key placement at locations throughout the course, enabling them to best respond to an accident. GIS could also determine the fastest passable routes to any jump on the cross-country course. GPS on the other hand is used to initially map the course as well as later update changes. These are just a few examples of applications. The list need only be limited by one’s imagination.

There are other sporting events that have already employed geographic information system (GIS) and Global Positioning System (GPS) technology. France hosted the 1998 World Cup Soccer Tournament. Several cities put GIS to use during the planning and managing of the tournament to help locate police, fire, medical and security personnel. During the competition, the police used real time GPS to keep track of and help coordinate the placement of key mobile units. In order to prepare for the 1997 Swedish National Cross-Country Skiing Championships, organizers needed to map a new twenty-kilometer racecourse. They used GPS with a modified antenna allowing for data

acquisition in dense tree cover. The goal was to collect data about the location and topology of the racecourse.\(^{34}\)

**E911**

Many people assume they can dial 911 in an emergency and the appropriate public service (police, ambulance, fire department) will promptly arrive at their location to offer the required assistance. This may not always be the case. It depends on whether the area in which the call is initiated is served by basic 911 (B911) or enhanced 911 (E911) service. “Basic 911 Service (B911) is a system providing dedicated trunk lines which allow direct routing of emergency calls to a pre-selected answering point.”\(^{35}\) B911 allows a call, placed from any hard-wired phone, to be directly routed to an emergency call center. The dispatcher in the call center cannot identify the caller’s location or phone number. It is up to the caller to provide the address of the location requiring assistance. “Enhanced 911 Service (E911) is a system that can automatically route emergency calls to a pre-selected answering point based upon the geographic location from which the call originates.”\(^{36}\) E911 provides the caller’s location and phone number to the dispatcher taking the call as long as the call is placed from a hard-wired phone. It is not necessary for the caller to identify their location in order for the appropriate emergency service to respond to the 911 call. Cell phones are generally covered under B911 regardless of where the call is placed, even in E911 services areas. The mobile nature of cell phones makes it a challenge to identify their location. A person making a 911 call from a cell

---


\(^{36}\) Westcott, "GIS and GPS," 1269.
phone must provide their location to the dispatcher taking the call. New technology is emerging that will allow the location of the cell phone to be automatically transmitted to the 911 dispatcher.

It is important to understand the differences between B911 and E911. There are places in the United States not covered by E911 service. It is helpful for the person making a 911 call to know whether E911 is in place or not. If a caller knows E911 is not available, the caller will know to immediately provide the address and location to the dispatcher taking the call in order to facilitate prompt emergency service. The medical personnel working at an event should know whether E911 is available or not and will generally handle emergency response and transport to an offsite medical facility. If for some reason, the organizer, safety coordinator or some other event official must make a 911 call, they should know whether the facility hosting the event is covered by E911 and if not then know the address of the facility in order to provide the correct information to the emergency call center dispatcher.

Other precedents for use of GIS and GPS in establishing emergency response systems include the successful implementation of a statewide E911 system in Vermont. Because this system depended upon communication and cooperation by all agencies involved, including emergency service personnel, the Postal Service, town governments, regional planning commissions, utilities, local businesses and citizens, GIS and GPS technology were viewed as valuable tools for successful implementation.37 Road naming,

---

addressing and data collection depended heavily upon the contribution of local community volunteers. It was stressed that the data be shared among all of the agencies.\(^{38}\)

Much of the literature regarding E911 and emergency response focuses on such issues as road naming and addressing techniques. Typically an equestrian event site would be one address in the larger E911 picture, if the event site were covered by E911 service. Although road naming and addressing are not necessarily applicable to this study, it is important to determine the best route as well as alternate routes from the event site to the nearest local hospital or other medical facility. Once this is initially determined, the routes are not likely to change because the location of the event site will not change. Other factors such as road construction or new development may alter the routes from time to time, but it is not the goal of this study to determine how an event site should be identified in an E911 system.

**Summary**

Eventing is a thrilling and exciting equestrian sport that has many serious injuries and even deaths to both riders and horses. There is a certain amount of risk and danger associated with participation in eventing, especially during the cross-country phase of competition. The goal at each equestrian event is that each horse and rider team safely navigates the cross-country course. When accidents occur, it is imperative that medical personnel reach the accident in a timely and efficient manner. For this to happen, qualified medical personnel must be physically present on the cross-country course or in close proximity to it. Communication must be in place to notify medical personnel when and where an accident occurs. Personnel must be familiar enough with the course to

\(^{38}\) Elliot, "Vermont Moves Forward," 43.
efficiently navigate to any site where an accident occurs. This involves knowledge of the spatial relationships between the physical features encountered on any given cross-country course. The most important tool for effectively communicating spatial relationships is the map. Maps help to facilitate understanding of the physical features encountered on a cross-country course and thus help improve response time to accidents.
CHAPTER 3

METHODLOGY

In order to improve emergency response, we must first understand how it is or is not currently managed at equestrian events. Very little information is documented regarding emergency response in the equestrian sport of eventing. Individual events around the country deal with emergency response as needed. Event organizers, safety coordinators and other volunteers perform their jobs and duties based on firsthand knowledge and past experience. Unless individuals from equestrian events around the country interact with one another and share their knowledge and experience, the information remains isolated and fragmented. Computer technology makes it easier than ever before to share information. In this case, the first step is to find out how emergency response is managed at equestrian events, noting similarities, differences and trends. Improvements can be made and information shared once this information is documented and disseminated.

The methodology, including data collection techniques, in-person interviews, design of the interviews, and purposeful selection will be discussed in this chapter. Primary data were collected using surveys and direct measurement. In-person interviews were used to survey respondents participating in this study. The advantages and disadvantages of using in-person interviews over other survey methods are addressed. Designing the in-person interviews involved several stages including identifying key issues, developing draft interviews, pre-testing the interviews, and revising the draft to
complete the final in-person interviews. Finally the use of purposeful selection in choosing events for inclusion in this study is discussed.

Data Collection Techniques

Several methods are available to the researcher for the purpose of collecting data. Primary data is collected firsthand, in which the researcher obtains data directly from the subject under investigation. There are three means to collect primary data: survey research, direct measurement, and observation.

Survey research asks individuals to share information about themselves or a subject about which they have direct knowledge. The information is shared either verbally or in writing. Surveys are conducted by one of three methods: mail-out, telephone and in-person interviews. The goal is to make generalizations about a large population by sampling a small subset of the entire population. These generalizations can be made if systematic, scientific procedures are closely followed.39

Direct measurement employs instruments to sense and record data. Instruments are used to record specific attributes of the subject under investigation.40 Examples include cameras, thermometers, scales, blood pressure cuffs, or any other device that accurately measures recordable attributes of subjects.

Observation involves direct study of behavior without interfering with the subject and their relationship with the environment. The researcher observes and records natural

responses of the subject to their environment. For example, a university adds a new building complex to the campus and would like to install pathways in high foot traffic areas. Pedestrians would be observed entering and exiting the new facility. The most frequent routes would then be recorded. New pathways would be built along the most popular routes that pedestrians prefer to take.

The alternative to primary data collection is secondary research, which involves compiling and analyzing data that already exists. Examples include census data, weather recordings, and data collected from other surveys. Any data another researcher has collected in a usable form that is related to the current area of interest is a potential source of secondary research data. However, there are no existing data regarding emergency response at Horse Trials and Three-Day Events. Thus, primary data collection techniques were required to accomplish the goal of this thesis.

In this study, surveys were utilized in the form of in-person interviews. Two separate in-person interviews were used for this study. One was written for organizers and safety coordinators. A second one was developed for medical personnel. It was felt that two separate interviews would best address the different issues facing organizers/safety coordinators and medical personnel. Refer to Appendix B for a copy of each interview used in this study, namely the Interview for Organizers and Safety Coordinators and the Interview for Medical Personnel. All of the data concerning existing emergency response was gathered by the primary data collection method.

---

Direct measurement was employed to map the cross-country courses and event sites. The instrument selected was the Global Positioning System. When opportunities existed, observations of emergency response taking place were recorded and used to verify data collected during the in-person interviews. Each of these methods will be discussed in further detail in later chapters.

**In-Person Interviews**

*Advantages*

In-person interviews allow the interviewer to gather information directly from the respondent. This method offers several advantages over other methods such as mail-out and telephone surveys. Flexibility, greater complexity, high response rate and assurance that instructions are followed are the main advantages.\(^{43}\)

In-person interviews encourage flexibility during the interview. The interviewer can explain unclear questions, employ visual aids such as maps, photos and exhibits, record greater detail, and ask more in-depth answers.\(^{44}\) The interviewer is able to note spontaneous reactions, body language and other non-verbal responses. All of these advantages help clarify answers and place them in the proper context, adding further understanding and meaning to the information and data collected. Neither mail-out nor telephone surveys permit the interviewer to gather such valuable non-verbal information. In a telephone survey, the interviewer might be able to detect changes in the respondent’s voice. However, without the benefit of non-verbal cues, subtle changes in voice may be missed or misinterpreted.

---


\(^{44}\) Rea and Parker, *Designing and Conducting Survey Research*, 8.
During telephone interviews visual aids of any sort are not available. Because a significant aspect of this thesis focuses on maps, several different examples of maps were necessary to include as visual aids during the interview. Respondents were asked to examine the maps and then answer several questions related to each map. Telephone interviews would not have worked as a means of gathering data for this thesis since the respondents would have been unable to examine the maps.

Mail-out surveys may be unclear or interpreted differently than the survey designer intended. The respondents may skip unclear questions or provide incomplete answers. Respondents may not wish to take the time to write thorough answers and fully explain themselves, especially for open-ended questions. If the respondent does not clearly articulate the answer in writing, the interviewer may not decipher the answer as intended. Respondents may not return the survey at all. Thus incomplete or inaccurate data is collected.

Complex, detailed questions are best administered during an in-person interview; “Interviewers can administer highly complex questionnaires and provide detailed instructions and lengthy lists of alternative responses that many respondents would find confusing and intimidating if the questionnaire were administered by any other means.” Through personal interaction with the respondent, the interviewer is able to clarify any misunderstanding or confusion the respondent may have regarding the instructions or questions. The interviewer may also probe for further detail when asking open-ended questions or those requiring an opinion from the respondent. Visual aids are easily

45 Stoddard, Field Techniques, 161.
46 Rea and Parker, Designing and Conducting Survey Research, 8.
presented and referred to during in-person interviews, as each map, photo, or other aid is presented with the corresponding question.

It would be difficult for respondents to remember lengthy questions or lists during telephone interviews. If the interviewer must repeat questions or choices of answers, the respondent may become frustrated and just pick an answer to move on to the next question or prematurely end the interview by hanging up the phone. This limits the telephone survey to short, simple questions the respondent can easily understand and remember.47

Mail-out questionnaires may include lengthy questions or multiple choice answers. However, if they are complicated, the respondent may not completely understand what is asked. Also respondents may not want to spend a great deal of time reading or answering complex questions that require much writing in order to provide an answer. They may become frustrated and skip questions or not complete the questionnaire at all.

In-person interviews tend to result in higher response rates and more complete questionnaires. Respondents feel more comfortable sharing information in person. They are likely to provide thorough, detailed answers and to complete the entire questionnaire. The interviewer and respondent are able to establish a relationship in which it is easier for the interviewer to earn credibility and trust. Mail-out surveys allow for no personal interaction between the interviewer and respondent. They tend to have a lower response rate than the other methods.48

47 Stoddard, *Field Techniques*, 161.
During in-person interviews, the interviewer can make certain the questionnaire is administered in the order and manner intended. This is particularly important for series of questions that build upon one another. Questions related to one another will be asked together to insure logical flow, allowing the respondent to focus on a particular issue without distraction. Jumping around in a questionnaire from issue to issue makes it difficult for the respondent to concentrate and stay focused on the questions. Mail-out surveys cannot guarantee the respondent will answer the questions in the order intended. In fact, the respondent can skip around and answer easy questions first. They can also read questions toward the end of the survey, which may influence answers to earlier questions and thus eliminate a certain degree of spontaneity to the answers.49

Disadvantages

There are certain disadvantages to using in-person interviews. High costs, interviewer-induced bias, respondents’ reluctance to cooperate, less anonymity and personal safety are all potential drawbacks to using in-person interviews.50 All of these were addressed and minimized. High costs related to this research include time per interview and time and money for travel. Event organizers and safety coordinators are very busy fulfilling numerous duties and obligations throughout the duration of the competition. In order to accommodate busy schedules, the researcher interviewed organizers and safety coordinators at their convenience. No appointment was necessary for interviewing medical personnel as they were interviewed wherever they were located in stand-by mode. Both interviews were designed to take a minimum amount of time. The

49 Rea and Parker, Designing and Conducting Survey Research, 7.
50 Rea and Parker, Designing and Conducting Survey Research, 9.
organizer and safety coordinator interview was designed to take an average of 20 minutes and the medical personnel interview an average of 15 minutes.

The researcher is an active competitor in horse trials and did in fact compete in some of the events included in this study. Including events in this study that the researcher would already be traveling to in order to compete alleviated some of the costs related to time and money for travel. For those events the researcher did not compete in, all but two were located within a reasonable driving distance. The researcher’s passion and love for the sport far outweighed the travel costs incurred for the purpose of gathering data. She took great pleasure and interest in traveling to events she had never been to before.

Several potential types of interviewer-induced bias exist. Demographic and socioeconomic characteristics of the interviewer can affect the respondent’s behavior and thus answers to interview questions. Such characteristics as race, age, level of education, sex, social class, religion, and political affiliation may influence the respondent’s perception of the interviewer and thus how the respondent answers questions. There were no questions involving sensitive demographic or socioeconomic characteristics included in either of the in-person interviews. The interviewer shares demographic and socioeconomic characteristics that are similar to those of the participants included in this study.

The defined role of the interviewer is variable. “Different types of interview situations allow interviewers different degrees of freedom to vary their behavior.” At

---

one end of the spectrum, an interviewer's role may be defined narrowly with little flexibility; she is expected to ask questions in a very precise manner with little if any other interaction with the respondent. At the other end of the spectrum an interviewer may be expected to perform the role of a "sensitive, information-gathering individual." In this situation, the interviewer is afforded more freedom and encouraged to adapt her defined role in a manner to best gather information from different respondents. The interviewer may offer varying degrees of assistance depending upon the respondent's level of understanding. In treating each respondent as an individual, the interviewer may use different probing techniques, place emphasis on different words, or vary intonation when asking questions. However, increased freedom introduces greater potential for interviewer-induced bias.

Another form of interviewer-induced bias occurs when the interviewer deviates from the defined method of conducting the interview. The interviewer may reword questions, ask them out of order, omit questions, or record responses incorrectly, intentionally or unintentionally. The interviewer might think she is acting within the scope of her role by merely adapting to each individual respondent when in fact she may overstep the bounds by deviating from the prescribed method of conducting the interview. Factors external to the actual interview may influence the behavior of the interviewer. She may be tired or distracted and forget to ask a question for example. Humans are not perfect, and from time to time they do make errors, often unaware they have made a mistake.

---

Certainly interviewer-induced bias must be considered. For this particular study, one person conducted all of the interviews. This at least eliminates variability introduced by employing multiple interviewers. Every effort was made by the interviewer to administer each interview in a consistent manner. The questions were asked in the same order and responses recorded immediately. The designer and interviewer of the in-person interviews were the same person; thus the interviewer clearly understood the intention and purpose of each question, and the type of information needed.

