THE INCIDENCE OF HEAT RELATED ILLNESS AT A WRESTLING CAMP IN MINNESOTA, SUMMER 2006

Sandra Michelle Keeler
B.S., University of Minnesota, Twin Cities, 2004

THESIS

Submitted in partial satisfaction of the requirements for the degree of

MASTER OF SCIENCE

in

KINESIOLOGY
(Sport Performance)

at

CALIFORNIA STATE UNIVERSITY, SACRAMENTO

FALL
2009
THE INCIDENCE OF HEAT RELATED ILLNESS AT A WRESTLING CAMP IN MINNESOTA, SUMMER 2006

A Thesis

by

Sandra Michelle Keeler

Approved by:

__________________________________, Committee Chair
Jayne A. Willett, Ph.D.

__________________________________, Second Reader
Rodney Imamura, Ph.D.

__________________________________

Date
Student: Sandra Michelle Keeler

I certify that this student has met the requirements for format contained in the University format manual, and that this thesis is suitable for shelving in the Library and credit is to be awarded for the thesis.

__________________________, Graduate Coordinator
Daryl L. Parker, Ph.D.                      Date

Department of Kinesiology
Abstract

of

THE INCIDENCE OF HEAT RELATED ILLNESS AT A WRESTLING CAMP IN MINNESOTA, SUMMER 2006

by

Sandra Michelle Keeler

Heat illness is one of many conditions that can occur to training program participants particularly during the summer months. This was a non-statistical observational study using data collected previously by staff at a summer wrestling camp. Data included weight tracking charts (to determine dehydration), participation records, practice schedule, humidity and temperature information, and specific demographic information on each participant (age, starting weight, and hometown region). It appeared that the most influential factor to determining risk of heat illness was based on environmental factors to include the practice schedule and changes in the weather. Monitoring changes in temperature, humidity, and activity in order to modify training accordingly should have a positive effect on the incidence of heat related illness.

Jayne A. Willett, Ph.D, Committee Chair

Jayne A. Willett, Ph.D

Date

iv
ACKNOWLEDGMENTS

This research would not have been possible without the cooperation and support of J Robinson Wrestling Camps and their willingness to provide access to their records for use in my analysis. I also would like to thank my friends and family for all of their support and encouragement throughout this adventure.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Acknowledgments</th>
<th>vi</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Tables</td>
<td>viii</td>
</tr>
<tr>
<td>List of Figures</td>
<td>ix</td>
</tr>
</tbody>
</table>

Chapter

1. INTRODUCTION.................................................................1
   - Statement of Problem ..........................................................2
   - Significance of the Study.....................................................3
   - Definition of Terms............................................................3
   - Limitations...............................................................................5
   - Delimitations..........................................................................5
   - Assumptions...........................................................................6
   - Exploratory Questions..........................................................6

2. REVIEW OF LITERATURE......................................................7
   - Weight Loss Methods ..............................................................8
   - Wrestling Performance..........................................................11
   - Dehydration............................................................................12
   - Influences on Training...........................................................15
     - Heat Illness......................................................................15
     - Environmental Monitoring..................................................17
     - Acclimation.......................................................................19
   - Summary..................................................................................21
3. METHODOLOGY

Participants.................................................................23
Procedures...............................................................24
Analysis.................................................................25

4. RESULTS

Camp Group Demographics.............................................27
Wrestling Group One..................................................28
Wrestling Group Two..................................................29
Wrestling Group Three...............................................29
Wrestling Group Four...............................................29
Wrestling Group Five...............................................30
Practice Schedule....................................................31
Temperature and Humidity...........................................34
Heat Illness Demographics...........................................38
Wrestling Group One..................................................39
Wrestling Group Two..................................................40
Wrestling Group Three...............................................40
Wrestling Group Four...............................................40
Wrestling Group Five...............................................41
Summary of the Exploratory Investigation..........................43
Exploratory Question 1.................................................43
Exploratory Question 2.................................................44
Exploratory Question 3.................................................45
LIST OF TABLES

1. Table 1 Regions with respective states ................................................................. 28
2. Table 2 Camp Demographics compared by Wrestling Group .............................. 31
3. Table 3 Practice Schedule with Temperature and Humidity ............................... 33
4. Table 4 Heat Illness Demographics compared by Wrestling Group ...................... 42
LIST OF FIGURES

1. Figure 1 Temperature Levels for the practice times of 7:00am, 10:00am, 3:00pm, and 8:00pm .................................................................35

2. Figure 2 Humidity Levels for the practice times of 7:00am, 10:00am, 3:00pm, And 8:00pm .................................................................35

3. Figure 3 Temperature and Humidity Levels at 7:00am ........................................36

4. Figure 4 Temperature and Humidity Levels at 10:00am .....................................37

5. Figure 5 Temperature and Humidity Levels at 3:00pm .....................................37

6. Figure 6 Temperature and Humidity Levels at 8:00pm .....................................38

7. Figure 7 Number of Participants sitting out of practice due to Heat Related Illness ....39

8. Figure 8 Participants with Heat Illness compared by wrestling group .................44

9. Figure 9 Participants with Heat Illness compared by running group .................45

10. Figure 10 Participants with Heat Illness compared by age ...............................46

11. Figure 11 Participants with Heat Related Illness compared by Region of Hometown ....47
Chapter 1
INTRODUCTION

Wrestling is defined as “a sport or contest in which two unarmed individuals struggle hand to hand with each attempting to subdue or unbalance the other,” (Mish, 2001, p.1362). Opponents follow very strict regulations regarding body weight to ensure an even match between participants. Wrestling is a sport with defined weight classes that require the athlete to have strict control over his/her competition weight. Wrestlers choose a weight class that would best fit their skill level and allow the wrestler to be competitive at the beginning of the season, often 10 to 15 pounds lighter than their off-season weight (H., 1998). An athlete’s summer weight is associated with the natural body weight that occurs during the summer off-season period because the influences of weight management training are not present.

To maintain the desired physical condition demanded from the sport, many athletes are consistently in training. There are multiple styles of wrestling with overlapping competitive seasons, which allow athletes to maintain a level of training throughout the year. Some areas of focus for training include aspects of technique, endurance, and weight management. Training sessions can result from team or club practices, individual workouts, specialty clinics, and specific training camps. Most training camps occur during the summer months and last between a couple days and a few weeks.
Heat related illness does not discriminate between athletes, and is not restricted to the summer months. In 1997, three collegiate wrestlers died from heat related illness following attempts to lose weight prior to a competition (Ransone & Hughes, 2004). These deaths occurred during the winter collegiate competitive season. In 2001, a professional football player died from complications of a heat related illness during a summer training camp (Schnirring, 2004). Whether summer or winter, athletes are at risk of developing a heat related illness. Wrestling is very physically demanding and participants are not always aware of the possible consequences involved from training. Proper education for coaches is essential to ensure safe standards are maintained in all training environments regarding weight management and heat illness (The CDC, 1998).

Statement of the Problem

Many athletes partake in summer training programs around the nation. Heat illness is one of many conditions that can occur to training program participants particularly during the summer months. Wrestling is a sport where heat illness is common. While heat illness prevention policies have been written, there is limited research on training protocols in hot conditions specifically for an athlete engaged in training for wrestling. Moreover, particularly the understanding of how participants are affected by the training environment. Based on what is known about training in hot environments and the sport of wrestling, identifying similar characteristics that involved those affected with heat related illness could provide information to better accommodate training to minimize risk.
Significance of the Study

Having a youth summer training camp in which the staff is aware of how the environment affects their athletes allows them to make changes as needed to ensure a positive safe training environment. From the analysis of heat illness data from the summer of 2006, medical and general camp staff may have a better understanding of those who are at risk for heat related illness in order to make amendments to heat illness policies to provide heat safety. The staff may also have an idea of how much the environment affects the outcome of participation for the athletes. Evaluation of these data allows for either confirmation of current guidelines or for the opportunity to reevaluate and create new guidelines regarding wrestling youth camps held in summer months where high heat and humidity are known to occur. Guidelines which apply to wrestling athletes may also be useful for other sport training programs with similar or less vigorous training. Results from this study may be used to improve safety not only for wrestlers but for other sport camp participants as well.

Definition of Terms

Dehydration: A loss of body fluids caused by increased physical exercise and not enough fluid replacement. This condition is worsened by continued exertion in hot environments.

Hard Practice: Either the second or third practice session of the day that consists of high intensity training on the mats. This session lasts approximately 2 hours.

Heat cramps: A sudden development of cramps in skeletal muscles that result from
prolonged exercise in a hot environment in combination with profuse sweating and loss of electrolytes from the body.

Heat Exhaustion: A condition caused by sustained physical exercise in a hot environment with symptoms of weakness, nausea, dizziness, and profuse sweating.

Heat Illness: A general term used to describe any condition found to be a result from training in hot environments, to include dehydration, heat cramps, heat exhaustion, and heatstroke.

Heatstroke: A condition caused by prolonged exercise or exposure to a hot environment with symptoms of cessation of sweating, extremely high body temperature, and loss of consciousness.

Morning run: The first practice session of the day that involves running in the predetermined running group beginning at 6:45 in the morning. This session lasts approximately 1 hour.

Motivation and Mental Attitude: This session occurs every evening following supper to include instruction in relaxation techniques and discussions from guest speakers. This session lasts approximately 1 hour.

Point Charts: Every aspect of camp participation is assigned a point value. The coaches record the various point deductions per participant at each practice. A reward is given to participants who finish the camp with a certain amount of total points. This is also used as accountability for every participant and documents specific reasons for each missed practice.

Red Flag Day: This session occurs once a week and is a high intensity workout designed
to minimize rest and keep the athletes in a near constant state of movement. This session lasts approximately 1 hour.

Technique Session: Either the second or third practice session of the day that consists of low intensity training on the mats to include multiple instructions from coaches in proper technique and wrestling form. This session lasts approximately 2 hours.

Weigh-ins: The athlete steps on a certified electronic scale wearing only the undergarments to determine weight.

Weight loss: A loss of weight greater than 1.5% from the previous known weight, not to exceed 7% over the entire 28 day period of camp.

Weights and Wrestle: This session occurs every evening following Motivation and Mental Attitude and incorporates a rotating schedule of high intensity running and strength training, with low intensity recovery based technique review sessions. This session lasts approximately 1 1/2 hours.

Limitations

1. Information regarding some heat related illness may not have been documented either due to a lack of communication between athlete and medical staff or lack of severity.

2. Temperature and Humidity recordings may not have been done consistently day to day due to work environment and medical staff tending to athletic needs.

Delimitations

Data regarding training and heat related illness were gathered from a summer wrestling camp that took place in the month of July, year 2006 in Minneapolis,
Minnesota. The camp lasted 28 days. The supplemental daily temperature information came from the National Weather Service for that area.

Assumptions

1. Data obtained for each participant have been correctly and accurately documented.
2. All recorders, including medical staff and wrestling counselors, were of equal knowledge, experience level and proficient in equipment used. Recorded information included body weight, temperature, humidity, and participation.
3. All participants were honest with medical staff and followed participation rules regarding heat related illness.
4. Medical staff complied with camp policy regarding participation rules of campers and actions were properly documented.

Exploratory Questions

1. Will the number of participants affected by heat related illness be restricted to one Wrestling Group?
2. Will the number of participants affected by heat related illness be restricted to one Running Group?
3. Will the number of participants affected by heat related illness be restricted to an Age Category?
4. Does the location of participants primary residence affect the number of heat illness cases reported?
5. How does the combination of practice schedule and weather impact the incidence of heat related illness?
Chapter 2
REVIEW OF LITERATURE

Wrestling is a sport of submission where two people compete to out strength the other by gaining control. Points are awarded for control over the opponent and for the ability to reverse the control of the match. Athletes train year-round to obtain an ideal level of competition for success. Many high school wrestlers attend technique clinics and training camps throughout the summer to improve their skill for the season. Strength and size are large factors in the success of a wrestler.

Weight management is an important part of a wrestler’s training. Wrestlers partake in many different forms of weight management techniques that have different effects on their performance. Nutrition is important to any athlete to ensure they are getting the right combination of calories for maximum energy during competition. In situations where excess weight that good nutrition and exercise alone will not remove, wrestlers often resort to different methods to accomplish weight loss. Fasting and fluid restriction are common methods wrestlers use to lose a few extra pounds (Oppliger, Steen, & Scott, 2003).

Training for wrestling is not limited to the competitive season. There are multiple styles of wrestling that overlap allowing an athlete to remain in active training for the majority of a year. As a method of training, many young athletes attend summer wrestling camps to improve their technique and training habits. Wrestling is primarily a winter sport, and the practice facilities are often kept at warm temperatures,
(approximately 80 degrees), with high humidity levels caused by sweat resulting from multiple athletes practicing in a small area. The increased temperature and humidity have been preferred by athletes for years with the belief that it assists with weight management. When athletes are under stress to maintain a preset weight, a certain amount of dehydration is also likely to occur. During the summer months, when most sport camps occur, dehydration can have negative effects on athletes and their camp performance. Dehydration can lead to a more serious heat illness (Pratt, 2005). To ward against serious bouts of heat illness, guidelines have been implemented to encourage safe training with sport camp participants (ACSM Issues Heat Stress Guidelines for Youth Football, 2005).

**Weight Loss Methods**

There are over 250,000 high school and college wrestlers who take part in competition (Bartok, Landry, Clark, Sullivan, & Schoeller, 2004). Wrestlers are divided into specific weight classes to pair up opponents of equal size (Bartok et al., 2004). Often times, wrestlers or coaches choose a weight class they feel they can be competitive in, which means the weight class is usually lower than their “natural” weight. Due to the variation between a wrestler’s natural weight and their competitive weight, many methods are used to compensate for this difference.

High school wrestlers are faced with external influences on their weights. Athletes in high school are still growing and need to account for those changes. Still, it is not uncommon for high school wrestlers to choose weight classes below their natural weight, thinking by losing the extra weight and having their size basically stay the same, they
would be more successful. Kiningham and Gorenflo (2001) conducted a study on weight loss methods in high school wrestlers by surveying 2,532 athletes regarding their weight loss behaviors. The average amount of weight loss over the course of the season was 6 pounds (Kiningham et al., 2001). Out of the athletes surveyed, 72% admitted to practicing at least one potentially harmful weight loss behavior each week. Also 72% of the subjects who lost more weight began wrestling at an earlier age, and had an increase in binge eating behaviors. The common behaviors for weight loss included fasting and varied dehydration techniques. These behaviors were consistently found at all competition and success levels throughout the high school wrestling population (Wroble & Moxley, 1998a). Extreme weight loss behaviors are not just limited to the sport of wrestling. Sports such as rowing, boxing, and lightweight football all have athletes that use methods such as dehydration and fasting to produce weight loss effects (Burge, Carey, & Payne, 1993; Depalma, M., Koszewski, Case, Barile, Depalma, B., & Oliaro, 1993; & Hall, 2001).

In 1997, three collegiate wrestlers died from complications due to dangerous weight loss methods. These deaths led to a change in the high school and college weight loss policies. The National Collegiate Athletic Association, (NCAA), made six substantial changes to their policies: 1) they increased the weight classes by 3.18kg, 2) established permanent weight classes of athletes, 3) moved the official weigh in to one hour before competition, 4) required multiple weigh-ins at multiple day tournaments, 5) prohibited the use of saunas, steam rooms, and plastic suits, and 6) required mandatory
CPR and first aid training for all coaches (Ransone & Hughes, 2004). Most of those changes also went into effect at the high school level.

Even with the new guidelines, wrestlers are still losing large amounts of weight immediately before competition and then gaining the weight back soon after competition. A four year study on athletes dietary intake by Short and Short (1983), found that after a successful weigh in, wrestlers would consume large meals and could gain 4-8 pounds before the competition. This study also found that some wrestlers could weigh as much as 17 pounds more than their competitive weight the morning following competition. Ransone and Hughes (2004), conducted a study over 2 years with college wrestlers to determine how much their weight changed over the course of a season. Seventy-eight participants’ weights were recorded 24 hours before competition, 1 hour before competition, and 24 hours following competition. There was a large difference noted in weight loss within 24 hours before competition and then a large difference in weight gain during the 24 hours following competition. This behavior was consistent throughout the season and could cycle through as many as 15 different times. The weight loss and gain cycle was consistent with novice and elite athletes (Ransone et al., 2004).

It appears that poor weight loss behaviors have decreased since the implementation of the new NCAA standards (Oppliger et al., 2003). Coaches and fellow teammates are most influential in athletes’ weight loss behaviors (Kiningham et al., 2001; Lakin, Steen, & Oppliger, 1990; & Lobuono, & Swain, 1999). Further education is still needed for coaches and athletes to ensure that they are making informed decisions about weight loss methods and benefits to performance.
Wrestling Performance

After 1997, the organization of high school wrestling made some changes to their policies of weight management as well. According to Wroble and Moxley (1998b), cutting weight is defined as “the intentional and purposeful loss of weight to compete in a weight class lower than preseason weight (p.625).” Many wrestlers view cutting weight as a tradition that all wrestlers endure. Coaches and athletes believe by cutting weight they are achieving strength and size advantages over their opponent. The lightest wrestlers lost the most weight in relationship to their percent body fat and many athletes did not acknowledge the dangers of their weight loss techniques (Wroble et al., 1998b). Overall, 465 wrestlers took part in body composition testing and an educational program. The study examined when an athlete disregarded their suggested minimum weight class, determined from body composition testing, if the decision would have an effect on placement in the Wisconsin high school state tournament. It was found that 33% wrestled at weights below the suggested minimum weight and those athletes also had increased success rates. However, it should be noted that the negative effects of the choice of weight class may not be noticed until higher levels of competition (Wroble et al., 1998b).

Another study conducted by Wroble and Moxley (1998a), evaluated rapid weight gain following an official weigh-in with success rates in competition. There were 260 participants whose body weights were recorded at an official weigh-in during a high school tournament, then again 12 hours prior to competition. The two phases in cutting weight were to attain leanness through decreased caloric intake and use dehydration to lower body weight even more in a short amount of time preceding competition. Many
wrestlers believe there is an adequate amount of time following the weigh in to rehydrate
the body before competition, and are oftentimes heavier than the weight class. That gives
athletes the impression there is an advantage over their opponents. Lower weight classes
had statistically higher weight gain following weigh in compared to the higher weight
classes (Wroble et al., 1998a). There was a significant difference in the amount of weight
gained and success in the tournament. Those who gained more weight were more
successful.

The research suggested that the ability to gain weight and the success could be
from skill level, athletic ability, and wrestling experience (Wroble et al., 1998b). Does
experience have an influence over the amount of weight gain and loss for a wrestling
competition? The observations suggest that wrestling at a lower weight may lead to
success as well as the ability to gain more weight back after weigh-ins also leads to
success (Wroble et al., 1998a & 1998b).

Dehydration

Most serious wrestlers will sacrifice anything to put themselves at an advantage
over their opponent. “Many coaches and wrestlers believe that wrestlers should compete
in a weight class lower than their preseason weight to gain a competitive edge,” (H.,
1998, p.1171). Research has found that the mean difference in wrestlers between their
Pre-season and In-season weight was 16 pounds or 10%. A common method used for
weight loss in wrestling is dehydration. Dehydrating the body eliminates water weight,
which will show immediate results on a scale. The quick result is what appeals to
wrestlers. Athletes mainly use this method right before an official weigh-in to lose the
stubborn pounds their regular weight regimen didn’t remove. There is controversy over those stubborn pounds as to whether wrestlers should try and lose them before competition.

The CDC (1998) reported information regarding three athletes in 1997 that died while trying to attain a weight that was at an unsafe level compared to their natural body weights. All athletes attempted to lose various amounts of weight in short periods of time before an official tournament weigh in. These were the first documented instances deemed solely related to rapid weight loss in wrestling and were cause for new rules throughout the sport. The first case was a 19 year old man in North Carolina who attempted to lose 15 pounds in 12 hours. He was trying to make a 195 pound weight class. The second case was a 22 year old man in Wisconsin who tried to lose 4 pounds in four hours to wrestle at 153 pounds. His rectal temperature at time of death was 108 degrees. The third case was a 21 year old man in Michigan who lost 6 pounds in 3 hours in order to compete at the 153 pound weight class. Changes were made in the sport of wrestling that included an overall addition of seven pounds added to all weight classes. The NCAA also got involved and banned the use of rapid weight loss methods such as laxatives, emetics, diuretics, saunas, etc. Currently a wrestler’s competition weight has to be determined by a health care professional at the beginning of the competitive season.