Respondents' reluctance to cooperate was not a factor in conducting this research. Every potential respondent contacted agreed to participate in the in-person interview. Almost all of the respondents are enthusiastic about the research. Most respondents think the research is worthwhile and important. Thus they were quite willing to participate.

Anonymity was assured to each respondent who participated in the interviews. Prior to the start of each interview, the interviewer clearly stated that each respondent’s name would not be recorded or mentioned in conjunction with the research. The only information gathered about each respondent was the particular job each performed at the event. They belonged to one of three categories: organizer, safety coordinator or medical personnel. The interviewer made sure that each respondent understood that anonymity was guaranteed to every person who participated in the study.

In-person interviews pose certain real or imagined risks to personal safety for both the interviewer and the respondent.\textsuperscript{57} Measures were taken to minimize risks to personal safety while conducting interviews for this research. All interviews were conducted on the grounds where each event occurred. There were many other people in close

proximity. None of the interviews took place in homes of the respondents. The interviews
did not address sensitive, personal, or controversial topics. Both the interviewer and the
respondent had the opportunity to physically leave the interview site at any time during
the interview. Neither ever exercised this option during any of the interviews conducted
for this research.

Design of In-Person Interviews

Design of the in-person interviews used for this study involved several stages of
development. First, key issues were identified. Second, draft interview questions were
developed. Third, the drafts were pre-tested. Fourth, the draft questions were revised
based upon results from the pre-test and the final interviews completed. Each of these
steps is discussed in further detail below.

Key Issues

Two separate in-person interviews were used in this study. One was developed for
the organizers and safety coordinators. A second interview was written for the medical
personnel. In listing key issues, it became apparent that each group dealt with different
issues. Key issues identified for organizers and safety coordinators were not always
applicable to the medical personnel. Issues faced by medical personnel were not always
applicable to organizers and safety coordinators. As a result, two separate in-person
interviews were designed to capture the issues applicable to each group.

Key issues were identified for the organizers and safety coordinators. It was
thought the organizers and safety coordinators would provide most of the information
regarding the event in general as well as specific information concerning safety issues.
After all, they are the people directly involved in the running of the entire event. The
following general issues for the organizers and safety coordinators were identified: event site, emergency response, mapping, and personal opinions regarding mapping and emergency response. Questions about the event site focused on physical attributes such as size in acreage, terrain, and nature of the cross-country course. Emergency response questions addressed number and types of medical personnel on site, methods of communication, and pre-planning of emergency response routes to jumps on the cross-country course. Mapping questions asked what maps are used for the event; how are the maps created; and what features should be included on maps for events? Finally organizers and safety coordinators were asked their opinions concerning use of maps, creation of maps, and use of technology such as the Global Positioning System.

A separate list of issues was prepared for medical personnel. Their questionnaire was shorter and addressed fewer issues. Their involvement with events was directed toward emergency response only. The following issues for medical personnel were identified: experience working at events, use of maps, and methods of communication. Medical personnel were asked about their experience at events in general as well as at the event they were working at the time of their interview. They were asked if they were provided with maps and if so did they use them? They were asked what features should be included on maps to help them perform their job? They were asked about emergency response routes to jumps. Were they pre-planned? Finally they were asked to describe methods of communication with each other as well as with event officials.

*Draft Interview Questions*

Once the issues were identified, the questions were developed. There is more to developing an in-person interview than merely writing questions. The researcher must be
concerned with the format of the entire interview, which includes the overall organization and structure, as well as with the questions, including formatting and phrasing. There are several important elements to consider related to the overall format and the actual questions.

The organization and structure of the in-person interview includes the introduction, question sequence, and length of the entire interview. First, the introduction explains the purpose of the study. The respondent is told who is conducting the study and why, in order to establish credibility. Goals and objectives are clearly stated so the potential respondent understands the purpose behind the study and how they might potentially benefit from either participating in the study or from the results of the study or both. People are more likely to participate in the study if they think they will benefit from it in some way. Potential respondents were informed as to why they were selected for inclusion in the study. They were also told that their participation is voluntary, their responses are strictly confidential, and that there is no correct or incorrect response to each question asked. Before proceeding with the in-person interview, the interviewer obtained permission from each respondent to continue the interview. Once respondents agreed to participate, background data was collected such as time, date, location of the interview, and name of the interviewer.

The order in which questions are presented plays an important role in the overall success of the research. Thus questions were organized in a manner that minimized confusion, stress, and difficulty for the respondents. The interview began with easy,
straightforward introductory questions, followed by more difficult, detailed questions, ending with any sensitive questions. Easier questions invite the respondent to participate, easing them into the more detailed questions. It is best to save sensitive questions or those dealing with controversial issues for the end of the interview in order to minimize feelings of animosity or uneasiness in the respondent that might cause them to end the interview prematurely. By placing sensitive questions at the end of the interview, information provided up to the point of termination is still useful. If sensitive questions were asked first, in this case, no data would be collected.\(^2\)

Related questions were grouped together in order to reduce confusion and encourage the respondent to think clearly and completely about the issues. It is helpful to group related questions into categories. This allows the respondent to focus completely on a subject without losing their train of thought. If the questions skip around to different subjects, the respondent may become distracted, confused, and lose focus, which could lead to frustration and loss of interest in the interview, causing them to terminate the interview. Organization of questions also makes the interview interesting and stimulating for the respondent, increasing willingness to participate.\(^3\)

Questions also followed a logical sequence.\(^4\) This is certainly important for a series of questions referring to time or dates. It is easier for a person to recall events in the order in which they occurred. Questions that build upon one another were ordered so that they did not influence answers to later questions. It may be necessary to establish that

---


\(^3\) Rea and Parker, *Designing and Conducting Survey Research*, 36-37.

a respondent is qualified to answer certain questions. Thus, questions that established their qualifications logically preceded questions specific to the appropriate issue.

The length of the entire in-person interview is another important factor to consider when designing questions. The interviews were “as concise as possible while still covering the necessary range of subject matter required in the study.” Interviews were designed to cover all important and relevant data for the research while maintaining a reasonable timetable. Only questions relevant and necessary for the research were included. Extraneous information, although interesting, adds unnecessary length and time to each interview. In designing questions, the interviewer kept in mind that the respondents were volunteering their time for the research. It is important for the participant to feel that their time and efforts are not wasted.

Questions are generally formatted in one of two ways. They are either close-ended or open-ended. Close-ended questions provide a set of choices from which the respondent chooses. They are asked to provide the best possible answer by making one or more selections from a list of choices. The uniformity of responses facilitates analysis of the results. Comparisons among responses can easily be made. Respondents may find close-ended questions easier to understand as well as easier to answer. Possible answers may be brought to their attention that they might not have otherwise thought of while answering the question. On the other hand, the respondent might guess at an answer or lose focus and simply select any answer. They may also choose an answer they think should be correct but may not necessarily reflect their true feelings. Close-ended

65 Rea and Parker, Designing and Conducting Survey Research, 43.
66 Stoddard, Field Techniques, 143.
67 Rea and Parker, Designing and Conducting Survey Research, 32.
questions are more difficult to write, as the researcher must anticipate all possible responses. This requires the researcher to be quite knowledgeable of the subject being studied. The choices must not allow the respondent to be able to select more than one choice, and must be mutually exclusive. In some cases, it makes sense to allow for answers such as: I do not know; no opinion; or other. Care must be taken not to use such answers to make up for lack of preparation and thoughtfulness on the part of the researcher in developing the questions. When writing questions, the researcher must consider all the possible answers and provide a means to capture any potential answer.

Open-ended questions permit the respondent to answer however they wish. There is no predefined list of choices from which the respondent may make a selection. They permit the respondent greater freedom in answering questions. However, there are several drawbacks to using open-ended questions: they require more effort from the interviewer as well as the respondent; the respondent must think of the answer without help and be able to effectively communicate their response; and the interviewer must understand and accurately record the response as intended. These types of questions are harder to quantify for statistical purposes since there is no standardization to the responses.

Proper phrasing and use of words in questions are essential to the success of the study. Questions are the heart of the interview. They are the tools that communicate the intention and purpose of the entire study and permit the interviewer to solicit data to satisfy the requirements of the research. Therefore much thought and care was given to the design of each question. Because vocabulary should be simple and easy to understand, questions avoided jargon, slang, technical words and phrases, and insensitive

---

68 Stoddard, Field Techniques, 147-149.
69 Rea and Parker, Designing and Conducting Survey Research, 35.
Questions were designed to be easy to understand, direct and to the point. Otherwise the researcher risked collecting inaccurate or incomplete data. Vague, non-specific words and phrases were not included, otherwise the respondent would not understand the intention of the question and provide an inaccurate response. On the other hand, it is possible to offer too much information, making the question lengthy and difficult to comprehend. A balance between question vagueness and too much information was established. It is important not to influence the respondent by the wording of the question. In order to remain objective, the question must not suggest certain responses and thus bias the response. Emotional words and phrases were not used. The questions were designed to be neutral so the respondent felt comfortable answering true facts, feelings or opinions without influence and bias. Efforts were made not to include multipurpose questions that ask about more than one issue at a time. If the respondent does not share the same response for multiple issues, she cannot answer truthfully and accurately to the multipurpose question being asked. Thus the questions were kept simple and easy to understand so there was no confusion about which issue the researcher intended to ask.

Prior to beginning any research involving human subjects, the research must be approved by the Institutional Review Board at the University of Montana. The researcher of this thesis completed the required Human Participants Protection Education for Research Teams online course sponsored by the National Institutes of Health on May 13.

---

Stoddard, *Field Techniques*, 146.
71 Rea and Parker, *Designing and Conducting Survey Research*, 47.
Stoddard, *Field Techniques*, 146.
Stoddard, *Field Techniques*, 146.
2001. An explanation of the research, a copy of the in-person interview questions, along with the required paperwork was submitted to the Institutional Review Board in June 2001. The Institutional Review Board determined that this research met the criteria for approved exemption from review. The researcher received permission from the University to proceed with the research.

Pre-Test

Once the issues were identified and a preliminary set of questions drafted, it was time to pre-test the interviews. A sample group, representative of the population interviewed, was selected. This sample group was not randomly selected since the objective was not to analyze results but rather to receive feedback concerning the overall quality of the interviews. The pre-test examined the clarity, comprehensiveness, and acceptability of the interview questions. Clarity assured that the questions were understood and clear enough to extract the intended information. Comprehensiveness determined if there were any unnecessary, repetitive, or incomplete questions and revealed whether close-ended questions provided a complete list of choices. The length of the interviews was determined to be acceptable. Sensitive or intrusive questions were identified and dealt with.

After writing a draft of the interview questions, a copy was submitted to the Director of Survey Development for the University of Montana’s Bureau of Business and Economic Research. The Director offered constructive and helpful feedback regarding the clarity, comprehensiveness and acceptability of the interview questions. Changes

---

74 Rea and Parker, Designing and Conducting Survey Research, 28-29. Stoddard, Field Techniques, 150.
75 Rea and Parker, Designing and Conducting Survey Research, 28-29.
76 Rea and Parker, Designing and Conducting Survey Research, 28-29.
were made primarily to the format and phrasing of the questions. Next, active participants in the sport of eventing were selected to participate in the pre-test. They also offered constructive and helpful feedback. As a result of the pre-testing, a few questions were reworded and related questions were grouped together to facilitate a logical sequence that is easier for the respondent to follow. Pre-testing also offered the interviewer a chance to practice and refine her interviewing skills before commencing the actual data collection. She requested comments and suggestions for improving her interviewing skills. The pre-test group pointed out things the interviewer already did well and offered suggestions for areas where she might make improvements.

Final Interview

After completing the pre-test, the final interviews were created. They consist of several parts. First, is an explanation of each interview was written and used to contact potential participants. See Appendix A for a copy of the explanation. The interviewer telephoned the organizer of each event selected for inclusion in this study. She stated her name, reason for calling, and background information about the study. She answered any questions the organizer had. Finally she asked if the organizer would voluntarily participate in an in-person interview and gained permission to ask safety coordinators and medical personnel if they would also participate in this study. The interviewer also requested permission to map the event site using the Global Positioning System. All of the organizers contacted agreed to participate in this study and granted permission to map the event site and conduct the other above-mentioned interviews if the respective people also agreed to participate.
As mentioned earlier in this chapter, two separate in-person interviews were used for this study. One was written for the organizers and safety coordinators. A second one was developed for the medical personnel. The interview for the organizers and safety coordinators asked questions related to the following general categories: event site, emergency response, mapping, and personal opinions regarding mapping and emergency response. It was lengthier and addressed more issues than the interview for medical personnel. The medical personnel interview included the following general categories: experience working at events, use of maps, and methods of communication. All of the in-person interviews took place over a period of time from June 2001 through November 2001. Refer to Appendix B for complete copies of the interviews.

**Purposeful Selection**

With purposeful selection, the researcher used her professional judgment to select respondents for inclusion in the study. The sample selection involved no degree of randomness. Thus purposeful selection is a type of a non-probability sample. The researcher must possess sufficient knowledge of the entire population to purposely select individuals who are typical of the entire population. In order to capture variations in the population, individuals possessing extreme characteristics that are not typical of the entire population were also included. It is unlikely that the researcher is entirely knowledgeable about all of the characteristics of the entire population. If this were the case, research would most likely be unnecessary. A truly representative sample is difficult to achieve with this method. Therefore the results were only generalized and applied to the actual sample and not to the larger population. The sampling error

---

77 Rea and Parker, *Designing and Conducting Survey Research*, 142.
78 Stoddard, *Field Techniques*, 82.
associated with a purposeful selection is too great to apply generalizations to the entire population.\footnote{Rea and Parker, \textit{Designing and Conducting Survey Research}, 141.} Despite its disadvantages, there are certain instances when purposeful selection is desirable. It is much less costly in terms of time and money than probability sampling. It is useful in generating preliminary knowledge and understanding of the topic under study.

As far as this researcher knows, there has been no other formal research completed that is related to this topic. Due to the preliminary nature of this research, it was decided that a purposeful selection would adequately meet the needs of this study. The added benefit of less costs in terms of time and money were considered advantageous. One person accomplished the design and administration of the entire study. Because one person possesses a limited amount of time, it was considered unreasonable for the researcher to visit the number of events required for probability sampling. There was no outside funding for this research. The researcher absorbed all of the costs except for use of the GPS equipment, which was borrowed from the Department of Geography at the University of Montana. Keeping costs to a minimum was desirable.

A purposeful selection of seven events is included in this study. The objective in selecting events was to include as many geographic regions as possible as well as a cross section of levels of competition. This study is limited to events falling under the jurisdiction of the USCTA, which includes events held in forty states throughout the United States. The USCTA divides the country into ten geographic regions called Areas, which closely correspond to the following regions: Area I (New England), Area II (Mid-Atlantic), Area III (Southeast), Areas IV and VIII in the Midwest/Plains, Area V (South-
Central), Area X (Southwest), Area VII (Northwest and Alaska), Area IX (Rocky Mountains and California/Hawaii). Events were selected from the following Areas: Area II (Mid-Atlantic), Area V (South-Central), Area VII (Northwest), and Area IX (Rocky Mountains).³⁰

Within these Areas, events were chosen that offered at least three levels of competition. A mixture of Horse Trials and full Three-Day Events are included in the purposeful selection. Every level of competition offered by the sport ranging from beginner novice up through Three Star is included at least once in this study. The only level of competition not included was a Four Star event.

One event from Area II was included. It was a full Three-Day Event offering CCI*** (International Three-Day Event at the Three Star level). It took place in late October 2001 in Maryland. One Three-Day Event from Area V participated in this study. It took place near Buffalo, Texas in early November 2001 and offered CCI* (International Three-Day Event at the One Star level) and CCI** (International Three-Day Event at the Two Star level). The one event from Area VII included in this study was a Horse Trial. It took place near Kalispell, Montana in July 2001. It offered six levels of competition including: novice, training, preliminary, intermediate, CIC* (International Horse Trial at the One Star level), and CIC** (International Horse Trial at the Two Star level). The four remaining events, all Horse Trials, took place in Area IX. The first took place at the end of June 2001 in Gillette, Wyoming. It offered four levels of competition, beginner novice, novice, training, and preliminary. The second Horse Trial took place near Billings, Montana in August 2001 and offered beginner novice, novice, and training.

³⁰ See page 11 for a map showing the ten geographic areas.
The third Horse Trial held outside of Helena, Montana also took place in August 2001. It offered beginner novice, novice, and training. The fourth Horse Trial offered seven levels of competition including: novice, training, preliminary, intermediate, advanced, CIC*, and CIC**. It was held in August 2001 near Jackson, Wyoming.

Summary

The methodology is the backbone of any research project. Solid, sound methods provide a strong foundation for well-executed research. Without a solid base, the remainder of the research will not measure up to its full potential. Careful thought and preparation went into selecting the methods for this study. Because there was no existing data, it was determined that primary data collection techniques were required. Survey research offered the best method of gathering the desired data. After considering the advantages and disadvantages of the different survey techniques, the in-person interview was selected. In order to address key issues identified for two different groups of respondents, two separate in-person interviews were designed and used in this study. One interview was written for the organizers and safety coordinators while a second was written for the medical personnel. The organizer and safety coordinator interview was more extensive and addressed a broader range of issues than the medical personnel interview. Each interview was pre-tested. Revisions were made based on the results of the pre-test and the final in-person interviews were completed and used to collect data. A purposeful sample of seven events from around the United States was selected. All of the events fell under the jurisdiction of the United States Combined Training Association (now the United States Eventing Association).
CHAPTER 4

RESULTS OF THE IN-PERSON INTERVIEWS

In this chapter, the results of the two in-person interviews, the organizer and safety coordinator interview and the medical personnel interview, will be discussed. Purposeful selection was discussed in Chapter 3 as the method used to select the events for inclusion in this study. The results are generalized and applied to the events included in the purposeful sample and not to the entire population. Seven events from around the United States are included in the sample. Five of the events are Horse Trials. All levels of competition offered, beginner novice through advanced, are included in at least one of the Horse Trials. Two of the events are full Three-Day Events, offering the following levels of competition: Three Star (***) , Two Star (**) , and One Star (*). The results of the Horse Trials are compared to one another, as are the results of the Three-Day Events. Finally all of the events are compared where applicable. In order to assure anonymity, events were assigned letters, A through G, and are referenced by the assigned letter.

Interview for Organizers and Safety Coordinators

Prior to conducting the interviews, the researcher obtained copies of all maps available for each event and recorded the presence or absence of each of the following types of maps: site map, cross-country map, and map showing the emergency vehicle route to the nearest offsite medical facility. Four of the five Horse Trials provided site maps while only one of the two Three-Day Events provided a site map. All seven of the
events had cross-country maps. None of the events had a map showing the emergency vehicle route to the nearest offsite medical facility. Refer to Tables 2, 3, and 4 below.

Table 2. Events with a Site Map

<table>
<thead>
<tr>
<th></th>
<th>Horse Trials</th>
<th>Three-Day Events</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>80%</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>20%</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Based on responses from 5 Horse Trials and 2 Three-Day Events.

Table 3. Events with a Cross-Country Map

<table>
<thead>
<tr>
<th></th>
<th>Horse Trials</th>
<th>Three-Day Events</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>100%</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>----</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Based on responses from 5 Horse Trials and 2 Three-Day Events.

Table 4. Emergency Vehicle Route to Offsite Medical Facility Map

<table>
<thead>
<tr>
<th></th>
<th>Horse Trials</th>
<th>Three-Day Events</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>----</td>
<td>0</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>100%</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: Based on responses from 5 Horse Trials and 2 Three-Day Events.

The in-person interview for the organizers and safety coordinators contained a total of twenty-six questions pertaining to the following categories: event site, emergency response, mapping and attitudes about maps. Each of the questions as well as the results is presented below according to category.

Event Site

There are five questions related to the event site. Answers to these questions offer a general overview of some of the physical characteristics of the site considered.
important to the continued success of an event. The acreage, track of the cross-country course, and terrain are addressed. Certainly there is a minimum amount of acreage required for an event. Just how much acreage is debatable. Horse Trials, particularly at the lower levels, require significantly less land than a full Three-Day Event. Knowing the spatial extent of an event is important for a couple of reasons. Design, creation, and presentation of maps are influenced by the size of the area being mapped. The area of the event also affects planning for medical coverage and emergency response.

The first question asked for the acreage of the entire event site, including arenas, cross-country, stabling, parking, concessions, and any other facilities associated with the event. Horse Trials ranged in size from 112 acres up to 500 acres. The acreage for the Three-Day Events is 495 acres and several hundred acres. It was interesting to observe whether or not the organizers and safety coordinators knew the acreage for their respective events. Six of the seven organizers interviewed knew the acreage and one did not know. Two of the six safety coordinators interviewed knew the acreage. Two of the safety coordinators under-estimated the total acreage and two did not know at all.

The second and third questions dealt with the track and jumps on the cross-country course. In order to generate interest and keep competitors coming back to an event from year to year, the cross-country course and/or jumps are changed. This would affect how often a course needs to be mapped and to what extent. If minor changes are made to the course such as replacing a jump in the same location, then perhaps the map will need very little if any editing. If a major re-route of the track occurs, then the course will need to be re-mapped.
The second question asked how often the cross-country route is changed. For all of the events included in this study, the majority waits at least five or more years before changing the track of the cross-country course. Refer to Table 5 below.

Table 5. Frequency of Changes Made to Cross-Country Routes

<table>
<thead>
<tr>
<th></th>
<th>Horse Trials</th>
<th>Three-Day Events</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
</tr>
<tr>
<td>Stays Same</td>
<td>1</td>
<td>20%</td>
<td>0</td>
</tr>
<tr>
<td>Yearly</td>
<td>1</td>
<td>20%</td>
<td>1</td>
</tr>
<tr>
<td>2-5 Years</td>
<td>1</td>
<td>20%</td>
<td>0</td>
</tr>
<tr>
<td>&gt;=5 Years</td>
<td>2</td>
<td>40%</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note: Based on responses from 5 Horse Trials and 2 Three-Day Events.*

Question three asked how often new jumps are added to the cross-country course. All of the events interviewed (100%) add new jumps to their courses yearly. This response includes a number of possibilities. Jumps may be completely removed and replaced by new jumps in the same location. Existing jumps may be altered or modified in some fashion. New jumps also may be added at different places along the already existing track so that the basic route stays the same. Certain jumps may be included in the competition while others are not. At the next competition, the previously left out jumps are used and others are not, thus rotating the use of the jumps. In other situations, completely new jumps are constructed in a new area and the route changes as well as the jumps. The degree of change affects the degree of map updating and planning for medical coverage of the cross-country course.

Question four asked the respondent to describe the general conditions of the course, specifically the terrain and footing. The terrain and footing of the cross-country

53
course contributes to the overall success or failure of an event. It is quite important to competitors and officials for various reasons beyond the scope of this study. The importance to this study of terrain and footing is related to access by emergency vehicles. Is the course physically navigable under all of the conditions that the event would be run? Will the course hold up in wet, rainy weather or will it become a sloppy, muddy mess requiring a 4-wheel drive vehicle? Does the course contain ravines, gullies or rocky areas that are not navigable by any type of vehicle?

Only one of the events was described as having flat terrain; all others included a combination of hills or rolling hills and flat areas. Some of the courses also included draws, coulees, and wooded areas. The draws and coulees are not navigable except by foot in most cases. The woods were accessible along paths or other cleared areas.

The footing at events east of the Continental Divide in the western states included sage and some prairie grass with soil types including sand, clay, gumbo, and shale. Sand tends to drain water well and remain accessible in wet weather. Courses with clay and gumbo were described as slick and muddy when wet, requiring a 4-wheel drive vehicle for access. The courses west of the Continental Divide in the western states tended to have established grass turf. Only one course is irrigated regularly. The footing for the course in the eastern part of the country is described as grass in clay soil that holds up well in the rain. The footing in the south-central part of the country consists of Coastal Bermuda grass in sandy soil with clay added.

Question five asked if there is a designated landing site for a helicopter and if yes, where? Two of the events (Helena, Montana and Gillette, Wyoming) are out of range for receiving reasonable service by helicopter. In both cases, it is faster to transport patients
by ground ambulance. These two events did not have a designated landing spot for a helicopter. The remaining five events did have designated landing sites, however only two of the events actually marked the landing site. One event had a helicopter on site in stand-by mode during part of the cross-country competition.

**Emergency Response**

There were seven questions related to emergency response. Information regarding the number of Advanced Life Support (ALS) paramedics, Basic Life Support (BLS) paramedics, doctors, nurses, and other medical personnel was requested. Questions were asked concerning communication between medical personnel and event officials. The issue of emergency response routes to jumps on the cross-country course as well as to offsite medical facilities is addressed. Are emergency routes determined prior to the start of the competition? If yes, are they documented in writing or on a map? Was emergency response access considered during the design and planning of the cross-country course?

Question six asked the respondent to list the number of medical personnel on site during the cross-country phase of competition. All of the events had the required medical personnel on site as specified in the 2000 AHSA Rules for Combined Training / Eventing. Table 6 lists the number of specified medical personnel on site. Table 7 lists how many of each type of medical personnel were on site for each event during the cross-country phase of competition.

Questions seven, eight, and nine asked respectively if medical personnel communicate with event officials, other medical personnel on site, and offsite medical facilities. If a yes answer was given, respondents were then asked how communication was accomplished. The organizers and safety coordinators from all seven of the events
indicated that communication does take place between medical personnel and event officials as well as among the medical personnel on site. Respondents from one event said that they were not sure if medical personnel communicated with the offsite medical facility but they assumed that the answer is yes. The medical personnel at this event confirmed they do in fact communicate with offsite medical facilities. For the remaining six events, all of the respondents answered affirmatively that communication occurs between medical personnel and the offsite medical facility.

Table 6. Medical Personnel on Site During Cross-Country

<table>
<thead>
<tr>
<th></th>
<th>Horse Trials</th>
<th></th>
<th>Three-Day Events</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
</tr>
<tr>
<td>ALS</td>
<td>5</td>
<td>100%</td>
<td>2</td>
<td>100%</td>
<td>7</td>
</tr>
<tr>
<td>BLS</td>
<td>2</td>
<td>40%</td>
<td>0</td>
<td>----</td>
<td>2</td>
</tr>
<tr>
<td>Doctor</td>
<td>0</td>
<td>----</td>
<td>1</td>
<td>50%</td>
<td>1</td>
</tr>
<tr>
<td>Nurse</td>
<td>0</td>
<td>----</td>
<td>0</td>
<td>----</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>----</td>
<td>0</td>
<td>----</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Based on responses from 5 Horse Trials and 2 Three-Day Events.

Table 7. Number of Medical Personnel on Site for Each Event

<table>
<thead>
<tr>
<th></th>
<th>ALS</th>
<th>BLS</th>
<th>Doctor</th>
<th>Nurse</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event A</td>
<td>2</td>
<td>----</td>
<td>1</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Event B</td>
<td>3</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Event C</td>
<td>2</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Event D</td>
<td>1</td>
<td>1</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Event E</td>
<td>3</td>
<td>12</td>
<td>2</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Event F</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Event G</td>
<td>3</td>
<td>2</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
</tbody>
</table>

Note: To ensure confidentiality, events, including Horse Trials and Three-Day Events, were assigned letters in place of their name.
The means by which communication takes place is almost always by handheld radios. Event A positions an event official on scaffolding so that all of the jumps except one are visible to the official. The official will radio the safety coordinator and medical personnel if he observes an accident. The safety coordinator, who is familiar with the course, will then direct the medical personnel to the accident. Jump judges in close proximity to each other share a radio that allows them to communicate with the official, safety coordinator, and medical personnel if an accident should occur at or near their jumps.

At this point, the researcher will include her own observations regarding emergency response at Event A. Her observations add further insight and explanation of emergency response at work at this particular event:

There was one ambulance on site during dressage and show jumping, which took place on the first day. There was also one ambulance on site for cross-country. The ambulance and crew are hospital based and are paid. The paramedic felt that driving around the course would be a rough ride for a patient, especially one with neck or spinal injuries. He felt that the cross-country course would not be accessible by a standard ambulance if it rains and the course becomes wet and muddy. The ambulance on site that day was a standard one. He did say that 4-wheel drive ambulances are available. Officials get around the course on ATVs. During cross-country, the ambulance and medics are parked near the announcer who has a radio and is in contact with jump judges and the person positioned on the scaffolding. The announcer and medics are parked near the start box. The medics do not have an event radio. They rely on the announcer and safety coordinator to inform them of an accident in which they must respond. The ambulance must follow the safety coordinator, who is on an ATV, to the accident.

I was sitting in the ambulance talking with the medics and we saw a rider fall at a jump near the end of the course. The safety coordinator was not near the ambulance, so the medic took the initiative and drove the ambulance to the fallen rider and the medics began treating the rider. The safety coordinator and other officials arrived after the medics, who were already treating the rider. I think this demonstrates a major flaw in the plan. What happens when the safety coordinator is not with the medics when an accident occurs and the accident is not visible to the paramedics? If the medics had waited for the safety coordinator, precious time would have been lost. In some cases of serious injury, time is critical. Fortunately
in this particular case, the rider was not seriously injured. If the medics can see
the accident from their standby position, they can drive to the accident on their
own as was demonstrated here. The entire course was not visible to the medics, so
relying on a safety coordinator, who cannot always be waiting with the medics, to
lead them to an accident is not the most efficient means of responding to
accidents. I think the medics demonstrated they are more than capable of getting
around the course on their own if they are trusted to do so and provided with
adequate information and tools (a radio and map for starters). They would
respond in a more timely and efficient manner and the safety coordinator could
focus on other duties.

Event B also uses hand held radios for communication between event officials
and medical personnel. The radio system has four channels, with one channel dedicated
to medical services. The researcher’s notes and observations add further explanation of
medical coverage at Event B:

There is a first aid tent where the safety coordinator stays during cross-
country. He can see the whole course from his vantage point. The course is
divided into halves. Each half has one roaming medic covering it. Each medic has
a 4-wheel drive truck equipped with basic medical supplies. They are both in
radio communication with the safety coordinator and other event officials. There
is no ambulance on site. If a person needs to be transported offsite then an
ambulance is called to come and transport the person. The announcer is
designated as the person to call an ambulance by land phone. Radio as well as
cellular coverage can be spotty.