The minimum weight standards were developed to prevent athletes from trying to achieve a weight that was not healthy for their body type. Part of the assessment is to ensure the athlete is in a hydrated state before analysis occurs. A study performed by Bartok, Schoeller, Clark, Sullivan, and Landry (2004), involved 22 male college wrestlers
who had body composition testing in both hydrated and dehydrated states. When the athlete was hydrated the test did not produce significant errors, however when dehydrated there was an increase in minimum weight errors. This study concluded that when the athlete is in a dehydrated state, the minimum weight assumptions are incorrect due to an artificially lowered body weight. This could potentially be dangerous to the athlete.

Wrestlers fear weight gain and sacrifice water (dehydrate), but they fail to regain (rehydrate) enough before competition. Athletes will strive for some level of rehydration to avoid an ill feeling during competition, but usually do not have ample amounts of time for proper rehydration to occur. To avoid last minute attempts of weight loss, a strict weight management routine is recommended early in the season. It is suggested that losing 2-3 pounds a week should be the maximum allowed (Yarrows, 1988), all while maintaining a hydrated state.

Research performed by Oppliger and Bartok (2002), provide guidelines to monitor athletes in training or competition since many athletes fail to return to a hydrated level following practice. Education regarding fluid consumption is very important as well as which type of fluid consumed. It is important to educate athletes about foods that retain water that increases the weight (Yarrows, 1988). Athletes don’t understand the difference between weight gain from fat and weight gain from water retention. The general rule of thumb for weight loss during practice is “an athlete who loses 3% of their body weight is considered ‘3% dehydrated’,” (Oppliger et al., 2002, p.961). Monitoring weight loss is very important and all weight lost during training should be regained before the next day’s workout. It is expected to have a 1% fluctuation in body weight
throughout the day, and 5% in heat and during strenuous exercise (Oppliger et al., 2002). It is important for athletes to understand how environmental factors can alter their weight management techniques.

Influences on Training

The body is a very complex system of self management. It is capable of maintaining a regulated internal temperature independent of outside conditions and activities the person is engaged with. The problem occurs when the system is challenged too far and becomes unable to maintain self-regulation. The environment combined with exertional activities can quickly cause the individual to develop a heat illness. Environmental monitoring is a method that uses theories of how humans react under certain conditions to determine safety of exertion. Proper monitoring can decrease risk of exertional heat related illness in athletes. Also, allowing for proper acclimation to the training environment will lessen the effects of extreme temperatures and humidity.

Heat Illness

The National Athletic Trainers’ Association (NATA) Position Statement on exertional heat illness was to provide information and recommendations for prevention, recognition, and treatment of heat illness (Binkley, Beckett, Casa, Kleiner, & Plummer, 2002). In addition to better understanding the natural response to heat and identify groups at risk. There are many forms of heat illness. The most common are heat syncope, heat exhaustion, and heat stroke. Heat syncope usually occurs within the first 5 days of exercising in a new hot environment before the body has had a chance to increase the blood volume. Heat exhaustion is classified when the internal temperature is between 97-
104°F and heat stroke includes temperatures over 104°F with multisystem failures due to overheating of internal organs (Binkley et al., 2002).

To complicate heat illness more, there are two types of heat exhaustion, one caused by water depletion and the other by salt depletion. Water and salt are both lost during exercise, however most athletes only think to rehydrate with water. Athletes can still suffer the effects of dehydration even though they have consumed the suggested amounts of water during activity. To lower the chance for dehydration, drinking 9oz of fluid every 20 minutes during exercise is recommended. If an activity is less than an hour, water is recommended, if the activity is longer than an hour, some sort of sport drink is recommended (Pratt, 2005). Unfortunately, dehydration from sodium loss will not produce a thirst response, but adding sodium to a drink increases water retention and adds flavor. Heat cramps usually result from a sodium deficiency and should be addressed with sodium and chloride rehydration (Casa, 1999).

Athletes are at risk for exertional heatstroke if their core temp is over 102.2°F. Research on treatment for heat illness indicated that rectal temperatures are the most accurate in determining core body temperature and cooling is best achieved in a circulating tub of water (Binkley et al., 2002). If the athlete begins to show symptoms of heat illness, delayed intervention could prove detrimental. Research has found that athletes prefer cold fluids for rehydration from exercise. It has also been found that grape is the most preferred flavor for a rehydration drink (Casa, 1999). The body is capable of losing 2-3 liters of fluid per hour just from sweating during exercise. Beverages with caffeine and carbonation do not help with rehydration efforts and can further dehydrate
the body. When dehydration occurs, it is important to correct the deficit slowly between 3-9 hours depending on severity (Auber, 2004). Ice packs can be used to cool the body temperature and should be placed on the neck, arm pits, and groin. The best way to cool an overheated athlete is to wet the skin with room temperature water and fan to cool, this simulates a natural evaporation method of temperature regulation.

Hydration is critical to maintain proper balance within the body, but effective cooling is just as important to maintain balance. The body’s primary method of cooling is through evaporation, or sweating. Research has found that when humidity reaches 75%, sweating is no longer an effective way of cooling (Pratt, 2005). To help make sweating more effective wearing light colored and lightweight clothing is recommended and changing into dry clothes when old ones become sweaty should increase evaporation on the skin.

According to a study by Epstein (1990), there are certain factors that can predispose individuals to heat intolerance. Those factors include dehydration, being overweight, having low physical fitness, lack of acclimation, febrile or infectious disease, and skin disorders. Athletes with these factors should be closely monitored because they are at an increased risk of developing a heat related illness. Dehydration increases the risk of heat related illness because there is a reduction in heat conduction from the core to the periphery and thus reduced cooling abilities.

*Environmental Monitoring*

In addition to close monitoring of athletes, close monitoring of the environment can provide valuable information regarding practice safety. Moran (2001), described the
development of stress for hot and cold environments and the need of implementation in sports for prevention of illness. The Wet Bulb Globe Test (WBGT) is the most common method for indoor and outdoor temperature. The WBGT is a temperature index that is used to predict sweat rate as a measure of heat stress (Kark, Burr, Wenger, Gastaldo, & Gardner, 1996). It produces both temperature and relative humidity for the area in question. However the WBGT does not account for the type of clothing worn by athletes and that should be taken into consideration when determining safety. Cotton is not recommended for athletes to practice in because of poor evaporability of the fibers.

A study was done using United Stated Marine Corps recruits to evaluate exertional heat illness in their training (Kark et al., 1996). The recruit training camp was located at Parris Island, South Carolina which produced hot temperatures with severe levels of humidity during the months of June through August. The military has developed a training protocol that follows results from the WBGT and limits certain activities under extreme settings. In attempts to lower incidences of heat illness, the majority of strenuous exercise was performed during the hours of 7-9 in the morning. The study found that most incidences of heat related illness occurred during the morning training hours even if the WBGT levels were within acceptable training limits. The conclusion has been made that the greatest impact on incidence of heat illness was what the recruits were exposed to during the previous training day. In addition to the WBGT of the previous day, combination of persistent dehydration and fatigue should be considered when determining risk of heat related illness (Kark et al., 1996).
Prevention is still the best method in defense of heat illness. The WBGT is a good
determining factor of environmental quality for exercise. A reading of <18.3\(^\circ\)C is low,
mod=18.3-22.8\(^\circ\)C, high=22.8-27.8\(^\circ\)C, and very high is >27.8\(^\circ\)C on the WBGT should help
determine the intensity of practice (Coris, Ramirez, & Van Durme, 2004). Having
properly trained staff to make practice considerations is very important for athlete safety.
In combination with the WBGT, it is advised to avoid the hours 1100-1500 for intense
exercise (Casa, 1999). The combination of high intensity with increased temperature and
humidity could lead to the potential of athletes to develop heat illness.

Weather and temperature are not variables that can be controlled. However,
athletes can learn to adapt to what the environment has to offer. Prevention and early
intervention are critical to success and safety in all athletic situations. There are simple
steps that can be implemented outside of the actual practice that can help prevent heat
illness from occurring. The NATA recommends that athletes be given 6-8 hours of sleep
a night, 2-3 hours of rest at meal time, recurring weigh-ins before and after practice, as
well as giving the Athletic Trainer the authority to limit practice if they feel it is unsafe.
Obese athletes are more at risk because the increased fat layer lowers the ability of heat
loss. Sleeping in air conditioning lowers the risk of heat illness, but overzealous athletes
tend to override normal adaptation behavior and ignore clues of a problem. It is important
for staff to watch for this and intervene if necessary (Binkley et al., 2002).

Acclimation

Acclimation to a new environment is very important for reduction of heat illness
and increase in performance. Adults acclimate to hot climates in 4-7 sessions whereas
children require 8-10 sessions (Coris, et al., 2004). Dehydration only makes acclimation harder and adds increase stress on the body. Athletic performance can begin to decrease with as little as 2-3% of dehydration and thirst is usually noted once an athlete reaches 5% dehydration. Prehydration works to help prevent dehydration, 500 ml of fluid 2 hours before exercise and 250 ml of fluid for every 20 minutes following exercise is recommended (Coris et al., 2004). To enhance thirst in children adding sodium chloride to any flavored drink (offering a sport drink) will increase voluntary drinking by 90%, compared to offering plain water (American Academy of Pediatrics, 2000).

Unfortunately, even following the suggestions for the prevention of heat illness, heat illness is still the third leading cause of death in high school athletes (Coris, Ramirez, & Van Durme, 2004; Lee-Chiong, & Stitt, 1995). Children are unable to react well to high climate heat due to morphological and physiological reasons. Children have an increased surface area-to-body mass ratio which increases their heat gain from the environment. They also produce higher metabolic heat compared to their body mass. Children have a lower sweat capacity which means less evaporation for cooling (American Academy of Pediatrics, 2000).

Literature also suggests that athletic injury rates increase with increases in temperatures and women are more susceptible than men (Moran, 2001). Women do not thermoregulate as efficiently as men do. However, a study by Avellini, Kamon and Krajewski (1980) found no difference in response to heat exposure between men and women when fitness levels were similar. The study also found that men have a higher rate of unevaporated sweat production than women. Therefore women can perform the
same amount of work as men with less loss of body fluid (Avellini et al., 1980). This is an advantage for female athletes who train in humid environments. Suggestions to decrease the effects of the environment are to practice in the early morning and late evenings to minimize solar radiation and air temperature. Further development of new products that measure environmental heat stress are needed to continue implementation of already known guidelines and limitations (Moran, 2001).

Summary

Wrestlers develop most weight management strategies while in the early stages of a competitive high school career. While in high school, athletes begin to determine which weight class is best suited. The weight management skills will continue to be utilized throughout all levels of competition. A novice wrestler’s ability to manage weight is greatly influenced by teammates and coaches. However, many coaches do not receive formal education regarding proper techniques for athletes involved in weight sensitive sports. Therefore, coaches may not render the best advice for novice or experienced athletes.

Weight management strategies include behaviors to dehydrate the body, and techniques to take advantage of the weigh in procedures. Athletes have learned that by rapidly losing weight before an official weigh in, followed by gaining weight immediately before competition will not have an adverse effect on performance (Wroble et al., 1998a & 1998b). Literature supports the perception that manipulating weight does not affect the outcome of a competition, which makes proper education difficult.
Due to the increased popularity of summer sport camps, proper understanding of how the environment affects training is essential for participant safety. Many guidelines and suggestions have been developed to reduce the risk of heat illness in athletes of various ages and abilities. Conducting educational sessions for summer camp staff, will aide in identification and prevention of heat related illness among participants. Early intervention is critical for survival of a heat related episode.
Chapter 3
METHODOLOGY

Many athletes partake in summer training programs around the nation, and policies have been implemented to prevent heat illness from occurring. However, at some summer training camps, varying degrees of heat illness will occur among a percentage of the participants. Wrestling is an example of a sport where heat illness is common. Based on what is known about training in hot environments and the sport of wrestling, can certain athletes be identified by similar characteristics that predispose them to an increased risk of heat related illness at summer wrestling camps? Reviewing records from a summer wrestling camp, data were analyzed to determine if athletes stricken with any degree of heat illness were in the population predetermined to be at an increased risk.

Participants

Human subject’s consent was granted to use existing information collected by the wrestling camp on their participants in the summer of 2006. Records were accessed by permission from the wrestling camp office with the understanding that all personal information will remain confidential.

The Minnesota summer wrestling camp included 330 participants from various locations around the world. The summer camp was open to participants entering high school through the summer before they attended college. The age range was between 14-18 years old. Every participant was divided into two practice groups for the duration of the summer camp, one for wrestling and one for running. There were five wrestling
groups based on weight that participants were placed in at the start of the summer. There were eleven running groups based on a one-mile timed run that participants were also placed in at the beginning of the summer camp. Participants attended this summer wrestling camp from all over the United States including some other countries. This information was used to distinguish between areas of residence and if heat illness is more common during a summer wrestling camp in Minnesota.

Procedures

Athletes were divided into both a running group, based on one-mile run time, and a wrestling group, based on weight from a weigh-in on the first day of camp. The majority of participant’s time was scheduled to involve various aspects of training, from the morning wake up call through the bed check in the evening. The camp averaged four practice sessions a day varying in length and intensity to include wrestling, running, and strength training in a variety of locations. Characteristics among those affected by heat related illness, were compared by running group, wrestling group, age, and state they normally reside in.

The information obtained from the wrestling camp during the summer of 2006, was observed for trends, and to identify similarities among collected data. The information used included weight charts with all documented weigh-ins performed during the summer camp. The weight information included details about how often weigh-ins occurred and which participants did not meet the minimum standard. The minimum standard can be found in the initial camp policy packet given to each athlete before the start date. The camp policy packet included information regarding camp preparation,
what to bring, medical forms and basic camp policies (see Appendix A to view camp packet). As predetermined by the summer wrestling medical staff, the use of weight measurement was the main method of heat related illness determent.

To determine if the weight measurement provided accurate information, obtaining the daily practice schedule was also used to determine specific activities during certain times of the day. Knowing which practice the participants attended in what order at any specific time provided valuable information related to possible causes for heat related illness to occur. Documented temperature and humidity readings were also obtained from a digital thermometer and a sling psychrometer. In addition to temperature and humidity readings provided by the camp medical staff, temperatures were also obtained from the National Weather Service database.

The summer wrestling camp staff provided guidelines regarding participation and completion of the camp. A point system was established to determine who completes the camp. Athletes earning higher total points generally completed a greater portion of the camp. The final point chart provided participation information regarding each specific practice over the duration of the camp. The point chart system was used to determine whether heat illness resulted in missed practice time.

Analysis

The analysis included a descriptive representation of data collected from a Minnesota summer wrestling camp in 2006. The representation includes graphs, tables, and charts showing possible trends linking data together. The total participant group was divided into subgroups to further examine the information collected in order to determine
similarities if any can be found. Each participant had a demographic identity that included age, running group association, wrestling group association, and location of primary residence. Of those athletes that were affected by a heat related illness, the demographic information was compared to determine similarities between those athletes. Specific environmental information was also used to determine if the structure of the training could possibly influence the incidence of heat related illness.

This was a descriptive study and no specific statistical analysis was performed. Using only the data this summer camp collected, the purpose of analysis was to attempt to locate areas that are inconclusive or areas of similarity to best provide information regarding heat related illness at a summer wrestling camp.
Chapter 4

RESULTS

There were a total of 317 participants that attended the 2006 Minnesota summer wrestling camp. There were 25 participants who did not complete the 28 day camp. Six experienced a heat related illness but only one participant did not finish camp due to a heat illness. Overall, there were a total of 82 participants who were affected with some degree of heat related illness.

Camp Group Demographics

Camp participants were divided into wrestling practice groups based on weight, running speed, and regional location. There were a total of five wrestling groups based on weight with approximately 63 participants in each group. These data were evaluated within wrestling groups to compare those who experienced a heat related illness to those who did not. The participants were also placed in one of eleven running groups based on running speed via a timed one-mile run. The participants ran four laps around a standard college track; as the campers finished they were immediately counted off into running groups. Running group #1 represented the fastest runners while running group #11 represented the slowest. Each running group averaged 25 participants and was comprised of campers from a variety of wrestling groups. Participants were also divided by home region. There were 5 regional groups with one participant from a foreign country. The regional breakdown was West (W), Southwest (SW), Midwest (MW), Northeast (NE),
Southeast (SE) and Foreign. The regional groups were numbered 1-5 respectfully with the exception of the foreign category as shown in Table 1.

<table>
<thead>
<tr>
<th>REGION-1 WEST (N=53)</th>
<th>REGION-2 SOUTHWEST (N=7)</th>
<th>REGION-3 MIDWEST (N=100)</th>
<th>REGION-4 NORTHEAST (N=110)</th>
<th>REGION-5 SOUTHEAST (N=38)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington (5)</td>
<td>Arizona (3)</td>
<td>N. Dakota (3)</td>
<td>Maine (11)</td>
<td>Kentucky (6)</td>
</tr>
<tr>
<td>Oregon (2)</td>
<td>New Mexico</td>
<td>S. Dakota (7)</td>
<td>Vermont</td>
<td>Tennessee (4)</td>
</tr>
<tr>
<td>California (23)</td>
<td>Texas (4)</td>
<td>Nebraska (1)</td>
<td>New Hampshire</td>
<td>Arkansas</td>
</tr>
<tr>
<td>Nevada</td>
<td>Oklahoma</td>
<td>Kansas (1)</td>
<td>Massachusetts (9)</td>
<td>Louisiana (11)</td>
</tr>
<tr>
<td>Utah (10)</td>
<td>Minnesota (24)</td>
<td>New York (54)</td>
<td>Mississippi</td>
<td></td>
</tr>
<tr>
<td>Colorado (4)</td>
<td>Iowa (3)</td>
<td>Pennsylvania (5)</td>
<td>Alabama</td>
<td></td>
</tr>
<tr>
<td>Wyoming (5)</td>
<td>Missouri</td>
<td>Rhode Island (2)</td>
<td>Florida (8)</td>
<td></td>
</tr>
<tr>
<td>Idaho (1)</td>
<td>Wisconsin (11)</td>
<td>Connecticut (17)</td>
<td>Georgia</td>
<td></td>
</tr>
<tr>
<td>Montana (2)</td>
<td>Michigan (29)</td>
<td>New Jersey (9)</td>
<td>Virginia (6)</td>
<td></td>
</tr>
<tr>
<td>Alaska (1)</td>
<td>Illinois (12)</td>
<td>Maryland (3)</td>
<td>West Virginia</td>
<td></td>
</tr>
<tr>
<td>Hawaii</td>
<td>Indiana (4)</td>
<td>Delaware</td>
<td>N. Carolina (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ohio (4)</td>
<td></td>
<td>S. Carolina (1)</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Regions with respective states

Wrestling Group One

Wrestling group one began with 62 participants, and finished with 55 participants. Weights ranged from 93.1-125.9 pounds with an average weight of 112.1 pounds. Ages ranged from 13-17 years old with an average age of 15.0 years old. There were 9 participants from the West, 1-Southwest, 18-Midwest, 21-Northeast, 11-Southeast, and two participant’s hometown region was Unknown. Wrestling group one was divided into the following running groups: RG-1 (n=3) the fastest, RG-2 (n=4), RG-3 (n=7), RG-4 (n=4), RG-5 (n=7), RG-6 (n=3), RG-7 (n=8), RG-8 (n=8), RG-9 (n=5), RG-10 (n=5), RG-11 (n=2) the slowest, and due to insufficient data, six participants were listed as unknown (UKN). Table 2 shows the camp demographics compared by wrestling group.
Wrestling Group Two

Wrestling group two began with 66 participants, and finished with 59 participants. Weights ranged from 121.4-138 pounds with an average weight of 128.7 pounds. Ages ranged from 14-18 years old with an average age of 15.9 years old. There were 11 participants from the West, 2-Southwest, 16-Midwest, 22-Northeast, 12-Southeast and 3-Unknown. Running groups included RG-1 (n=1) the fastest, RG-2 (n=8), RG-3 (n=4), RG-4 (n=7), RG-5 (n=7), RG-6 (n=7), RG-7 (n=7), RG-8 (n=7), RG-9 (n=6), RG-10 (n=2), RG-11 (n=3) the slowest, and Unknown (n=7). Table 2 shows the camp demographics compared by wrestling group.