The organizer and safety coordinator at Event C said the officials and medical
personnel communicate by hand held radio during the competition. Prior to the start of
cross-country, a meeting is held during which the official(s) review medical coverage
with the medical personnel working at the event on cross-country day. Observations of
Event C by the researcher follow below:

The paramedic was sitting at the office in standby mode. He relies on the
event radio to get a call to respond to an accident. He would drive his personal
truck (4-wheel drive) around the course to the accident. The truck has medical
equipment. If a person needed to be transported offsite, someone would call using
a cell phone to dispatch an ambulance from the closest town. This ambulance would transport the person to the hospital. It would take approximately 15 minutes for an ambulance to travel from town out to the event site.

The safety coordinator, a paramedic, roamed around the course on foot during the competition. She has no equipment with her nor is she very quick on foot, unless she happens to be near an accident when it occurs.

The organizer of Event D indicated the officials and medical personnel communicate by hand held radio. According to the safety coordinator, the medical personnel have an event radio; however their communication with event officials is supposed to occur via the safety coordinator. Notes and observations for Event D follow:

There was one ambulance on site with two paramedics. The ambulance was 4-wheel drive; so it could navigate the course even in wet, muddy conditions. The plan was to have the safety coordinator lead the paramedics to any accidents. This is run similarly to Event A. I see the same problems in this situation as well. Although things are a bit better here in that the paramedics do have an event radio so they can at least hear when an accident happens that they can’t visually see. When they were in stand by mode, they could see a lot of the course although not the entire course.

This site is a challenge to navigate with a vehicle. There are gullies and draws as well as fence lines that impede travel by line of sight. In this case, it would be most helpful to be very familiar with the course and where you can and can’t drive in order to respond quickly.

At Event E, medical personnel communicate with event officials via hand held radio. This is one of the better-organized events in terms of emergency response. The researcher’s observations and notes explain the safety coordination efforts at Event E:

There was one ambulance on site. There were from 3 to 4 paramedics on site during cross-country. One of the paramedics roamed the course on a bicycle with panniers containing medical supplies. The safety coordinator was on an ATV and stayed near the ambulance unless other tasks needed attending to. This was the only event to provide a map with some emergency routes delineated. The course is divided into general areas with each area containing several jumps. The emergency routes were shown to the general areas rather than individual jumps. The paramedics had an event radio plus the maps and were thus able to function and respond to accidents on their own without having to wait for an official. The organization hired to provide medical care is an independent organization. They are not tied to any one medical facility. There is a paramedic whose job title is
Special Events Coordinator. It is his job to arrange medical care at special events in the county. He made sure he visited the course prior to the event to determine how best to address medical care at the event. He even drove an ambulance around the course prior to the event to make sure it was accessible. It was determined one of the bridges would not support the weight of an ambulance so it was rebuilt. The paramedic interviewed thought the course might not be accessible if it were wet and muddy. The ambulance on site during the event was not the primary transport unit. If needed, a second ambulance could be dispatched to transport a person to an offsite facility.

Communication at Event F between event officials and medical personnel occurred via hand held radios. One medical person is stationed at the main control center for all event communications. Accidents are relayed to the control center by radio from jump judges or other officials. The medic stationed at the control center then relays information to the medics positioned on course as needed. The course is divided into three main areas with medical personnel assigned to each area on the course. The researcher made the following observations at Event F:

The cross-country course was divided into three areas. There were two 4-wheel drive Suburbans and one Gator (ATV). Each area had one of these vehicles assigned to it with corresponding medics. Each Suburban had two medics while the Gator had one medic. The entire course is accessible by emergency vehicles in all types of weather conditions.

There were three different medical organizations providing coverage. There was one helicopter on site until noon. There was one pilot and two paramedics with the helicopter. They would transport to one of two Level I trauma centers: the primary center is a 3 1/2 to 4 minute flight and the second center is a 25-30 minute flight. The medics assigned to the Suburbans and Gator were paid. Volunteer ambulances were used to transport patients to an offsite facility so that the event could continue without an interruption in coverage.

The paramedics shared some of their concerns. They felt that crowd control was an issue, particularly on the first third of the course. People were not getting out of the way when the ambulance was responding to an accident. They also felt better communication was needed at the start of the competition. It was not clearly communicated who was to go where or the location of the standby spot for each ambulance. During the event, better communication was needed with the officials as to who was supposed to be doing what. The medical information is relayed through the control center and the safety coordinator. The paramedics felt
it was not always clear as to what was happening and where they should respond to an accident.

At Event G, communication between medical personnel and event officials was accomplished by way of hand held radio. Emergency response at Event G is similar to Events A and D. The medical personnel had event radios allowing them to communicate with officials. If an accident occurred, the medics were to wait to be escorted to the accident by a sheriff who was on site during the cross-country phase of the competition.

The researcher’s notes and observations are below and better describe the emergency response plan for Event G:

At this event, there were two ambulances each with two paramedics and one Dodge Ram truck with one paramedic and limited medical supplies. One ambulance was stationed on the steeplechase course and one ambulance on the cross-country course. The Dodge truck roamed the cross-country course. The closest hospital is 20 miles north of the event site. The next closest is 35 miles to the northeast. All of the medical personnel were paid.

The medics expressed being confused about what was going on during the event. They didn’t always know immediately when an accident had occurred. They were frustrated that they had to rely on radio contact from control and then be led by the Sheriff to the accident. The Sheriff would clear the path for the emergency vehicle and then secure the accident site from spectators. Because they couldn’t respond independently, it took more time to respond.

At all of the events, medical personnel communicate among themselves via radio. All of the medical personnel carry or have access to a radio on a system separate from the event. At two of the events, medics carried cell phones in addition to radios as a back-up means of communication.

The medical personnel at Events A, D, E, and G communicate by radio to offsite medical facilities. At Event C, cell phones are used to call for an ambulance or helicopter. At Event B, cell phone and radio coverage is sometimes spotty so a standard landline
phone is used to call offsite facilities. The organizer and safety coordinator at Event F were not sure how medics at the event communicate with offsite medical facilities.

Question ten asked organizers and safety coordinators if emergency response routes to each jump on the cross-country course were determined prior to the start of the cross-country phase. An emergency response route is considered to be the route a paramedic would take from the place he is located on standby to the accident site. If emergency routes were determined, were the routes written down or included on a map? Who was given copies of the maps if they exist?

There are discrepancies in answers between the organizer and safety coordinator at two of the events. Since safety planning and organization is primarily the job of the safety coordinator, it was determined that the safety coordinator would provide a more accurate response to this question. Results shown in the following tables (Tables 8 and 9) are derived from responses provided by the safety coordinators.

<table>
<thead>
<tr>
<th>Table 8. Emergency Routes Determined at Horse Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routes Determined</td>
</tr>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

*Note: Based on responses from 5 safety coordinators.*

<table>
<thead>
<tr>
<th>Table 9. Emergency Routes Determined at Three-Day Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routes Determined</td>
</tr>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

*Note: Based on responses from 2 safety coordinators.*
Although four of the seven events reported emergency response routes for the cross-country courses were determined, only one event provided a copy of a map showing such routes. In this case, the routes were to general areas of the course and not to each jump. Copies of the map showing emergency response routes were given to the medical personnel, organizer, safety coordinator, and technical delegate. The organizer and safety coordinator for another event both stated that routes are planned however they are not documented either in writing or on a map. The safety coordinator knows the routes and leads the medical personnel around the cross-country course as needed.

Question eleven asked if emergency response routes from the event site to the nearest medical facility were determined prior to the start of the event. The answer to this question is that routes are determined to the offsite medical facility for all of the events included in this study. In all cases, the medical personnel determine the route. If maps are used, they are maps that are a standard item on the ambulance. None of the events prepared maps nor written directions explaining the route to the nearest hospital.

Whether or not emergency response access was considered during the design and planning of the cross-country course was asked in question twelve. There was a discrepancy in answers between the organizer and safety coordinator at one event. The safety coordinator stated that emergency response was not considered during the design and planning of the cross-country course. The organizer said that access was considered and that it was discussed with the planning committee and course designer. Of the remaining six events, four indicated that access was considered and two indicated that access was not considered.
Maps

Questions thirteen through sixteen focus on mapping issues. Respondents were asked to list all of the maps available at their event. They were asked who created the maps and how. Finally they were asked to list features they think should be included on maps provided at events. Table 10 lists the types of maps available at Horse Trials and Three-Day Events.

### Table 10. Types of Maps Available at Horse Trials and Three-Day Events

<table>
<thead>
<tr>
<th></th>
<th>Horse Trials</th>
<th></th>
<th>Three-Day Events</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Site Map</td>
<td>4</td>
<td>80%</td>
<td>1</td>
<td>50%</td>
</tr>
<tr>
<td>Cross-Country</td>
<td>5</td>
<td>100%</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td>Stabling Map</td>
<td>1</td>
<td>20%</td>
<td>0</td>
<td>----</td>
</tr>
<tr>
<td>Roads &amp; Tracks</td>
<td>Not applicable</td>
<td>----</td>
<td>2</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Note: Based on responses from 5 Horse Trials and 2 Three-Day Events.*

Question thirteen served to check if the organizers and safety coordinators were aware of all the maps available at their respective events. A few of the respondents were not always aware of the available maps. The organizers were more aware of the available maps than the safety coordinators. Refer to Table 11 for the number of organizers and safety coordinators who correctly listed the types of maps available at their respective events.

Question fourteen asked who created the maps. According to the organizers and safety coordinators, the organizers create the majority of the maps provided by events. Course builders, artists, and other people not associated with the event were also listed as
people called upon to create maps used by events. Table 12 lists who created the maps by event type.

Table 11. Organizers and Safety Coordinators Correctly Listing Available Maps

<table>
<thead>
<tr>
<th></th>
<th>Organizers</th>
<th></th>
<th>Safety Coordinators</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Site Map</td>
<td>6</td>
<td>85.7%</td>
<td>3</td>
<td>50%</td>
</tr>
<tr>
<td>Cross-Country</td>
<td>7</td>
<td>100%</td>
<td>4</td>
<td>66.6%</td>
</tr>
<tr>
<td>Stabling</td>
<td>7</td>
<td>100%</td>
<td>4</td>
<td>66.6%</td>
</tr>
<tr>
<td>Roads &amp; Tracks</td>
<td>7</td>
<td>100%</td>
<td>4</td>
<td>66.6%</td>
</tr>
<tr>
<td>Don't know</td>
<td>0</td>
<td>----</td>
<td>2</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

Note: A total of 7 organizers and 6 safety coordinators' responses were counted.

Table 12. People Who Created Maps Used by Events

<table>
<thead>
<tr>
<th></th>
<th>Horse Trials</th>
<th></th>
<th>Three-Day Events</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Organizer</td>
<td>3</td>
<td>60%</td>
<td>1</td>
<td>50%</td>
<td>4</td>
<td>57.1%</td>
</tr>
<tr>
<td>Builder</td>
<td>1</td>
<td>20%</td>
<td>0</td>
<td>----</td>
<td>1</td>
<td>14.3%</td>
</tr>
<tr>
<td>Artist</td>
<td>1</td>
<td>20%</td>
<td>0</td>
<td>----</td>
<td>1</td>
<td>14.3%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>----</td>
<td>1</td>
<td>50%</td>
<td>1</td>
<td>14.3%</td>
</tr>
</tbody>
</table>

Note: Based on responses from 5 Horse Trials and 2 Three-Day Events.

When asked to describe how the maps were created none of the safety coordinators knew how the maps were created. The four organizers who created the maps for their respective events were able to briefly describe how they made the maps. Two of the organizers used Corel Draw on their home computers. One organizer who is also a graphic artist drew the cross-country maps by hand and used a computer to draw the site map included in the event program. The fourth organizer used pencil and paper to draw the cross-country map by hand. Independent of the in-person interviews, the researcher
spoke in person with the artist hired to create the cross-country and site maps for one of
the events. The artist traced over aerial photos on a light table. She then drove around the
course with the builder and added the jumps to the maps. The goal was to provide
utilitarian maps that look artistic.

Question sixteen asked organizers and safety coordinators to list the features they
think should be included on maps provided at events. Table 13 records their responses.

**Attitudes about Maps**

The final ten questions of the organizer and safety coordinator interview
addressed attitudes and opinions about maps. Respondents were asked what types of
maps should be provided at events. They were asked to share their opinions regarding
how maps should be created and who should create them. Finally they were asked about
costs associated with producing maps: how much is currently spent and how much would
they be willing to spend in the future to improve maps?

Question seventeen asked organizers and safety coordinators if they thought the
following maps should be available at events: site map, map showing the emergency
vehicle route to the nearest offsite medical facility, map of the cross-country course, map
showing emergency response routes to each cross-country jump, and other miscellaneous
maps such as stabling assignments, vendor locations, and offsite amenities. Table 14
shows the results from this question.

Although organizers and safety coordinators said they thought the maps listed in
Table 14 should be available, several stressed that requiring these types of maps should
not become mandatory. It is up to the officials at individual events to determine which
maps are most appropriate for each event. Several of the respondents also indicated that
Table 13. Features That Should Be Included on Maps at Events According to Organizers and Safety Coordinators

<table>
<thead>
<tr>
<th>Feature</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-country jumps</td>
<td>10</td>
<td>77%</td>
</tr>
<tr>
<td>Terrain / Topography</td>
<td>7</td>
<td>54%</td>
</tr>
<tr>
<td>Ambulance location</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Restrooms</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Stabling</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Show office</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Dressage</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Warm-up areas</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Emergency route to jumps</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Spectator viewing / location</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Roads</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Jump description</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Water – horses &amp; people</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Parking</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Radio locations</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Landmarks</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Overall site maps</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>First aid</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Manure pile</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Wash bay for horses</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Ice for horses</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Entrance / exit</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Show jumping</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Event in relation to town</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Optimum time</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Time allowed</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Start / finish</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Distances to jumps</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Concessions</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Permanent structures</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Fence lines</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Line of sight to jumps</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Hazardous jumps</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>North arrow</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Woods / streams</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Spectator information</td>
<td>1</td>
<td>8%</td>
</tr>
</tbody>
</table>
Table 14. Types of Maps Organizers and Safety Coordinators Think Should Be Available at Events

<table>
<thead>
<tr>
<th></th>
<th>Organizers</th>
<th></th>
<th>Safety Coordinators</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Site Map</td>
<td>6</td>
<td>85.7%</td>
<td>6</td>
<td>100%</td>
</tr>
<tr>
<td>Route to Offsite Medical Facility</td>
<td>5</td>
<td>71.4%</td>
<td>5</td>
<td>83.3%</td>
</tr>
<tr>
<td>Cross-Country Map</td>
<td>7</td>
<td>100%</td>
<td>6</td>
<td>100%</td>
</tr>
<tr>
<td>Routes to Cross-Country Jumps</td>
<td>3</td>
<td>42.8%</td>
<td>5</td>
<td>71.4%</td>
</tr>
<tr>
<td>Other Maps</td>
<td>4</td>
<td>57.1%</td>
<td>4</td>
<td>66.6%</td>
</tr>
</tbody>
</table>

Note: A total of 7 organizers and 6 safety coordinators' responses were counted.

certain types of maps, such as those showing emergency response routes to jumps, should be restricted to event officials and medical personnel and not made available to spectators. Maps showing routes to the nearest medical facilities were considered to be potentially helpful to competitors traveling from out of town. Should a competitor become injured and require medical attention at a hospital family and friends might need directions to the hospital. One organizer felt that maps should be posted on the internet when possible, particularly site and cross-country maps.

The next question asked organizers and safety coordinators if they think guidelines and helpful hints should be included in the Safety Coordinator’s Manual to assist in preparing the maps recommended by the manual. Organizers and safety coordinators as a group were evenly split in their responses. Half thought guidelines and helpful hints should be included in the Safety Coordinator’s Manual and the other half thought they should not be included. One person thought the issue not relevant and did not respond one way or the other. Those who indicated guidelines should be included thought they would be most helpful to new safety coordinators and organizers. Two of
the respondents stressed that guidelines should not become mandatory requirements. There is a great deal of diversity among events all over the country. It would be difficult to develop mandatory guidelines that would be applicable to all events. Of those who thought guidelines should not be included in the Safety Coordinator’s Manual, two thought the manual already too large and that very few people currently use it. Others thought individual events should determine how best to prepare maps most applicable to their particular event.

Question nineteen asked organizers and safety coordinators if they think it is necessary for a cartographer to prepare the maps listed in the Safety Coordinator’s Manual. Ten of the thirteen respondents thought it is not necessary for a cartographer to prepare maps for events. The two who thought a cartographer should create maps for events, said they thought a cartographer should be used to initially prepare the maps. After creating the maps, event officials would maintain and update the maps as needed. One organizer thought a cartographer’s services should be used if the cartographer would volunteer or donate his or her services. One person did not offer an opinion.

The next question asked respondents if they know about the Global Positioning System (GPS) and if yes, to describe it. This question was used to determine if respondents had sufficient knowledge to answer later questions regarding GPS. One hundred percent of the organizers and safety coordinators have heard of GPS. All of them know that GPS provides the operator’s location and is used to indicate where spatial features are located on earth. Ten of the thirteen knew GPS uses satellites to calculate geographic coordinates. One person used a recreation grade GPS unit while hunting. The
researcher discussed GPS and how it works with each respondent and felt each person had sufficient knowledge to answer the next two questions regarding GPS.

Question twenty-one asked organizers and safety coordinators their opinion regarding whether or not new technology such as GPS should be considered as an option to help prepare maps for events. Ten of the thirteen respondents indicated GPS should be considered when preparing maps. The fact that GPS should be optional was stressed repeatedly. Most thought it would be useful to calculate distances in addition to being used for mapping. One safety coordinator expressed concern about the cost of purchasing a GPS unit. How would an event offset the cost, especially if GPS was only used once for the initial mapping? One person stated emphatically she is technology phobic and believed a GPS unit is not necessary. She also stated that using GPS is an invasion of privacy.

Question twenty-two asked respondents about possible options for obtaining a GPS unit should events choose to use this technology. One option is that the USCTA (now USEA) purchase GPS units and then make them available to events. Another option is for individual events to obtain their own GPS unit - events might purchase, rent, or receive a donation. The respondents are almost evenly divided in their responses. See Table15.

Table 15. Methods of Obtaining GPS by Events

<table>
<thead>
<tr>
<th></th>
<th>Organizers and Safety Coordinators’ Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Events obtain GPS</td>
<td>7</td>
</tr>
<tr>
<td>USCTA provides GPS</td>
<td>5</td>
</tr>
<tr>
<td>Both options</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: A total of 7 organizers and 6 safety coordinators’ responses were counted.
Those who indicated events should obtain GPS on their own thought availability of GPS units through the USCTA would be limited; thus, events would not be able to use a GPS unit when they need it; or other events would not return the GPS units on time for other events to use. Several respondents thought events should try and have a GPS unit donated or made available through a sponsor. One organizer who thought the USCTA should provide GPS units argued that events would be more likely to use GPS if they did not have to obtain one on their own. Another organizer thought that limited finances would prevent smaller events from obtaining GPS units on their own.

Organizers and safety coordinators were next asked if computer-mapping software was used to prepare any of the maps used at their respective events; if yes, which software and by whom? Three of the thirteen respondents indicated that computer-mapping software was used to prepare maps for their events. The software used by each was Corel Draw. It should be noted that the researcher does not consider Corel Draw to be mapping software. Six of the respondents said that computer-mapping software was not used. The remaining four respondents did not know whether computer-mapping software was used.

Question twenty-four asked what are the obstacles if any to using new technology such as GPS and computer-mapping software? The most frequent answers were cost and lack of knowledgeable people, followed by time, availability, frequency of use, and overcoming old traditions. One person thought there are no obstacles in using new technology. Table 16 shows the results to this question.
Table 16. Obstacles Faced by Events in Using New Technology

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>46.1%</td>
</tr>
<tr>
<td>6</td>
<td>46.1%</td>
</tr>
<tr>
<td>4</td>
<td>30.7%</td>
</tr>
<tr>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>1</td>
<td>7.6%</td>
</tr>
<tr>
<td>1</td>
<td>7.6%</td>
</tr>
<tr>
<td>1</td>
<td>7.6%</td>
</tr>
<tr>
<td>1</td>
<td>7.6%</td>
</tr>
</tbody>
</table>

Note: A total of 7 organizers and 6 safety coordinators’ responses were counted.

The final two questions of the organizer and safety coordinator interview are related to costs in preparing maps. Respondents were asked how much is currently spent to prepare maps and how much would they be willing to spend to improve mapping? Six of the thirteen respondents did not know how much is currently spent to prepare maps for their respective event. Three indicated the time and costs are all donated. Three others said less than $500 was spent preparing the maps. One person said that $2000 - $3000 is spent for the entire program. The maps are included in the program so she did not know how much was spent just on the maps alone.

Two of the safety coordinators did not know how much the event would be willing to spend in order to improve maps. Two of the organizers said they would be willing to spend nothing to improve maps. They feel the existing maps are sufficient. Three respondents indicated they would be willing to spend a minimal amount to improve maps. The remaining organizers and safety coordinators provided dollar amounts ranging from $250 up to $1000.
Interview for Medical Personnel

At the start of each medical personnel in-person interview, the researcher recorded the certification of the person interviewed. The researcher did not interview every medic on site at every event as a lack of availability of medical personnel and time constraints hindered such efforts. In many cases, the safety coordinator is also a medic. When organizers and safety coordinators were asked to list all the medical personnel on site they included the safety coordinator if in fact the safety coordinator is a medic. Safety coordinators who are also certified medics were only interviewed once. They were administered the Organizer and Safety Coordinator In-person Interview and not the Medical Personnel In-Person Interview. The researcher determined that more thorough and complete information would be provided via the Organizer and Safety Coordinator Interview. Of the sixteen medics interviewed using the Medical Personnel In-Person Interview, eleven are Advanced Life Support (ALS) providers, four are Basic Life Support (BLS) providers, and one is a Registered Nurse (RN).

The medical personnel interview first asked how many events medics worked at including this event plus other events? All of the medical personnel working at Horse Trials had worked at two or fewer events. Almost half of the medics working at Horse Trials (44%) reported this to be their first time working at an event. Medical personnel working at Three-Day Events tended to have more experience working at events. Two of the medics (29%) have worked at ten events. Two of the medics working at Three-Day Events (29%) reported this to be their first time working at an event. The remaining three medics (42%) reported experience working at two, four, and seven events. Refer to Table 17 for a list of the number of events at which medical personnel have worked.
Table 17. Number of Events Medical Personnel Worked Including the Current Event

<table>
<thead>
<tr>
<th>Number of Events</th>
<th>Horse Trials</th>
<th>Three-Day Events</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
</tr>
<tr>
<td>First Event</td>
<td>4</td>
<td>44.4%</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>55.6%</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>----</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>----</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>----</td>
<td>2</td>
</tr>
</tbody>
</table>

*Note: 9 medical personnel were interviewed at Horse Trials and 7 medical personnel were interviewed at Three-Day Events.*

In question two, medical personnel were also asked how many times they have worked at the particular event at which they were currently working. Nine (100%) of the medical personnel working at Horse Trials indicated they have only worked at that particular event, which includes working at the current event in previous years. Five (71.4%) of the medical personnel working at Three-Day Events reported previously working at that event, while two (28.5%) had worked at other events.

Question three asked the respondent if he or she was given the following maps: site map, cross-country course map, and a map showing routes to offsite medical facilities. Only two of nine medics working at Horse Trials received a site map and two of the seven medics working at Three-Day Events received a site map. Six medics working at Horse Trials received a cross-country map, while only two medics at Three-Day Events reported receiving a cross-country map. None of the medics reported receiving a map showing routes to offsite medical facilities. However, most of the medics knew the route to the nearest hospital. At one event, the medics indicated they did not usually work in the part of the county in which the event took place and were not familiar with the roads and did not know the best routes to take to offsite medical facilities. The
medics expressed a desire to be given a map showing the local roads. Table 18 shows the results of answers to question three.

Table 18. Whether or Not Medical Personnel Received Certain Types of Maps

<table>
<thead>
<tr>
<th>Map Type</th>
<th>Horse Trials</th>
<th>Three-Day Events</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Did Receive</td>
<td>Did Not Receive</td>
</tr>
<tr>
<td>Site Map</td>
<td>2 (22%)</td>
<td>7 (78%)</td>
</tr>
<tr>
<td>Cross-Country</td>
<td>6 (67%)</td>
<td>3 (33%)</td>
</tr>
<tr>
<td>Offsite Medical Facility</td>
<td>0</td>
<td>9 (100%)</td>
</tr>
</tbody>
</table>

Note: 9 medical personnel were interviewed at Horse Trials and 7 medical personnel were interviewed at Three-Day Events.

The next question asked medical personnel if they would use the following maps if they received them: site map, cross-country course map, and a map showing routes to offsite medical facilities. All of the medical personnel for Horse Trials and Three-Day Events said they use maps if they are provided. For those medical personnel who did not receive any maps, they expressed a desire to be provided maps. The medical personnel working at their first event indicated that maps would be very helpful to them since they were not very familiar with the event site and cross-country courses.

For those medical personnel who are provided maps and use them, they were asked to describe how they use the maps. The number one use of maps was to determine where the jumps on the cross-country course are located. Figuring out how to navigate to jumps and determining the best place to position the emergency vehicle in stand-by mode were the next most frequent. Table 19 shows how medical personnel reported using their maps.
Table 19. How Medical Personnel Use Maps at Events

<table>
<thead>
<tr>
<th>Map Use</th>
<th>Responses By All Medical Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Determine location of jumps</td>
<td>9</td>
</tr>
<tr>
<td>Navigate to jumps</td>
<td>3</td>
</tr>
<tr>
<td>Position vehicle in stand-by</td>
<td>2</td>
</tr>
<tr>
<td>Locate event entrance/exit</td>
<td>1</td>
</tr>
<tr>
<td>Locate hazards</td>
<td>1</td>
</tr>
<tr>
<td>Navigate local roads</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Based on a total of 13 medical personnel responses.

Question six asked medical personnel to list the features they think should be included on maps provided at events. Table 20 reveals the results.

Table 20. Features That Should Be Included on Maps at Events According to Medical Personnel

<table>
<thead>
<tr>
<th>Feature</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td>8</td>
<td>62%</td>
</tr>
<tr>
<td>Ambulance location</td>
<td>7</td>
<td>54%</td>
</tr>
<tr>
<td>Jumps</td>
<td>7</td>
<td>54%</td>
</tr>
<tr>
<td>Access routes to jumps</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Entrance / exit</td>
<td>5</td>
<td>38%</td>
</tr>
<tr>
<td>Hazards</td>
<td>5</td>
<td>38%</td>
</tr>
<tr>
<td>Gates</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Restrooms</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Parking</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Stabling</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Permanent structures</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Compass / legend</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Radio communications</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Longitude / latitude – GPS</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Visible / non-visible areas</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Crowd control</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Difficult jumps highlighted</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Fence lines</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Woods</td>
<td>1</td>
<td>8%</td>
</tr>
</tbody>
</table>

Note: Based on a total of 13 medical personnel responses.
Question seven asked medical personnel if they were given a map showing emergency response routes to each jump on the cross-country course. Two of the respondents indicated that they were given a map showing emergency response routes to general areas of the cross-country course and not to individual jumps (both medics were working at the same event). None of the other medics working at Horse Trials and Three-Day Events were given a map with emergency response routes to each jump on the cross-country course.

As a follow-up question, medical personnel who did not receive a map showing emergency response routes were asked if they planned routes to each jump on their own prior to the start of the cross-country competition. If yes, how did they plan emergency response routes? Refer to Tables 21 and 22. Table 21 lists how many medical personnel at Horse Trials and at Three-Day Events planned emergency response routes on their own. Table 22 shows the methods used by medical personnel to plan emergency routes on the cross-country course.

Table 21. Medical Personnel Who Planned Emergency Response Routes to Jumps on the Cross-Country Course

<table>
<thead>
<tr>
<th>Response</th>
<th>Horse Trials</th>
<th>Three-Day Events</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>71.4%</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>28.6%</td>
<td>5</td>
</tr>
</tbody>
</table>

*Note:* Based on 7 responses at Horse Trials and 7 responses at Three-Day Events.
Table 22. Methods Used By Medical Personnel to Plan Emergency Response Routes To Jumps On the Cross-Country Course

<table>
<thead>
<tr>
<th>Method</th>
<th>Horse Trials</th>
<th>Three-Day Events</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visually inspect course from one place</td>
<td>2 (40%)</td>
<td>0</td>
<td>2 (28.6%)</td>
</tr>
<tr>
<td>Walk around course</td>
<td>2 (40%)</td>
<td>0</td>
<td>2 (28.6%)</td>
</tr>
<tr>
<td>Drive around course</td>
<td>0</td>
<td>1 (50%)</td>
<td>1 (14.2%)</td>
</tr>
<tr>
<td>Follow safety coordinator to accidents</td>
<td>1 (20%)</td>
<td>1 (50%)</td>
<td>2 (28.6%)</td>
</tr>
</tbody>
</table>

Note: Based on 7 responses answering Yes to planning routes on their own.

A higher number of medical personnel at Horse Trials planned emergency response routes to jumps than did the number of medical personnel at Three-Day Events. Two of the medics considered following the safety coordinator to accidents a method of planning emergency response routes on their own. The researcher does not consider this to be emergency route planning because the medics relied on an event official to direct them around the course. They were unable to respond on their own and did not really plan out routes prior to the start of cross-country.

All of the medical personnel, regardless of whether they planned emergency response routes or not, were asked if they walk or drive around the cross-country course prior to the start of competition. The medical personnel had the option of touring the course in order to familiarize themselves with it and yet still not plan routes. Four of the total sixteen medics, walked, drove, or bicycled around the cross-country course. Of these four, three worked at Horse Trials and one worked at a Three-Day Event. Only 25% of the medical personnel toured the cross-country course prior to the start of the competition.
Question ten asked medical personnel if they are very familiar, somewhat familiar, somewhat unfamiliar, or not at all familiar with the cross-country course. Refer to Table 23 for the results.