Wrestling Group Three

Wrestling group three began with 64 participants, and finished with 62 participants. Weights ranged from 134.4-148.6 pounds with an average weight of 140.3 pounds. Ages ranged from 14-19 years old with an average age of 16.1 years old. There were 13 participants from the West, 1-Southwest, 23-Midwest, 22-Northeast, 2-Southeast and 2-Unknown. Running groups included RG-1 (n=6) the fastest, RG-2 (n=7), RG-3 (n=7), RG-4 (n=4), RG-5 (n=5), RG-6 (n=7), RG-7 (n=9), RG-8 (n=5), RG-9 (n=2), RG-10 (n=4), RG-11 (n=6) the slowest, and Unknown (n=2). Table 2 shows the camp demographics compared by wrestling group.

Wrestling Group Four

Wrestling group four began 63 participants, and finished with 58 participants. Weights ranged from 145.2-179.5 pounds with an average weight of 154.5 pounds. Ages ranged from 14-18 years old with an average age of 16.1 years old. There were 12
participants from the West, 0-Southwest, 24-Midwest, 18-Northeast, 7-Southeast, and 2-
Unknown. Running groups included RG-1 (n=13) the fastest, RG-2 (n=4), RG-3 (n=4),
RG-4 (n=7), RG-5 (n=1), RG-6 (n=5), RG-7 (n=4), RG-8 (n=3), RG-9 (n=5), RG-10
(n=4), RG-11 (n=8) the slowest, and Unknown (n=5). Table 2 shows the camp
demographics compared by wrestling group.

*Wrestling Group Five*

Wrestling group five began with 62 participants, and finished with 58
participants. Weights ranged from 158.9-255.5 pounds with an average weight of 182.7
pounds. Ages ranged from 15-18 years old with an average age of 16.2 years old. There
were 8 participants from the West, 3-Southwest, 19-Midwest, 25-Northeast, and 7-
Southeast. Running groups included RG-1 (n=3) the fastest, RG-2 (n=3), RG-3 (n=3),
RG-4 (n=5), RG-5 (n=6), RG-6 (n=7), RG-7 (n=0), RG-8 (n=4), RG-9 (n=6), RG-10
(n=13), RG-11 (n=8) the slowest, and Unknown (n=4). Table 2 shows the camp
demographics compared by wrestling group.
<table>
<thead>
<tr>
<th>Wrestling Group</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number n</td>
<td>N=62</td>
<td>N=66</td>
<td>N=64</td>
<td>N=63</td>
<td>N=62</td>
</tr>
<tr>
<td>Weight Range (lbs) Average</td>
<td>93.1-125.9</td>
<td>121.4-138</td>
<td>134.4-148.6</td>
<td>145.2-179.5</td>
<td>158.9-255.5</td>
</tr>
<tr>
<td></td>
<td>Avg 112.1</td>
<td>Avg 128.7</td>
<td>Avg 140.3</td>
<td>Avg 154.5</td>
<td>Avg 182.7</td>
</tr>
<tr>
<td>Age Range (years) Average</td>
<td>13-17</td>
<td>14-18</td>
<td>14-19</td>
<td>14-18</td>
<td>15-18</td>
</tr>
<tr>
<td></td>
<td>Avg 15</td>
<td>Avg 15.9</td>
<td>Avg 16.1</td>
<td>Avg 16.1</td>
<td>Avg 16.2</td>
</tr>
<tr>
<td>Region 1 W</td>
<td>9</td>
<td>11</td>
<td>13</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Region 2 SW</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Region 3 MW</td>
<td>18</td>
<td>16</td>
<td>23</td>
<td>24</td>
<td>19</td>
</tr>
<tr>
<td>Region 4 NE</td>
<td>21</td>
<td>22</td>
<td>22</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td>Region 5 SE</td>
<td>11</td>
<td>12</td>
<td>2</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Unknown</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Foreign</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Running Group 1 (Fastest)</td>
<td>3</td>
<td>1</td>
<td>6</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Running Group 2</td>
<td>4</td>
<td>8</td>
<td>7</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Running Group 3</td>
<td>7</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Running Group 4</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Running Group 5</td>
<td>7</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Running Group 6</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Running Group 7</td>
<td>8</td>
<td>7</td>
<td>9</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Running Group 8</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Running Group 9</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Running Group 10</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Running Group 11 (Slowest)</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Running Group UKN</td>
<td>6</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 2: Camp Demographics compared by Wrestling Groups

Practice Schedule

Four practices were scheduled each day to include a morning run/weight training session, a morning technique practice session, an afternoon hard practice session and an evening run/weight training session. Practice times were scheduled at 7:00am, 10:00am, 3:00pm, and 8:00pm. To break up the training environment, training day 11 was devoted to a soccer tournament and training day 23 included a scheduled fieldtrip to a local amusement park. The participants had three mornings and six evenings with no scheduled
practices. On a few occasions, the afternoon hard practice was moved to the morning session for a variation in training, or if extreme weather conditions were predicted.

Table 3 represents the practice schedule for the 28 day wrestling camp. Each documented session includes specific practice times, and temperature and humidity data from the practice facility. The highlighted days indicate training days in which at least one participant was affected with a heat related illness. If a practice was different from the standard schedule (Early-Run, Morning-Technique, Afternoon-Hard, and Evening-Run), it was depicted on the table: R-Run, F-Red Flag, T-Technique Session, H-Hard Practice, as well as all special activities.
<table>
<thead>
<tr>
<th>Day</th>
<th>Early Practice</th>
<th>Morning Practice</th>
<th>Afternoon Practice</th>
<th>Evening Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time</td>
<td>Time</td>
<td>Time</td>
<td>Time</td>
</tr>
<tr>
<td>1</td>
<td>N/A 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>2</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>3</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>4</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>5</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>6</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>7</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>8</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>9</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>10</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>11</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>12</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>13</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>14</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>15</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>16</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>17</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>18</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>19</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>20</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>21</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>22</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>23</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>24</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>25</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>26</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>27</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
<tr>
<td>28</td>
<td>6:45 7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
<td>7:00am</td>
</tr>
</tbody>
</table>

Table 3: Practice Schedule with temperature and humidity, (highlighted days indicate participants with heat illness).
Temperature and Humidity

The camp medical staff recorded temperature and humidity readings at the practice facility for at least one practice session on 21 out of 28 training days. Table 3 includes all temperature and humidity data at specific practice sessions and times. When temperature and humidity were not recorded at the facility, these data were supplemented from the Minneapolis International Airport. ‘Actual’ depicts data recorded at the practice facility and ‘Airport’ indicates supplemental data. The ‘Airport’ location provided hourly recordings for the general Minneapolis area.

Air temperature was generally slightly cooler at 10:00am than 7:00am, and then increased throughout the day to peak at 8:00pm. There were dramatic changes in temperature and humidity that occurred on various days of training. For example, during the afternoon session on training day 19 the temperature dropped from 81°F on day 18 to 66°F on day 19 and the humidity peaked from 62% on day 18 to 97%. Figure 1 includes all temperature data during the 28 days at all four practice times. Figure 2 shows humidity readings at each of the four practice times. Generally the humidity was higher in the beginning of the day, peaking at the 10:00am session then gradually lowering as the day progressed. Temperature appeared to be inversely related to humidity during this training camp. As the hours progressed throughout the day, the temperature would rise and the humidity levels would decrease.
Fig. 1: Temperature Levels for the practice times of 7:00am, 10:00am, 3:00pm, and 8:00pm

Fig. 2: Humidity Levels for the practice times of 7:00am, 10:00am, 3:00pm, and 8:00pm
The next series of figures illustrates the temperature and humidity for each practice session for the 28 day period. For the morning run/weight training practice session at 7:00am, the average temperature and humidity over the 28 days was 73.4°F and 83.4% respectfully. (See Figure 3)
The temperature and humidity for the morning technique session (10:00am) over the 28 day period averaged 70.4°F and 86.4% respectfully. (See Figure 4)

The temperature and humidity for the afternoon practice session (3:00pm) over the 28 day period averaged 77.8°F and 77.5% respectfully. (See Figure 5)
The temperature and humidity for the evening run/weight training session (8:00pm) over the 28 day period averaged 86.4°F and 67.7% respectfully. (See Figure 6)

![Fig. 6: Temperature and Humidity Levels at 8:00pm](image)

**Heat Illness Demographics**

There were a total of 317 camp participants. Eighty-two participants experienced some degree of heat related illness during the 28 days of training. During the 28 days of camp, at least one participant experienced some degree of heat illness on 14 of the training days. Table 3 shows which days there were participants affected by a heat related illness as well as their activity before, during and after in relation to temperature and humidity. In addition to Table 3, Figure 7 shows how many participants sat out on a given day due to a heat related illness.
**Wrestling Group One**

There were 14 participants from wrestling group one that experienced a heat related illness. The average age was 15.5 years old and the average weight was 111.7 pounds. Two participants were from the West, 1-Southwest, 4-Midwest, 4-Northeast, and three from the Southeast. There was one participant that did not complete the camp that experienced a heat illness from the Southeast region. Participants affected were in RG-1 (n=1), RG-2 (n=2), RG-3 (n=1), RG-5 (n=1), RG-6 (n=1), RG-7 (n=1), RG-8 (n=3), RG-9 (n=1), RG-10 (n=2), and Unknown (n=1). Table 4 shows the camp demographics of participants affected by a heat related illness compared by wrestling group.
**Wrestling Group Two**

There were 14 participants from wrestling group two that experienced a heat related illness. The average age was 15.7 years old and the average weight was 128.6 pounds. Four participants were from the West, 1-Southwest, 3-Midwest, 5-Northeast, 2-Southeast, and 1-Unknown. A participant with heat illness from the Midwest region did not complete the camp and the camper whose region is unknown did not complete the camp due to the heat related illness. Participants were in RG-3 (n=1), RG-4 (n=1), RG-5 (n=2), RG-6 (n=2), RG-7 (n=2), RG-8 (n=2), RG-9 (n=2), RG-10 (n=1), RG-11 (n=1), and Unknown (n=2). Table 4 shows the camp demographics of participants affected by a heat related illness compared by wrestling group.

**Wrestling Group Three**

There were 18 participants from wrestling group three that experienced a heat related illness. The average age was 16.2 years old and the average weight was 139.5 pounds. One participant was from the Southwest, 6-Midwest, 7-Northeast, 1-Foreign, and 1-Unknown. The participant that is unknown did not complete the camp. Participants were in RG-1 (n=1), RG-2 (n=1), RG-3 (n=1), RG-4 (n=1), RG-5 (n=1), RG-7 (n=3), RG-8 (n=3), RG-9 (n=1), RG-10 (n=1), RG-11 (n=2), and Unknown (n=1). Table 4 shows the camp demographics of participants affected by a heat related illness compared by wrestling group.

**Wrestling Group Four**

There were 18 participants from wrestling group four that experienced a heat related illness. The average age was 15.9 years old and the average weight was 155.5
pounds. Three participants were from the West, 8-Midwest, 4-Northeast, and 3-Southeast. A participant from the West region did not complete the camp. Participants were in RG-1 (n=3), RG-3 (n=2), RG-4 (n=3), RG-6 (n=1), RG-7 (n=1), RG-8 (n=1), RG-9 (n=1), RG-10 (n=4), RG-11 (n=2), and Unknown (n=1). Table 4 shows the camp demographics of participants affected by a heat related illness compared by wrestling group.

Wrestling Group Five

There were 18 participants from wrestling group five that experienced a heat related illness. The average age was 16.1 years old and the average weight was 189.9 pounds. One participant was from the West, 7-Midwest, 8-Northeast, and 2-Southeast. A participant from the Northeast region did not complete the training camp. Participants were in RG-2 (n=1), RG-4 (n=1), RG-5 (n=1), RG-6 (n=3), RG-8 (n=1), RG-9 (n=2), RG-10 (n=5), RG-11 (n=3), and Unknown (n=1). Table 4 shows the camp demographics of participants affected by a heat related illness compared by wrestling group.
<table>
<thead>
<tr>
<th>Wrestling Group</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total/Heat Illness N=</td>
<td>N= 62/14</td>
<td>N= 66/14</td>
<td>N=64/18</td>
<td>N=63/18</td>
<td>N=62/18</td>
</tr>
<tr>
<td>Average Weight</td>
<td>111.7</td>
<td>128.6</td>
<td>139.5</td>
<td>155.5</td>
<td>189.9</td>
</tr>
<tr>
<td>Average Age</td>
<td>15.5</td>
<td>15.7</td>
<td>16.2</td>
<td>15.9</td>
<td>16.1</td>
</tr>
<tr>
<td>Region 1 W</td>
<td>9/2</td>
<td>11/4</td>
<td>13/0</td>
<td>12/3</td>
<td>8/1</td>
</tr>
<tr>
<td>Region 2 SW</td>
<td>1/1</td>
<td>2/1</td>
<td>1/1</td>
<td>0/0</td>
<td>3/0</td>
</tr>
<tr>
<td>Region 3 MW</td>
<td>18/4</td>
<td>16/3</td>
<td>23/6</td>
<td>24/8</td>
<td>19/7</td>
</tr>
<tr>
<td>Region 4 NE</td>
<td>21/4</td>
<td>22/5</td>
<td>22/7</td>
<td>18/4</td>
<td>25/8</td>
</tr>
<tr>
<td>Region 5 SE</td>
<td>11/3</td>
<td>12/2</td>
<td>2/0</td>
<td>7/3</td>
<td>7/2</td>
</tr>
<tr>
<td>Unknown</td>
<td>2/0</td>
<td>3/1</td>
<td>2/1</td>
<td>2/0</td>
<td>0/0</td>
</tr>
<tr>
<td>Foreign</td>
<td>0/0</td>
<td>0/0</td>
<td>1/1</td>
<td>0/0</td>
<td>0/0</td>
</tr>
<tr>
<td>Running Group 1</td>
<td>3/1</td>
<td>1/0</td>
<td>6/1</td>
<td>13/3</td>
<td>3/0</td>
</tr>
<tr>
<td>Running Group 2</td>
<td>4/2</td>
<td>8/0</td>
<td>7/1</td>
<td>4/0</td>
<td>3/1</td>
</tr>
<tr>
<td>Running Group 3</td>
<td>7/1</td>
<td>4/1</td>
<td>7/1</td>
<td>4/2</td>
<td>3/0</td>
</tr>
<tr>
<td>Running Group 4</td>
<td>4/0</td>
<td>7/1</td>
<td>4/1</td>
<td>7/3</td>
<td>5/1</td>
</tr>
<tr>
<td>Running Group 5</td>
<td>7/1</td>
<td>7/2</td>
<td>5/1</td>
<td>1/0</td>
<td>6/1</td>
</tr>
<tr>
<td>Running Group 6</td>
<td>3/1</td>
<td>7/2</td>
<td>7/0</td>
<td>5/1</td>
<td>7/3</td>
</tr>
<tr>
<td>Running Group 7</td>
<td>8/2</td>
<td>7/2</td>
<td>9/3</td>
<td>4/1</td>
<td>0/0</td>
</tr>
<tr>
<td>Running Group 8</td>
<td>8/3</td>
<td>7/2</td>
<td>5/3</td>
<td>3/1</td>
<td>4/1</td>
</tr>
<tr>
<td>Running Group 9</td>
<td>5/1</td>
<td>6/2</td>
<td>2/1</td>
<td>5/1</td>
<td>6/2</td>
</tr>
<tr>
<td>Running Group 10</td>
<td>5/2</td>
<td>2/1</td>
<td>4/1</td>
<td>4/4</td>
<td>13/5</td>
</tr>
<tr>
<td>Running Group 11</td>
<td>2/0</td>
<td>3/1</td>
<td>6/2</td>
<td>8/2</td>
<td>8/3</td>
</tr>
<tr>
<td>Running Group UKN</td>
<td>6/1</td>
<td>7/2</td>
<td>2/1</td>
<td>5/1</td>
<td>4/1</td>
</tr>
</tbody>
</table>

Table 4: Heat Illness Demographics compared by Wrestling Groups
Summary of the Exploratory Investigation

*Exploratory Question 1*

Five exploratory questions were developed and evaluated. The focus of the first exploratory question was whether a heat related illness would be restricted to a specific wrestling group. Figure 8 shows the number of total participants in each wrestling group who completed camp and those affected with a heat related illness compared to all wrestling groups. Heat related illness was present in all five wrestling groups. A non-statistical comparison of percentages of heat illness across wrestling groups showed a slightly higher number of heat illness cases in wrestling groups four and five compared to the other three groups. (WG-1: 23%; WG-2: 20% ; WG-3: 27%; WG-4: 29%; WG-5: 29%) Groups four and five represented the highest weight classes (WG-4: 145.2-179.5 pounds; WG-5: 158.9-255.5 pounds).
Exploratory Question 2

Participants in every running group were affected by a heat related illness. The second exploratory question was concerned with whether a heat related illness would be restricted to a specific running group. Figure 9 shows the number of total participants in each running group who completed the camp and those affected with a heat related illness compared to all running groups. Heat related illness was present in all eleven running groups. A non-statistical comparison of percentages of heat illness across running groups showed a slightly higher number of heat illness cases in running group eleven compared to the other groups. (RG-1: 19%, RG-2: 19%, RG-3: 20%; RG-4: 26%; RG-5: 19%; RG-
6: 24%; RG-7: 22%; RG-8: 37%; RG-9: 20%; RG-10: 46%; RG-11: 29%) Group ten represented the second slowest running group.

**Fig. 9: Participants with Heat Illness compared by running group**

![Bar chart showing participants with heat illness by running group and those who did not finish.]

**Exploratory Question 3**

Participants in most age groups were affected by a heat related illness with the exception of the youngest participant, (13 yrs) and oldest participant, (19 yrs). The third exploratory question was concerned with whether a heat related illness would be restricted to a specific age category. Figure 10 shows the number of total participants in each age category who completed the camp and those affected with a heat related illness compared to all ages. Heat related illness was present in most age categories. A non-statistical comparison of percentages of heat illness across participant’s ages showed a
slightly higher number of heat illness cases in the 15 year old age category compared to the other ages. (13 yrs: 0%; 14 yrs: 19%; 15 yrs: 31%; 16 yrs: 23%; 17 yrs: 27%; 18 yrs: 33%; 19 yrs: 0%)

**Exploratory Question 4**

Participants from all regions were affected by a heat related illness including the camper who came from a foreign country. The fourth exploratory question was concerned with whether the location of participant’s primary residence would have an influence on the incidence of a heat related illness. Figure 11 shows the number of total participants divided by region who completed the camp and those affected with a heat related illness compared to all regions. Heat related illness was present in all regions. A
non-statistical comparison of percentages of heat illness across participant’s primary residence showed a slightly higher number of heat illness cases in the Northeast and Midwest regions compared to the other regions; noting there was only one foreign participant and seven participants from the Southwest region. (West: 22%; Southwest: 42%; Midwest: 26%; Northeast: 27%; Southeast: 21%; Foreign: 100%) The camp took place in the Midwest, where many of the participants affected by a heat related illness resided; a region known to experience hot and humid weather during the summer months.

**Fig. 11: Participants with Heat Related Illness compared by Region of Hometown**

<table>
<thead>
<tr>
<th>Region of Hometown</th>
<th>Number of Participants</th>
<th>Participants affected with Heat Related Illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-West</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>2-Southwest</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>3-Midwest</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>4-Northeast</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>5-Southeast</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Foreign</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

**Exploratory Question 5**

The fifth exploratory question was concerned with whether a relationship could be identified between the practice schedule and the weather when cases of heat illness
were reported. Table 3 shows the practice schedule with the corresponding temperatures and humidity as well as which days there were participants affected by heat related illness. Based on these data, the prevalence of heat illness may be related to the combined effects of the weather and practice schedule. For example, on training day 11 there was a modified practice day to include a soccer tournament. Cases of heat illness were reported on this day and on the next several days following the soccer tournament. The humidity levels were higher on day 11 than on previous days, although temperatures remained constant. This was a situation where changes in the practice schedule, appeared to lead to a change in athlete behavior, and increased exposure to elements which may have increased the susceptibility of developing a heat related illness.