**Table 23. Medical Personnel’s Level of Familiarity with the Cross-Country Course**

<table>
<thead>
<tr>
<th></th>
<th>Horse Trials</th>
<th>Three-Day Events</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
</tr>
<tr>
<td>Very Familiar</td>
<td>1</td>
<td>11.1%</td>
<td>0</td>
</tr>
<tr>
<td>Somewhat Familiar</td>
<td>3</td>
<td>33.3%</td>
<td>4</td>
</tr>
<tr>
<td>Somewhat Unfamiliar</td>
<td>3</td>
<td>33.3%</td>
<td>3</td>
</tr>
<tr>
<td>Not at all Familiar</td>
<td>2</td>
<td>22.2%</td>
<td>0</td>
</tr>
</tbody>
</table>

*Note: Based on a total of 16 responses, 9 from Horse Trials and 7 from Three-Day Events.*

The remaining three questions asked medical personnel if they communicate with event officials, among themselves, and with offsite medical facilities. If they do communicate, they were asked by what method. All sixteen of the medical personnel (100%) indicated that they communicate with event officials. At all of the events, except one, communication occurs via hand held radio. At one of the events, the medical personnel communicate in person with officials. This is one of the events discussed in the organizer and safety coordinator interview as relying on the safety coordinator to direct the medics to accidents. All sixteen of the medical personnel (100%) communicate with each other by radio. The medical personnel at all of the events, except one, communicate with offsite medical facilities by radio. In addition, medics at five of the events also carry cell phones. At the one event where medical personnel do not communicate with offsite medical facilities, the medics rely on the event officials to communicate with hospitals via a landline phone.
Two separate in-person interviews were used in this study: one for organizers and safety coordinators and another for medical personnel. Copies of each in-person interview used in this study are found in Appendix B.

Summary

The results of the two in-person interviews, the organizer and safety coordinator interview and the medical personnel interview, were presented in this chapter. The organizer and safety coordinator interview addressed four general categories including: event site, emergency response, mapping, and personal opinions regarding mapping and emergency response. It was lengthier and covered a broader range of issues than the medical personnel interview. Organizers and safety coordinators were directly involved in running the event and were more likely to provide information about the event site as well as safety issues and emergency response. The medical personnel interview focused on emergency response. It included the following general categories: experience working at events, use of maps, and methods of communication. Refer to Appendix B for a complete copy of the two interviews used in this study.
CHAPTER 5
MAPPING TECHNIQUES

This chapter will address the topic of mapping. Maps made available by events at the time this research was conducted will be discussed, including their strengths and limitations. The method used to collect data to prepare maps for each event by the researcher will be addressed. The use of data dictionaries for GPS data collection and the corresponding features used to create maps for each event will be presented. Finally general recommendations are made for those who desire to improve existing maps.

Existing Maps

In addition to conducting in-person interviews, each event site including the cross-country course was mapped by the researcher. Copies of any existing maps related to each event were collected. Maps specifically requested were those of the entire event site, the cross-country course, and emergency routes to the nearest offsite medical facility. Additional maps were also requested if they existed.

Examples of existing maps made available at each event are included. Refer to pages 84-95 for examples of existing maps. All of the events provided cross-country maps. In addition, some events also provided separate maps of the event site. In some cases, a single map served as both the cross-country map and the site map. Although every event includes certain required facilities such as dressage arena(s), cross-country courses and stadium courses, each event site is unique. The placement and location of facilities varies according to the individual characteristics of each event site. Some event sites are well suited to include site and cross-country features on one map. Other events require two maps, one for the site and separate map(s) for cross-country. In those
instances where site and cross-country information is adequately presented on one map, by all means one map should be used. In other situations this is not possible and separate maps are necessary. It is not the intention of this thesis to suggest that every event needs to provide separate maps for the cross-country courses and site, but rather that cross-country and site information be provided either on one map or separate maps. Individual events should decide the best way to map their events.

Of the seven events included in this study, five provided site maps. Two of the events combined the site and cross-country maps into one while three had separate site and cross-country maps. All of the site maps adequately convey the intended information about the location of features at each event site. The Jackson Hole, Herron Park, and Fair Hill site maps are attractive and easy to read and understand. Powder Basin made good use of an existing map created by the organization that manages the Cam-Plex facility where part of their event is held. This is a good example of using existing maps that someone else already created. The Arrowhead site map is primitive, yet conveys the relative location of the general facilities.

All of the site maps except the Fair Hill map lack certain standard mapping elements including north arrow, legend, and scale. The Jackson Hole map includes a north arrow and legend but not a scale. The Arrowhead map does include a north arrow but lacks a legend and scale. The Herron Park and Powder Basin maps are missing all three elements. With effort, most map readers may be able to figure out where features are located and what certain symbols mean, a legend, north arrow, and scale make the job of using and interpreting a map much easier.
The cross-country maps for Fair Hill, Herron Park, Jackson Hole, Juniper Hill, Powder Basin, Arrowhead, and Camino Real satisfy the goal of assisting competitors seeking information about the course. As a minimum, all of the maps indicate approximate jump locations. Some of the maps offer additional information in the form of jump names (which often describe the type of jump) and course statistics such as length, number of obstacles, optimum time, time limit, and speed. All of this information is required by the competitors in order to successfully complete the cross-country phase of competition. For non-competitors, including EMS personnel and spectators who may not be familiar with the sport of eventing or for those attending the event for the first time, some of the maps may be of limited use.

The Juniper Hill, Camino Real, Arrowhead, and Jackson Hole cross-country maps might be of limited value for non-competitors such as spectators and EMS personnel. None of these maps include recognizable landmarks that the map-readers can use to orient themselves. The Arrowhead map is particularly confusing because it not only lacks landmarks but is missing jump numbers as well. The map-reader struggles to figure out the order of jumps and direction of the course. The most useful information on the Arrowhead map is the course statistics.

Standard mapping elements are missing from all of the maps except for those of the Fair Hill event. The Powder Basin and Arrowhead maps do include north arrows but not legends or scales. The Juniper Hill map includes the word “north” but no arrow. The remaining maps from the Jackson Hole, Camino Real, and Herron Park events are missing legends, scales, and north arrows.
Existing Map of Arrowhead Site
NOVICE
20 obstacles OT - 6:00
2100 Meters at 350 mpm TL - 12:00

Warm-up
Existing map of Powder Basin Cross-Country
2001 Herron Park Horse Trials
Existing Map of Juniper Hill Cross-Country

JUNIPER HILL HORSE TRIALS

2001

Training Course (21 efforts)

North

1. Garden Box Log
2. Triple Oxer
3. Way North
4. Brush Box
5. The Deep V
6. Welsh Log
7. Sneaky Oxer
8. Log Askew
9A. Water Way to Go
9B. Water Way to Go
10. Coop D'Jour
11. Wittle Weldon
12. Badger Logs
13. Columbus Log
14. Tiger Trap
15A. Sunken Road
15B. Sunken Road
16. Ski Jump
17. Trakhener
18. Straw Bale Oxer
19. Tired Yet?
CIC* COURSE MAP

JUMPS
1. Ramp
2. Boulders
3. Steeplechase Fence
4. a.b. - Tucker's Corral
5. Corner
6. Table
7. Kayak Rails
8. a.b. - Wall-Pete's Water
9. Step
10. Rails
11. Log Oxer
12. Trakehner
13. a.b.c. - Coffin
14. Bent Log
15. a.b.c. - Coffin
16. Log Into Water
17. Moose's Cabin
18. Palisade Oxer
19. a.b.c.d. - Jackson State Bank
20. Bank Narrow
21. Brush
22. Broken Table
23. Webb's Flying Finish

JACKSON HOLE HORSE TRIALS CIC* COURSE MAP

Spring Creek Equestrian Center, Jackson Wyoming

COURSE STATISTICS:
23 obstacles numbered white on green
29 jumping efforts
Meters to be ridden at 520 mpm

Existing map of Jackson Hole Cross-Country
CCI** ROAD & TRACKS

Phase A
Distance 3960 m
Speed 220 mpm
Opt. Time 18 min
Time Limit 21m, 36s

Phase B
Distance 2310 m
Speed 660 mpm
Opt. Time 3m, 30s
Time Limit 7m

Phase C
Distance 7040 m
Speed 220 mpm
Opt. Time 32m
Time Limit 36m, 24s

Existing map of Camino Real Roads and Tracks
Distance 5110m
Speed 550 mpm
Opt. Time 9 min, 17 sec
Time Limit 18 min, 34 sec

1. Horse Trials Inc Beginning
2. Keechl Equip Log Pile
3. Kubota Angles
4. Bossier Curve
5. Round Tops
6. Into Space
7. Kubota Keyhole
8. Oxer
9. Calf Creep
10. Elephant Trap
11. AB: Yale Animal Clinic Corner
12. Bit of Britain House
13. ABC: Combination
14. Trakhener
15. Cedar Oxer
16. AB: Turn
17. Trakhener
18. Two Oxers
19 & 20 Huber's Hope
21. Pepsi Poser
22. AB: IBM Challenge
23. Houston 2012 Up & Over
24. Mark's Well
25. Breath In
26. ABC Kinko's Water
27. AB: Stubben Corral
28. Phoenix Performance Table
29. Lone Star
New Maps

The researcher anticipated events would have a broad spectrum of maps ranging from none or very limited to quite extensive. There was no way to know with certainty all of the maps each event would have available and use. In order to ensure a minimum level of consistency of maps for all of the events at the completion of the fieldwork, the researcher undertook the task of systematically mapping each event. A map of the entire site and a map of the cross-country course were created for each event by the researcher. A minimum set of standard features was included when collecting data in order to prepare the maps. Given the diverse nature of events, it was difficult to devise an all-inclusive, complete list of standard features. Certain features are common to all events and these made up the minimum set of standard features. Beyond the minimum standards, individualized characteristics were captured for each event.

Certain standard features are common to all events. These features include cross-country jumps, dressage arena(s), start and finish for cross-country, first aid, parking areas, restrooms, score board, show jumping area, show office, warm-up areas, and water (potable and non-potable plus natural features such as rivers, streams, ponds). In addition most events also include buildings (permanent and temporary), fence lines, gates, roads, stabling, vendors, food, vets, and farriers. The researcher also anticipated the following additional possible features: bridges and culverts, camping, power poles (useful for helicopter pilots), and telephones. For those features that were not anticipated but encountered at events, generic categories for point, line, and area features were included in the data dictionary. All of these were included in the data dictionary used to collect data at each event and are listed in Appendix C.
Data was collected using a Global Positioning System (GPS) unit. A Trimble GeoExplorer 3 was used to collect all of the GPS data. This is considered a mapping grade unit as opposed to a low-end sporting unit or a high-end survey grade unit and was deemed sufficient for the purposes of this study. Low-end units lack the ability to capture attribute data, a requirement for this research. Survey-grade GPS is expensive and requires a significant amount of skill from the user. This researcher is not a licensed surveyor nor has access to or knowledge of how to use survey-grade GPS. Mapping grade GPS was the logical choice. The Trimble GeoExplorer 3 was selected for two reasons. The researcher is familiar with and experienced in the use of Trimble products. The Geography Department at the University of Montana owns several Trimble GPS units and these were made available to this researcher.

An advantage of using a mapping grade GPS unit such as the GeoExplorer is the ability to collect attribute data about the features being mapped. Not only was the researcher able to capture spatial data, she was also able to capture descriptive data as well through use of a data dictionary. A data dictionary is a description of features and their attributes. It structures data collection, making it easier and consistent. For example, suppose jumps are the feature about which data is collected. A data dictionary is created with jumps as the feature and number, type, and level as attributes. When in the field, the researcher is prompted to enter the attributes at the same time as the position data is collected. This serves as a reminder to the researcher not only about what data to collect but also to collect it consistently from feature to feature. Data dictionaries can be created to capture any feature occupying physical space on earth along with any type of attribute associated with the feature. See Appendix C for the data dictionary used for this research.
Once the GPS data was collected in the field, it was downloaded to a desktop computer and processed on the computer using Trimble’s Pathfinder Office software. The data was post-processed or differentially corrected in order to minimize the amount of error. The closest public or community base stations to each event included in this study were located via the internet and base files downloaded for the purpose of differential correction. Once the GPS data was differentially corrected, it was exported from Pathfinder Office in drawing interchange format (.dxf). The data was then imported into AutoCad Map 5. All of the maps for each event were created in AutoCad Map 5.

Examples of maps created using the data collected by the researcher at each event are included on the following pages. The maps are intentionally presented in different formats to highlight the fact that there is more than one way to present the same type of information through maps. Certain information is included on some maps but not others to highlight the individual nature of each event. For example, the Jackson Hole and Herron Park maps include symbols for trees, shrubs and hedgerows because these types of features are prominent and easily identified at these particular events. The Fair Hill site map includes a background image of a topologic map in order to demonstrate that it is possible to include this type of information as well. The topographic data was taken from Delorme’s Topo USA Version 3.0, a software package that can be bought at most retail stores selling computer software.
2001 Herron Park Horse Trials
Kalispell, Montana
Training Cross-Country Course

LEGEND
Bridge
Building
Cross-Country Jump
Fenceline
First Aid
Food
Irrigation Ditch
Restroom
Stabling Permanent
Stabling Temporary
Water

Training
Distance: 1945 meters
Speed: 450 mpm
Optimum Time: 4:20 min
Time Limit: 8:40 min

114° 21' 35" W  114° 21' 30" W  114° 21' 25" W  114° 21' 20" W  114° 21' 15" W  114° 21' 10" W  114° 21' 05" W
2001 Herron Park Horse Trials
Kalispell, Montana
CIC** Cross-Country Course

LEGEND
Bridge
Building
Cross-Country Jump
Fenceline
First Aid
Food
Irrigation Ditch
Restroom
Stabling Permanent
Stabling Temporary
Water

CIC**
Distance: 2925 meters
Speed: 550mnpm
Optimum Time: 5:20 min
Time Limit: 10:40 min
Warfield Equestrian Park
Billings, Montana
Site Map
Arrowhead Cross-Country Courses, August 2001

Scale in Feet

Time Limit: 9:18 10:08 8:90
Speed: 325 400 450

Office

Start

Finish

Water

Levels

Beg. Novice
Novice
Training

J. Wicks 3/10/02
Juniper Hill Horse Trials 2001
Helena, Montana
Training Cross-Country Course

Distance: 2350 meters
Speed: 450 mpm
Optimum Time: 5:13 min
Time Limit: 10:26 min

LEGEND
- Ambulance
- Building
- Cross-Country Jump
- Fenceline
- Food
- Restroom
- Water
Jackson Hole Horse Trials
Training Cross-Country Course
Spring Creek Equestrian Center, Jackson, Wyoming August 2001

Distance: 2150 meters
Speed: 450 mpm
Optimum Time: 4:47 min
Time Limit: 9:34 min
20 obstacles, 22 jumping efforts
Jackson Hole Horse Trials
CIC** Cross-Country Course
Spring Creek Equestrian Center, Jackson, Wyoming August 2001

Distance: 3050 meters
Speed: 550 mpm
Optimum Time: 5:33 min
Time Limit: 11:06 min
26 obstacles, 34 jumping efforts
CCI** Cross-Country
Camino Real
November 8-11, 2001

Jump Description
1. Horse Trials Inc Beginning
2. Keechi Equip Log Pile
3. Kubota Angles
4. Bossier Curve
5. Round Tops
6. Into Space
7. Kubota Keyhole
8. Oxer
9. Calf Creep
10. Elephant Trap
11. AB Yale Animal Clinic Corner
12. Bit of Britain House
13. ABC Combination
14. Trakhener
15. Cedar Oxer
16. AB Turn
17. Trakhener
18. Two Oxers
19 & 20. Huber's Hope
21. Pepsi Poser
22. AB IBM Challenge
23. Houston 2012 Up & Over
24. Mark's Well
25. Breath In
26. ABC Kinko's Water
27. AB Stubben Corral
28. Phoenix Performance Table
29. Lone Star

Distance: 5110 meters
Speed: 550 mpm
Opt. Time: 9:17
Time Limit: 18:34
Recommendations

It is important to keep in mind the intended audience or user of each map. What types of information are required? How will the information be used? Prioritize the information and determine the best way to present the information so that it is easy to understand and meets the needs of the map user(s). For example, when organizers and safety coordinators were asked to list the features that should be included on maps, cross-country jumps topped the list of responses. When medical personnel were asked the same question, roads made the top of their list. Traditionally maps are provided to benefit competitors and organizers probably had competitors in mind when they listed cross-country jumps as important features to include on maps. Medical personnel on the other hand are interested in navigating to an accident in order to perform their job. So they would need to know where roads are located for navigation. This is not to suggest that one is more important than the other, rather it highlights the fact that different map-readers prioritize information based on their needs. It is possible to include both roads and cross-country jumps on the same map and thus meet the needs of medical personnel and competitors. Competitors might find road information of value and certainly medical personnel will need to know where jumps are located. If the goal is for maps to serve more than one type of user, it is important to include the features important to each type of user. Keep in mind that information required by one type of user might also prove to be of value to other types of users even though it may not be considered a high priority to them.