Training Day 11 is only one example of how the practice schedule combined with environmental factors may have had an effect on the incidence of heat related illness. More examples will be discussed in the following chapter to include a dramatic change in weather followed by bouts of heat illness as well as an added practice which also followed with participants being affected. It appears that exploratory question 5 addressed the most influential factors that lead to heat illness in participants and is warranted further in depth discussion.
Chapter 5
DISCUSSION

Having a youth summer training camp in which the staff is aware of how the environment affects their athletes allows them to make changes as needed to ensure a positive safe training environment. The results of this study may serve to identify characteristics of individuals that may be at a greater risk for developing a heat related illness during an intense summer wrestling camp. Heat illness is a condition that can range from a *simple* dehydration to life threatening heat stroke in a very short amount of time. The time between when heat illness symptoms are identified and treatment is provided is critical to decrease the possibility of death and/or devastating lifelong physiological effects. Those effects could be detrimental for a young athlete or individual regarding quality of life in general.

When athletes participate in summer training camps, they do not anticipate life threatening conditions that may sideline them forever. As a member of a medical staff, it is important to understand the environment in which these athletes are participating in order to quickly recognize subtle changes that can dramatically increase the potential for heat illness to occur. It is essential to address them before lifelong effects occur.

Demographic data were described for subjects who participated in a summer wrestling camp, including size (Wrestling Group), conditioning level (Running Group), age and region of hometown, along with weather and practice schedule. Five exploratory
questions were developed concerning the incidence of heat illness which occurred at the Minnesota summer wrestling camp in 2006.

Of primary interest was whether heat illness would be restricted to a specific wrestling group (Exploratory question #1). Wrestling groups were divided by weight with the smallest participants in group one and the largest in group five. Heat illness occurred in all five wrestling groups. However, there was a non-statistical higher percentage of heat illness in wrestling groups four and five (WG-4: 29%, WG-5: 29%) compared to the other three groups (WG-1: 23%, WG-2: 20%, WG-3: 27%). Wrestling groups four and five represented participants with the highest weights.

The second exploratory question was concerned with whether heat illness was restricted to a specific running group. Running groups were formed following a timed one mile run with the fastest individuals in running group one and the slowest in group eleven. All running groups had participants affected with heat illness. However, running group ten had the highest percentage of participants affected (46%) compared to the other groups (RG-1/2/5: 19%, RG-3/9: 20%, RG-4: 26%, RG-6: 24%, RG-7: 22%, RG-8: 37%, RG-11: 29%). Running group ten consisted of slower, possibly less conditioned participants. However, percent comparisons were not determined statistically.

Exploratory question #3 was concerned with the age of the participants and whether the occurrence of heat illness was associated with a particular age category. Younger athletes naturally have a harder time regulating internal body temperature due to increased surface area-to-body mass ratio (American Academy of Pediatrics, 2000). This fact combined with inexperience with an intense training regimen could increase their
heat illness risk. The age range was 13-19 years old, however both 13 and 19 year olds only had one participant and were not affected with heat illness. Between 14 and 18 year olds, the 15 year old participants had a non-statistical higher percentage of heat illness (31% of 67 participants) compared to the other age groups (14yrs: 19% of 31, 16yrs: 23% of 117, 17yrs: 27% of 84). The 18 year old group only had six participants with 33% affected (two participants).

The 28 day intensive wrestling camp in Minnesota is popular with athletes from around the country including some overseas locations. The fourth exploratory question was concerned with the influence of hometown region and the incidence of a heat related illness. Since participants travel from different climates to attend, the need for acclimation could be cause for increased heat illness. However, the highest percentage of reported heat illness cases were from participants from the Northeast and Midwest (27%, 26% respectfully) compared to other regions (West: 22%, Southeast: 21%). There was one foreigner and only seven participants from the Southwest (42% affected). Since the camp took place in the Midwest region, the acclimation of those participants in theory should have naturally decreased their risk of experiencing a heat illness.

Based on observed demographic information, wrestling groups four and five, running group 10, age category 15 years old, and the Northeast and Midwest Regions were most affected by a heat related illness. As for wrestling group four and five, nine participants were in running group ten, (out of 13 participants affected with heat related illness) and one was 15 years old. As for known risk factors, studies conducted by Binkley et al. (2002), Epstein (1990), and the American Academy of Pediatrics (2000)
have identified overweight individuals, lower physical fitness levels, and youth to increase the risk of a heat related illness. However, from the information provided for this analysis, it is not possible to determine actual fitness ability and if an individual is truly considered overweight. This shows that even though certain physical characteristics can increase a specific individual’s risk of a heat related illness, everyone is susceptible.

Practice Schedule and Environmental Conditions

The camp has policies in place for rearranging the training intensity when unsafe environmental conditions are present, i.e., practice schedules could be modified to lower the risk of heat illness. Once the threat has been cleared standard operations would resume. Demographics such as size, conditioning level, age and hometown region, of the individuals that were affected with a heat related illness may have had some influence on the development of heat illness over the 28-day camp. However, the practice schedule and training environment (temperature and humidity) in the hours preceding the heat illness may have had more of an impact. This is interesting because it takes the focus off of who is affected to when people are most likely to be affected.

The fifth exploratory question was developed to examine the relationship between the practice schedule and the environmental conditions when a heat illness occurred. A similar study involving military recruits found that the weather conditions participants were previously exposed to could have a significant influence in the onset of a heat related illness. Consequently, the physiological effects of heat and humidity have culminating effects lasting overnight (Kark et al., 1996). The body may not be able to fully recover from the previous day’s exposure before the following day’s activities.
Four distinct periods were recognized over the course of the 28-day wrestling camp by an increase in heat illness that coincided with changes in practice schedule and weather conditions. At the beginning of the 28 days, the first increase was expected as a product of the acclimation process. Most of the affliction with heat illness was from dehydration characterized by weight loss. The participants were weighed before the morning practice (after the early practice and breakfast) and were allowed a loss of 1.5% of their previous body weight before being considered too dehydrated to participate.

Training days 3-7 included the standard practice schedule. Temperature peaked during the evening practice, and then participants spent the night in a non-air conditioned building. On the following day after the early practice, temperatures were lower but humidity was higher, continuing the heat stress.

Days 11-14 marked the second period in which heat illness cases rose. A change in the normal schedule took place with the addition of a day off for a soccer tournament. Normal practice sessions had mandatory hydration breaks. Participants were required to maintain a full water bottle (provided by the camp) at all times and drink as needed especially when hydration breaks were authorized. Replenishing recommendations included three water bottles per practice. Practice sessions typically occurred inside a closed practice facility where sweat was visible and often rung from participant’s shirts following practice. When the participants moved practice to the soccer field, their environment changed. The visual cues of fluid loss may have diminished as sweat quickly evaporated from the skin from being outside. The focus of that day was on the
soccer competition, with possibly less attention paid to staying hydrated. Mandatory hydration breaks occurred after games although, not at steady intervals on that day.

The third period of heat illness, (days 17-18, & 20) related to a brief change in weather as well as a day off. Previously discussed were the affects of changes in activity on a participants ability to be aware of hydration needs. That in combination with cooler temperatures and lower humidity can be misleading. Visible sweat loss will be less during cooler temperatures thus decreasing the appearance for the need for increased fluids. If rain occurred during an outside activity, the participant may be unable to decipher the amount of fluid loss vs. rain saturation.

The final period of heat illness (days 23 & 24) followed an extremely intense practice day. Participants completed a hard practice in place of the early morning run. The morning practice included the technique session in addition to the usual early run activities. Following lunch, participants experienced another hard practice and finished the evening with normal evening run sessions. Every camper endured an extra practice. The normal hydration procedures participants used appeared to have be insufficient on this day, perhaps due to the extra practice and demands on their bodies. Even with the following morning off, some participants were unable to fully recover.

As the camp progressed, the incidence of heat illness became shorter and affected fewer participants; suggesting that the majority of the participants may have acclimated to the rigors of an intense training environment. However, subtle changes in the environment cannot be overlooked as they may pose potential hazards for any participant. If a participant was exposed to a deviation from the usual training environment, then was
not allowed adequate recovery time, that individual may be at an increased risk for heat illness. For proper recovery, an emphasis on proper hydration and cooling techniques between sessions could help participants adapt and further lessen the incidence of participants affected.

**Future Directions and Recommendations**

When addressing youth, technical jargon can be overwhelming and the point can be lost. A constant reminder of the importance of hydration is required throughout the camp, not only in the beginning. The camp offers alternative activities versus spending free time outside in the elements, but could arrange them in air conditioned facilities where participants can continue cooling and internal recovery from practice extremes. Perhaps adapting a formal method of analysis such as using the military method (Kark et al., 1996) of colored flag conditions would better anticipate heat related illness. All temperature environments are associated with a flag color and when those conditions are present that particular flag is flown and training is appropriately modified. Since weather conditions would be announced, participants would have another indication of the effects of weather and increase prevention techniques accordingly.

To fully understand the extent of heat related illness at a summer wrestling camp, more information specifically to what extent heat illness is observed is needed. Also information from the participant, including identification of the events that took place prior to their bout of heat illness such as infection, or previous activities especially during time off from training would be helpful. If practice was modified due to weather conditions and a participant took their new free time to “run around town”, their extra
activities might have an impact on their recovery from the conditions and increase their risk the next day when normal operations resumed. Since the wrestling camp is made up of minors, careful selection of free time activities might be in order. The results of this study showed that changes in the schedule to include time off, were usually followed by some form of heat related illness. If a schedule modification could be inserted on the morning following time off and used as a recovery hydration period, perhaps some control could be gained over ensuring proper hydration.