None of the events had maps showing emergency response routes to the nearest offsite medical facility. At the very least, copies of these maps kept on hand at the event
might prove useful and of great value to someone, who is not familiar with the local area, during an emergency situation. In most cases it is possible to obtain an existing map showing the streets for the area in which events are located. Some of these maps even include hospitals, schools, and other points of interest. If not, the person responsible for the maps at each event can mark or highlight the location of medical facilities as well as the best route or routes to take from the event site. Maps are made available to the public by various organizations or government offices such as the Chamber of Commerce, Department of Public Works, County or City Surveyors Offices, to name a few.

Map users appreciate certain elements that help make interpreting the map easier. These include a title, legend, north arrow, scale, and date. The title clearly conveys the purpose and subject of the map. The legend explains what the symbols represent, even those symbols may be assumed understood by the map-readers. The north arrow indicates the direction of north, which does not always need to be the top of the page although this is the conventional placement. The features depicted on a map are represented at a scale smaller than the space they actually occupy in the real world. A scale on the map represents this relationship between real world features and the corresponding features on the map. The date and author of the map provide credit as well as a source for users of the map to contact if they have questions or require further information regarding data depicted on the map.

It is also important to include identifiable landmarks that the map user can use for reference and orientation. It is preferable that the landmarks be permanent, however this is not a requirement. Permanent landmarks are less likely to be moved, altered, or even completely removed making them a reliable source of reference on the map. Points of
reference may include natural or human-made features depending upon what features are present at each individual event site. Examples include bodies of water, forests, hedges, mountains, fence lines, bridges, culverts, roads, and buildings.

It is not the purpose of this thesis to list specific features that should be included on maps provided by all events. There is no possible way for this researcher to anticipate or predict all of the features at every event. Event officials must exercise common sense and good judgment in determining what features to include on the maps provided by their respective events. Each event site is unique and possesses its own individual characteristics. Those people most familiar with the event site should be responsible for the maps, taking into consideration the intended audience and users of the maps.

Summary

All of the events included in this study provide maps. As a minimum, cross-country maps are available at each event. Some events additionally provide separate site maps while others include site and cross-country features on one map. Most of these maps are of value to competitors at the very least. In order to expand the maps’ usefulness, the needs of a broader audience need to be considered. This study in particular focuses on EMS personnel. The needs of two or more different types of map users do not have to be mutually exclusive. It is possible to include features and information required by competitors and EMS personnel on one map. How this is accomplished will vary from event to event depending upon the individual characteristics of each event.

The same type of information required by competitors is also useful to EMS personnel, however they require additional information to help them best respond to
accidents and perform required duties. Of particular interest to EMS personnel is information related to navigation. They need to know how to get from Point A to Point B in the fastest amount of time. Things such as the type of vehicle on site are important. Certainly a 4-wheel drive truck or ATV can negotiate terrain that a standard ambulance is unable to navigate. Maps for EMS personnel might shows areas that are navigable as well as those areas not navigable. Things such as fence lines, ditches, swampy areas, heavily treed areas, and hedgerows might be useful since a vehicle will have to avoid or go around such areas. Show gates and passageways through otherwise un-navigable areas. These are just examples of some of the things to consider when preparing maps for medical personnel.

Events have the opportunity to improve their existing maps by adding mapping elements such as north arrows, legends, and scales. Drawing maps to a certain scale will help EMS personnel immensely. Being able to determine the distance from one point to another using a map will give medical personnel an indication of how far they have to travel in order to respond to an accident. This might prove most useful in pre-planning routes to different sections of a cross-country course or even to specific jumps. Medical personnel may be able to estimate the amount of time to different parts of the cross-country course and position themselves in standby mode to minimize the distance and time required to respond to the areas they are assigned to cover for emergency response.

The great thing about maps is that they are a wonderful tool for conveying a great deal of information, in an easy to understand format, in a relatively small amount of space. Maps allow us to understand and thus respond to and interact with more of the world around us than what we, as individuals are able to sense at any given time. Events
have the opportunity to take advantage of the strengths of maps and use them to benefit competitors, medical personnel, spectators, and officials.
CHAPTER 6

SUMMARY AND CONCLUSION

Eventing is the triathlon of equestrian sports. At its core are three distinct phases: dressage, cross-country, and show jumping. Together, the three phases challenge the ability, versatility, and preparedness of horse and rider. Cross-country has long been considered the heart of the sport. It measures the speed, endurance, and jumping ability of the horse over natural obstacles such as logs, ditches, banks, stone walls, and water. Solid in nature, these obstacles are designed not to give if a horse hits them. Although thrilling and exciting, cross-country is dangerous and inherently risky. Accidents frequently occur, most notably on the cross-country course. The death of five British riders during the 1999 competition season prompted the national and international equestrian community to recognize the need to address safety issues at events.\(^1\)

In 2002, the United States Eventing Association (USEA) responded by implementing several new rules related to safety and medical coverage at recognized events under its jurisdiction. All recognized events must have a safety coordinator who is “responsible for the establishment and coordination of medical services, including the transportation of injured riders.”\(^2\) The safety coordinator arranges for qualified Emergency Medical Services (EMS) to be on site during all phases of the competition as well as during scheduled schooling over jumps. Qualified medical personnel trained in pre-hospital trauma care are required. A new addition to the 2002 rules requires that


medical personnel be able to rapidly deploy to any part of the arenas and cross-country courses.

The USEA’s creation of a National Safety Committee and addition of new rules focusing on medical services in the past several years suggests that safety is recognized as an important issue. A large part of safety involves medical care and emergency response. The goal of this study was to understand how emergency response, as it relates to the use of maps, is handled at recognized events falling under the jurisdiction of the USEA. Of particular interest is the ability of medical personnel to respond quickly and efficiently to any accident that occurs during the course of an event, especially during the cross-country phase of competition. Medical personnel must be able to quickly determine a direct, passable and fast route to any particular place on the cross-country course. In order for this to occur, medical personnel must understand how the cross-country course is laid out, where the jumps are located, and what terrain is suitable for their vehicles. One method of obtaining this information is through maps.

No other formal research has been done regarding emergency response and mapping at the equestrian sport of eventing. It was necessary to conduct preliminary research to determine how emergency response as it relates to maps is handled at events. Two in-person interviews were used for this purpose. One interview was designed for organizers and safety coordinators while a second one was developed for medical personnel. A purposeful selection of seven events was included in this study from four different Areas. The Areas, as defined by the USEA, included in this study are Area II (Mid-Atlantic), Area V (South-Central), Area VII (Northwest), and Area IX (Rocky
Mountains). Five of the events included in this study are classified as Horse Trials and two of the events are classified as Three-Day Events.

The in-person interview for the organizers and safety coordinators addressed the following general categories: event site, emergency response, mapping, and attitudes about maps. The in-person interview for medical personnel included the following general categories: experience working at events, use of maps, and methods of communication. All of the events provided cross-country maps of some kind. Five of the seven events provided maps of the event site. In some cases, the cross-country and site maps were the same map. All of the information was combined into one map. The fact that the majority of events provide cross-country and site maps should not be taken as an indication that events are adequately meeting their mapping needs. In many cases, improvements could be made to the map content. Organizers, safety coordinators, and medical personnel were asked to list the features they think should be included on maps provided at events. Organizers and safety coordinators as well as medical personnel listed cross-country jumps and the location of ambulances in the top three responses of features that should be included on maps. The complete list of responses is included in Chapter 4, which discusses the results of the interviews. Most of the maps currently in use at events lacked the features listed by respondents. Cross-country jumps are the exception since most cross-country maps currently include the jump locations. Determining the quality of a map involves a certain amount of subjectivity. However there are standard features widely accepted as essential to any map. These include a north arrow, legend, scale, date, and author.
Whether or not the maps currently available at events adequately meet the needs of emergency response is questionable. Traditionally maps are created with the competitor in mind. Competitors usually walk the cross-country course to track its layout and locate jumps while referencing the map. These maps traditionally provide a minimum amount of detail, just enough to offer a sense of the general layout of the course. Medical personnel require more detail and information on maps in order to improve upon current emergency response. Can medics perform their duties under current conditions? Yes. Could medical personnel respond quicker, more efficiently, and with less frustration than they currently do? Is there room for improvement? This study shows that there is a need for improvement. All of the medical personnel interviewed expressed a desire to have quality maps showing the information they need to perform their duties to the best of their abilities. Not only is there an opportunity for improving maps, but maps must also be distributed to medical personnel. Seventy one percent of medics interviewed received site and cross-country course maps. However, at two of the events none of the medical personnel reported being given a map of any kind. These same medical personnel indicated that they were only somewhat unfamiliar or not at all familiar with the cross-country course. It makes it harder for medical personnel to perform their job well if they are not sure how to navigate the course.

The Safety Coordinator’s Manual recommends events provide at least three types of maps: a map of the event site, a map of the cross-country course(s), and a map showing emergency response routes to the nearest offsite medical facility. None of the events included in this study provided a map showing emergency response routes to offsite medical facilities. Event officials assumed that many of the people working at the
event including the medial personnel already know the route to the nearest hospital, because these people live and work in the area. Yet, in some cases, medical personnel are not from the immediate area and may not be familiar with the local road network. These medics may require maps showing local roads, especially if any maps they might carry in the ambulance are for a neighboring area only. Competitors, their families, and friends might also appreciate a map showing the route to the nearest medical facilities, especially if they are from out of town.

How to create quality maps for events is an important issue. A GPS unit was used to map event sites and cross-country courses included in this study. The purpose was twofold: to map each event included in this study and to determine the feasibility and practicality of using technology such as GPS to map event sites and cross-country courses. Might GPS be a tool, organizers, safety coordinators, or others associated with an event can use to prepare their own maps? Could this tool be used to improve maps? After using GPS to map each event, the researcher feels this technology would be useful for future mapping of events.

When used correctly, GPS offers a means to consistently collect a large amount of data in a relatively short period of time. The researcher was only able to spend one or two days at each event collecting data using GPS. It was a challenge. More time is required for thorough and efficient data collection. However, time should not be an issue for officials, volunteers, or anyone else associated with a particular event. All of these people have regular access to the site and cross-country courses.

GPS offers consistency and a certain degree of accuracy to data collection. This would go a long way in helping to improve upon existing maps. Attribute information
can be collected uniformly for different features. The user is prompted to enter the same
attributes each time a particular feature is mapped. Each feature is spatially referenced
and latitude and longitude recorded. Thus its geographic location in the real world is
mapped. Coordinates can be recorded and provided to Emergency Medical Services such
as a helicopter.

There are certain issues to address in using GPS to map events. Training and
practice using the equipment is necessary in order to map events by those individuals
who are not familiar with the technology. Time and training is also required to use the
accompanying computer software. The researcher recognizes the fact that organizers,
safety coordinators, and others associated with events tend to be overworked and not
have the time for mapping. With patience, determination, and perseverance the rewards
of utilizing GPS may far outweigh the costs.

Further Research

Given that this thesis primarily gathered data of a preliminary nature, there is
plenty of opportunity for further research. A study including more events that constitute a
probability sample should be done. Findings and generalizations could then be applied to
the larger population of events. A study addressing how maps are used by medical
personnel would prove interesting and useful. Such a study might determine what
information is required by medical personnel and the best method of presenting such
information via maps. Further research should be done to study methods of determining
emergency response routes to jumps on the cross-country course. Perhaps events should
consider providing maps to their medical personnel. Improved response could save a life
or minimize the effects of a serious injury.
APPENDIX A: EXPLANATION OF INTERVIEW

I plan to call event organizers prior to each event in order to determine if they are willing to participate in the study. If they decline, I will not spend the time and money to travel to their event. Below is the explanation I will present during the initial contact I make with the event organizer.

Hello, my name is Jennifer Wicks. I am a graduate student attending the University of Montana. I am also a member of the USCTA and compete in lower level events. I'm calling to ask if you will participate in a study I'm conducting. The purpose of the study is to find out how cross-country courses are currently mapped and to determine methods for improving maps in the future. My thought is that improved maps will assist in better emergency response during cross-country. I plan to attend your event on month day, 2001. While at your event, I'd like to personally interview the event organizer, the safety coordinator and the paramedic(s). Each interview will require about 30 minutes to complete. Participation in this study is voluntary and completely confidential. I would also like to map the event site, including the cross-country course using a GPS unit. The information I gather will be used to develop a model to assist in preparing maps for events in the future.
APPENDIX B

INSTRUCTIONS FOR THE INTERVIEWER

ORGANIZER AND SAFETY COORDINATOR INTERVIEW

MEDICAL PERSONNEL INTERVIEW

EXAMPLES OF MAPS USED IN BOTH INTERVIEWS
Instructions for Interviewer

*Answer the following questions prior to interview if possible. Obtain copies of the maps if they exist.*

1. Is a map of the competition site available? (yes no)

2. Is a map of the cross-country course available? (yes no)

3. Is a map of the emergency vehicle route to the nearest offsite medical facility available? (yes no)

To start each interview, show map examples and then proceed with interview questions.
Mapping Horse Trials and Events:
A Survey of Emergency Response Capabilities

Date: _____________
Org. S.C.

Interview for Organizers and Safety Coordinators

The purpose of this study is to find out how cross-country courses are currently mapped and to determine methods for improving maps in the future. This study will also examine how maps relate to emergency response, particularly to accidents that occur during the cross-country phase.

Site
1. How large is the entire event site, including dressage arena(s), stadium arena(s), cross-country courses, all warm-up arenas, stabling, concessions, competitor and spectator parking and any other facilities associated with the event? (acres preferred, if not known prompt for boundary description)

2. How often is the cross-country course route changed from event to event?

3. How often are new jumps added to the cross-country course?

4. Describe the following general conditions of the course:
   a. Terrain (rolling hills, hilly, flat, uneven, even, bumpy, forested)
   b. Footing (deep, hard, muddy, sand, grass, soft)

5. Is there a designated landing site for a helicopter? (yes no)
   a. If yes, describe where the landing site is located.
Emergency Response

6. List the following number of medical personnel on site during the cross-country phase.
   a. Advanced Life Support Paramedic
   b. Basic Life Support Paramedic
   c. Doctor
   d. Nurse
   e. Other

7. Do paramedics communicate with event officials such as the organizer, safety coordinator, technical delegate, jump judges and the announcer? (yes no)
   a. If yes, how do they communicate with the event officials?
      (cell phone radio HAM radio CB other)

8. Do paramedics communicate with each other? (yes no)
   a. If yes, how do they communicate with each other?
      (cell phone radio HAM radio CB other)

9. Do paramedics communicate with offsite medical facilities? (yes no)
   a. If yes, how do they communicate with offsite facilities?
      (cell phone radio HAM radio CB other)
For this interview, an emergency response route is considered to be the route a paramedic would take from the place he/she is located when not responding to an accident to any accident that may occur.

10. Keeping this definition in mind; are emergency response routes to each jump determined prior to the start of cross-country? (yes no)

   a. If yes, are they written down? (yes no)
   b. Are the routes included on a map? (yes no)
   c. Who is given a copy of the map with emergency routes?
      Paramedics? (yes no)
      Jump judges? (yes no)
      Organizer? (yes no)
      Safety coordinator? (yes no)
      Technical delegate? (yes no)
      Announcer? (yes no)
      Others? (yes no)

11. Are emergency vehicle routes from the event site to offsite medical facilities determined prior to the start of cross-country? (yes no)

   a. If yes, are they written down? (yes no)
   b. Are the routes included on a map? (yes no)
   c. Who is given a copy of the map with emergency routes?
      Paramedics? (yes no)
      Jump judges? (yes no)
      Organizer? (yes no)
      Safety coordinator? (yes no)
      Technical delegate? (yes no)
      Announcer? (yes no)
      Others? (yes no)

12. If you happen to know, was emergency response access to all areas of the course considered or not considered during the design and planning of the cross-country course? (considered not considered)

   a. If considered, how was emergency response access considered?
**Mapping**

13. List all of the maps of this event that are available.

14. Who created the map(s)?
   
   *(organizer secretary safety coordinator technical delegate other)*

15. If you happen to know, describe how the map(s) are created?

16. List the features you, yourself, think should be included on the maps provided at events? *(Circle all that are mentioned plus write in features not on the list below)*

<table>
<thead>
<tr>
<th>Restrooms</th>
<th>Dressage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vet</td>
<td>Cross-country</td>
</tr>
<tr>
<td>Shoeing</td>
<td>Show jumping</td>
</tr>
<tr>
<td>First aid</td>
<td>Warm-up arenas</td>
</tr>
<tr>
<td>Information</td>
<td>Jumps</td>
</tr>
<tr>
<td>Score posting</td>
<td>Jump description</td>
</tr>
<tr>
<td>Water (potable &amp; for horses)</td>
<td>Optimum time</td>
</tr>
<tr>
<td>Stabling</td>
<td>Time allowed</td>
</tr>
<tr>
<td>Permanent structures</td>
<td>Speed</td>
</tr>
<tr>
<td>Show office</td>
<td>Course length</td>
</tr>
<tr>
<td>Parking</td>
<td>Start/finish</td>
</tr>
<tr>
<td>Telephone</td>
<td>Ambulance location</td>
</tr>
<tr>
<td>Roads</td>
<td>Terrain</td>
</tr>
<tr>
<td>Entrance/exit</td>
<td>Topography</td>
</tr>
<tr>
<td>Areas horses not allowed</td>
<td>Vehicle/pedestrian crossings cross-country</td>
</tr>
<tr>
<td>Offsite amenities</td>
<td>Detail stabling map</td>
</tr>
<tr>
<td>Route to medical facility</td>
<td>Detail vendor booths</td>
</tr>
<tr>
<td>Alternate route to medical facility</td>
<td>General vendor area</td>
</tr>
</tbody>
</table>
Attitudes about maps
17. Do you, yourself, think the following maps should be available at every USTCA recognized event.
   a. Map of the entire competition site? (yes no)
   b. Map of the emergency vehicle route to the nearest offsite medical facility? (yes no)
   c. Map of the cross-country course? (yes no)
   d. Map of emergency routes to each cross-country jump? (yes no)
   e. Other maps such as:
      I. Stabling assignments/locations (yes no)
      II. Detail of vendor booths (yes no)
      III. Offsite amenities (yes no)

18. Some individuals think guidelines or helpful hints should be included in the safety coordinator’s manual to assist in preparing the recommended maps listed in the manual. Others think guidelines and helpful hints are not necessary and should not be included in the safety coordinator’s manual. What do you, yourself, think?

19. Some individuals think each event should have a professional mapmaker, a cartographer, prepare the recommended maps listed in the safety coordinator’s manual? Others think the people who currently prepare event maps should continue to do so and that a professional mapmaker or cartography is not necessary. What do you, yourself, think?

20. Do you know about the Global Positioning System or GPS? (yes no)
   a. If yes, describe in your own words, what is GPS?
21. Some individuals think new technology such as GPS is a useful tool that events might consider as an option to help prepare the recommended maps listed in the safety coordinator's manual. Others think GPS is not a useful tool or that it would cost too much time and money and should not be considered as an option to help prepare the recommended maps. What do you, yourself, think?

22. If events choose to use new technology such as GPS, there are several possible options for obtaining a GPS unit. One option is that the USCTA would purchase one or more GPS units and then make them available for events to use. Another option is that each event would be responsible for obtaining GPS units on their own. For example, events might purchase, rent or receive a donation. If events choose to use GPS, which option do you, yourself, think should be used? (USCTA provided events on their own)

23. Have you or anyone working at this event ever used computer-mapping software to help prepare the maps for this event? (yes  no)
   a. If yes, which computer-mapping software?
   b. Who used the software?

24. For events such as this one, what are the obstacles to using new technology such as GPS or computer mapping software?

25. How much money does this event spend to prepare maps? Include time to create the map(s) and costs for reproducing copies of the map(s).

26. How much would you be willing to spend to improve mapping?
Mapping Horse Trials and Events:  
A Survey of Emergency Response Capabilities

Date: ___________  Start Time: ___________  Finish Time: ___________

Circle One:  Paramedic   EMT   Other

Interview for Medical Personnel

The purpose of this study is to find out how cross-country courses are currently mapped and to determine methods for improving maps in the future. This study will also examine how maps relate to emergency response, particularly to accidents that occur during the cross-country phase.

Medical Personnel
1. How many events have you, yourself, worked at including the current event?

2. How many times have you, yourself, worked at this particular event including this time?

3. Are you, yourself, given the following maps?
   a. Map of the event site (yes  no)
   b. Map of the cross-country course (yes  no)
       a. Map of routes to offsite medical facilities (yes  no)

4. Do you, yourself, use any of the following maps if they are provided?
   a. Map of the event site (yes  no)
       b. Map of the cross-country course (yes  no)
       c. Map of routes to offsite medical facilities (yes  no)

5. If yes, describe how you, yourself, use each map?
6. List the features you, yourself, think should be included on the maps provided at events? (Circle all that are mentioned plus write in features not on the list below)

- Restrooms
- Vet
- Shoeing
- First aid
- Information
- Score posting
- Water (potable & for horses)
- Stabling
- Permanent structures
- Show office
- Parking
- Telephone
- Roads
- Entrance/exit
- Areas horses not allowed
- Offsite amenities
- Route to medical facility
- Alternate route to medical facility
- Dressage
- Cross-country
- Show jumping
- Warm-up arenas
- Jumps
- Jump description
- Optimum time
- Time allowed
- Speed
- Course length
- Start/finish
- Ambulance location
- Terrain
- Topography
- Vehicle/pedestrian crossings cross-country
- Detail stabling map
- Detail vendor booths
- General vendor area

For this interview, an emergency response route is considered to be the route a paramedic would take from the place he/she is located when not responding to an accident to any accident that may occur.

7. Keeping this definition in mind; are you, yourself, given a map showing predetermined emergency response routes to each jump on the cross-country course? (yes no)

8. If not, do you, yourself, plan emergency response routes to each jump on the cross-country course prior to the start of the cross-country phase of the competition? (yes no)

   a. If yes, describe how you plan routes to each jump.

9. Do you, yourself, walk or drive the cross-country course prior to the start of the cross-country phase of the competition? (yes no)
10. How familiar are you, yourself, with the cross-country course? Would you say you are:

Very familiar    Somewhat familiar    Somewhat unfamiliar    Not at all familiar

11. Do paramedics communicate with event officials such as the organizer, safety coordinator, technical delegate, jump judges and the announcer? (yes no)

   a. If yes, how do they communicate with the event officials?
      (cell phone    radio    HAM radio    CB    other)

12. Do paramedics communicate with each other? (yes no)

   a. If yes, how do they communicate with each other?
      (cell phone    radio    HAM radio    CB    other)

13. Do paramedics communicate with offsite medical facilities? (yes no)

   a. If yes, how do they communicate with offsite facilities?
      (cell phone    radio    HAM radio    CB    other)
Missoula Equestrian Park
Training Cross-Country

SCALE: 1" = 250'
Note: Not to scale in thesis format

DISTANCE: 1800m
SPEED: 450m/min
OPTIMUM TIME: 4:00
TIME ALLOWED: 8:00
LEGEND
- Boundary
- Bridge
- Building
- Cross-Country Jump
- Beg. Novice
- Novice
- Training
- First Aid
- Gate
- Information
- Irrigation Ditch
- Restroom
- Spectator
- Seating
- Water

Missoula Equestrian Park
Cross-Country Emergency Routes

Scale: 1" = 250'
Note: Not to scale in thesis format

North Avenue
37th Avenue
Tower Street
Entrance
Exit

PARKING

WARM-UP AREA

FENCED AREA
DRESSAGE
JUMPING

WATER

Food

Storage

Trailer Parking

Stabling

20m x 60m
DRESSAGE

NORTH AVENUE
APPENDIX C: DATA DICTIONARY

"thesis", Dictionary, "Mapping Horse Trials and Events"
"bridge", point, ",", 3, seconds, 1, Code
"width", numeric, 0, 0, 200, 20, normal, normal, Label1
"type", menu, normal, normal, Label2
"culvert"
"concrete"
"metal"
"wood"
"purpose", menu, normal, normal
"pedestrian"
"horses"
"vehicles"
"description", text, 50, normal, normal

"building", point, ",", 3, seconds, 3, Code
"corner", menu, normal, normal, Label1
"NW"
"SW"
"SE"
"NE"
"description", text, 50, normal, normal, Label2
"purpose", text, 100, normal, normal
"structure", menu, normal, normal
"permanent"
"temporary"

"camping", area, ",", 5, seconds, 3, Code
"description", text, 50, normal, normal, Label1

"cross-country jump", point, ",", 3, seconds, 3, Code
"jump#", numeric, 0, 0, 50, 1, normal, normal, Label1
"combination", menu, normal, normal, Label2
"a"
"b"
"c"
"d"
"e"
"f"
"level", menu, normal, normal
"beg. novice"
"novice"
"training"
"preliminary"
"intermediate"
"advanced"
"description", text, 100, normal, normal

dressage", point, "", 3, seconds, 3, Code
"corner", menu, normal, normal, Label1
"NW"
"SW"
"SE"
"NE"

"size", menu, normal, normal, Label2
"20 X 60"
"20 X 40"

"footing", menu, normal, normal
"sand"
"grass"
"dirt"
"other"

"entrance_exit", point, "", 3, seconds, 3, Code
"type", menu, normal, normal, Label1
"entrance"
"exit"
"both"

"fence", line, "", 5, seconds, 3, Code
"type", menu, normal, normal, Label1
"barbed wire"
"chain link"
"other"
"rail"
"wood"

"description", text, 50, normal, normal, Label2

"finish", point, "", 3, seconds, 3, Code
"flag", menu, normal, normal, Label1
"red"
"white"

"first aid", point, "", 3, seconds, 3, Code
"type", menu, normal, normal, Label1
"ambulance"
"fixed"

gate", point, "", 3, seconds, 1, Code
"function", menu, normal, normal, Label1
  "hinged side"
  "latch side"
"width", numeric, 0, 0, 50, 10, normal, normal, Label2
"purpose", menu, normal, normal
  "pedestrian"
  "horses"
  "vehicles"
"description", text, 50, normal, normal

"no horses", area, "", 5, seconds, 1, Code
"description", text, 50, normal, normal, Label1

"parking", area, "", 5, seconds, 1, Code
"type", menu, normal, normal, Label1
  "spectator"
  "trailer"
  "special"
"surface", menu, normal, normal, Label2
  "dirt"
  "paved"
  "gravel"
  "other"

"power", point, "", 3, seconds, 1, Code
"type", menu, normal, normal, Label1
  "powerpole"
  "outlet"
  "other"
"description", text, 50, normal, normal, Label2

"restrooms", point, "", 3, seconds, 3, Code
"type", menu, normal, normal, Label1
  "permanent"
  "portable"

"road", line, "", 5, seconds, 3, Code
"surface", menu, normal, normal, Label1
  "paved"
  "dirt"
  "gravel"
  "other"
"portion", menu, normal, normal, Label2
  "center"
  "north edge"
"south edge"
"east edge"
"west edge"
"width", numeric, 0, 0, 100, 30, normal, normal

"score posting", point, ",", 3, seconds, 3, Code
"description", text, 30, normal, normal, Label1

"shoeing", point, "", 3, seconds, 3, Code

"show jumping arena", area, "", 5, seconds, 3, Code
"footing", menu, normal, normal, Label1
"sand"
"grass"
"dirt"
"other"

"stabling", point, "", 3, seconds, 3, Code
"corner", menu, normal, normal, Label1
"NW"
"SW"
"SE"
"NE"
"type", menu, normal, normal, Label2
"permanent"
"temporary"

"stadium jump", point, "", 3, seconds, 1, Code
"jump #", numeric, 0, 0, 50, 1, normal, normal, Label1
"combination", menu, normal, normal, Label2
"a"
"b"
"c"
"d"
"e"
"f"

"level", menu, normal, normal
"beg. novice"
"novice"
"training"
"preliminary"
"intermediate"
"advanced"
"description", text, 50, normal, normal
"start", point, "", 3, seconds, 3, Code
"dimension", text, 30, normal, normal, Label1

"telephone", point, "", 3, seconds, 1, Code
"type", menu, normal, normal, Label1
"pay"
"private"

"vendors", area, "", 5, seconds, 1, Code
"description", text, 100, normal, normal, Label1

"vet", point, "", 3, seconds, 3, Code

"warm-up", area, "", 5, seconds, 3, Code
"type", menu, normal, normal, Label1
"dressage"
"cross-country"
"show jumping"
"combo"

"water", point, "", 3, seconds, 3, Code
"consumption", menu, normal, normal, Label1
"human"
"human&horse"

"water feature", line, "", 5, seconds, 3, Code
"type", menu, normal, normal, Label1
"ditch"
"irrigation"
"other"
"river"
"stream"
"description", text, 50, normal, normal, Label2

"point_other", point, "", 3, seconds, 3, Code
"description", text, 50, normal, normal, Label1

"line_other", line, "", 5, seconds, 3, Code
"description", text, 50, normal, normal, Label1

"area_other", area, "", 5, seconds, 3, Code
"description", text, 50, normal, normal, Label1
BIBLIOGRAPHY


Tinline, Peg Hauschidlt; David Ball; Rowland. "Driving 911: GPS Road Maps Enhance Response." *GPS World* 10, no. 6 (1999): 30-36.