Level of experience could also have an impact on the risk of heat illness. A new athlete may underestimate how their body will react to this aggressive training program and increase their risk. On the other hand, athletes who train throughout the year could be putting extra stress on their body by denying a break in training and possibly increase their risk. If experience level is determined a factor in preventing heat illness, conditioning programs could be recommended and mandated for new athletes prior to attending camp.

This particular wrestling camp has four locations across the country at various times throughout the summer. It would be possible to evaluate data from all locations over a few years for a more concrete conclusion as to how practice schedule and weather relate to the incidence of heat illness. Governing agencies could produce official training protocols that could be used with all sport training camps to lower the risk of heat related illness. As supported by these data, demographics play a minimal role in heat related illness; however further investigation on specific events and participant situations could
help produce a formal protocol regarding heat related illness at youth summer sport camps.

According to the NATA, there are specific recommendations regarding lowering the risk of heat related illness in athletes. One recommendation is to provide air conditioned sleeping facilities. At the wrestling camp observed, the participants resided in non-air conditioned dormitories, which could have increased the physiological recovery time between practice sessions, thus, increasing the participants chances of developing a heat related illness. Air conditioned recovery facilities may help to reduce the risk.

Heat illness is a serious condition that if not caught early could be detrimental to an individual. Wrestling is a unique sport where athletes are generally “in tune” to their bodies through weight management. To prevent athletes from using these training camps as opportunities to “cut weight” participants are closely monitored by medical staff. Not many other sports monitor the physiological effects of training, performance, and the environment which make this a prime research group for training protocol development. Heat illness cannot always be prevented and there are circumstances that cannot be anticipated. Developing training guidelines and identifying individuals who are at risk, as well as conditions that increase the risk may be important steps to providing a safer training environment.
APPENDIX A

Participation Packet from Wrestling Camp
EMERGENCY INFORMATION

Camper Name: ____________________________

Birthdate: _____/_____/_______ Age: ____________

IN CASE OF EMERGENCY CONTACT:

Name: ____________________________ Relation: ____________________________

Address: ____________________________ City: ____________ State: _____ Zip: ________

Telephone #: (DAYTIME) ______-_______ (EVENING) ______-_______ (CELL) ______-_______

Name: ____________________________ Relation: ____________________________

Address: ____________________________ City: ____________ State: _____ Zip: ________

Telephone #: (DAYTIME) ______-_______ (EVENING) ______-_______ (CELL) ______-_______

INSURANCE INFORMATION:
Please include a photocopy (front & back) of your current insurance and prescription card or information.

Primary Insurance Company: ____________________________

Address: ____________________________ City: ____________ State: _____ Zip: ________

Group #: ____________________________ Policy #: ____________________________

Special Instruction: ____________________________

2nd Payer Insurance Policy Through J Robinson Wrestling Camps
After all of your hospital bills have been submitted through your primary insurance, in order to start the claim process, please forward any remaining bills on to:

J Robinson Camps
2520 East Hennepin Ave, Suite 220
Minneapolis, MN 55413
Phone: 612-349-6385
Dear Intensive Camper and Parents,

Thank you for choosing to attend what we believe is the best Intensive Wrestling Camp in the United States. J Robinson developed the “Intensive Camp” concept in 1978. Since that time, many others have tried to copy our program, but have not been able to achieve the intensity of our workouts and the dedication of our excellent staff. At the Intensive Camp you will improve your skills, gain knowledge, and become aware of the amount of work required to become a Champion. Our goal is to help you become the best wrestler you can be.

Please read over the following information before you come to camp. Feel free to contact the camp office (612.349.6585) if you have further questions.

Check-in: Check-in is the first day of camp from 1:00-5:00 pm in the dorm lobby. Your balance is due before you will be admitted to camp. If you would like to pay by personal check or credit card, the camp office must receive it at least 2 weeks before the start of camp. The enclosed balance due statement has the balance due date along with a payment stub. Any unpaid camp fees at check-in will have a $25 Late fee added to them and must be paid in cash or money order. Cash or money order are the only form of payment that will be accepted at check in.

Check-out: Check-out is the last day of camp from 8:00-10:00 am. Flights should not be made before 10:00 am (11:00 am CA). There will be no supervision provided after 10 am. You cannot leave early and still expect to graduate.

Accommodations: Campers are housed in college dorms (2 per room - MN & CA some 4 per room). Shared bathroom facilities are located on each floor. Roommate requests are taken and every effort will be made to honor those requests, but there is no guarantee. If you do choose a roommate, please try to check in together on the first day of camp.

Bedding will be provided ONLY at the 28-day camp in Minneapolis. Campers at the 14-day and 10-day camps must bring their own bedding and pillow.

A $40.00 damage deposit for your room and key is required. You are responsible for keeping your room clean. Any damages will be charged to you. The deposit will be refunded when you leave camp, provided your room is in good condition and you return your key.

Meals: All you can eat meals will be served in the cafeteria (3 per day).

Laundry: There will be an optional laundry service at camp, please see the enclosed insert for details. You must wear clean gear to every practice. You will be working out four times per day, so bring lots of shorts, t’s, socks, and jocks—there is no such thing as too many! Coin-operated facilities are available in the dorm. Cost is approximately $7.50-8.30 for the washer and dryer—bring a roll of quarters (28-day campers use machines operated by cards purchased with paper money).

Illness/Injury: We maintain a staff of athletic trainers to deal with minor injuries and illness. If it becomes necessary for you to see a doctor, arrangements will be made for you. Injuries are a part of any contact sport. If you become ill, get a skin infection, or are injured at camp and have to return home, there is NO REFUND.

Camp Rules: You will be expected to follow all camp rules. These rules were developed for your safety and so you can obtain the greatest benefit from camp. Failure to comply with all rules will result in your immediate dismissal. Your parents will be called and your immediate return home will be arranged. There will be no refund under these circumstances.

Additional policies as well as Terms & Conditions are posted at www.JRobinsonCamps.com/terms.html. For alternative formats please call the camp office.

Cars: Parking is not provided and not recommended. If you drive your car to camp, keys must be turned over to camp staff upon arrival. You are not permitted to enter any vehicle while at camp. Parking is very difficult to find and very costly.

Church Services: Campers who wish to attend religious services while at camp will be permitted to do so. They are
required to notify their group leader in advance.

**Mail & Messages:** Please see the enclosed camp information sheet for the camper mailing address and emergency phone numbers. Campers will be given any mail received on a daily basis.

**Visitors:** Visitors are encouraged to watch as long as practice is not disrupted. Please note that campers are not allowed to enter any vehicle while at camp (even if accompanied by a parent or guardian). If you wish to spend time with visitors, plan something within walking distance.

**Travel:** ALL campers are required to fill out and return a TRAVEL INFORMATION FORM. Please follow the directions on the form and fill it out completely.

Travel arrangements to and from camp are your responsibility. Transportation to and from the airport, train, or bus station is provided. We suggest Teel’s Travel Planners (Marcia: 809-233-3225 M-F 8:30 am-5:30 pm, PST, Marcia@Travel-Planners.com, www.Travel-Planners.com) if traveling by air. Identify yourself as a camp participant. She is familiar with our camps and can help find a reasonable fare.

Any campers traveling as an Unaccompanied Minor (determined by airlines) will be subject to an additional $20 gate transfer fee. You must check with your specific airline to see if you fall into this requirement. If a gate pick up is required by your airline, it must be on your TRAVEL INFORMATION FORM.

**What to Bring:**

Required Equipment: (Some items listed will be available in the camp store)

- Towels (you will be required to shower after every practice, so bring an adequate supply)
- Antibacterial soap-Sport, Phisoderm or Dial (decreases the chance of skin infection, Sport is available in the camp store)
- Laundry detergent & quarters
- At least 10-12 sets workout gear - t-shirts, athletic supporters, shorts (pockets are only acceptable if the pockets are securely sewn shut), socks, etc.
- NO Tank tops or cut off shirts are allowed. You must wear shorts, athletic supporter, t-shirt, socks and shoes to every practice.

**See SHIRT MARKING below**

- Jump rope (may be purchased in the camp store)
- A good pair of running shoes (running will be an important part of camp)
- Cotton sweats (tops and bottoms) - suggested for running and weight training
- Pen and JRIC Camp Workbook (see below), or blank notebook
- Bedding / Pillow (14 Day & 10 Day campers) bedding is supplied at 28 Day camp
- Alarm clock - You will be getting up early

We also recommend:

- Headgear, kneepads- strongly recommended (available in the camp store)
- Camera
- Electric fan (optional - dorms are NOT air-conditioned - it gets very hot & humid)

TV or radio (there is a TV in the dorm lounge)
- Rollerblades/ Skateboard - 28-Day campers ONLY
- Spending money $75-$100 per week for additional food and snacks throughout the day

If you travel by air, you must bring your wrestling and running shoes along with two sets of workout gear in a carry-on.

In the event your luggage is lost, you will still be able to work out until your luggage arrives.

**Shirt Marking:** On the outside, back of ALL of your workout shirts (between your shoulder blades) print your name in 4" block letters. Yes, this is required. Tape or water-based markers are not acceptable--make sure to use permanent marker.

**Camp Store / Camp Bank:** Snacks, t-shirts, shorts, sweatshirts, camp notes, hats, Camp Workbooks, headgear, kneepads, jump ropes, and other wrestling related items will be available in the camp store. It is a good idea to bring your spending money in the form of traveler's checks or money orders. We will have a "bank" where you can cash checks and store money, plane tickets and other valuables. A guideline for spending money is about $75-$100 per week.

**JRIC Camp Workbook:** We have put together a workbook to use as a reference and to keep notes in throughout the
Intensive Camp. It includes information on topics covered at camp such as diet, weight training, cutting weight, motivation and goal setting, as well as assignments to help you in motivation and goal setting.

This is a good way for you to keep all your camp notes together. It will be available at check-in or in the camp store for $8.00. It is also available as part of the ‘Supplemental Training Materials’ (see the enclosed flyer for details on this full package). There are no refunds for any pre-ordered materials.

Skin Infections: In recent years, skin infections have become a part of the sport of wrestling. To be proactive in this situation and head off any potential problems that might arise while you are at camp, the Intensive Camp has initiated stringent controls. Although we realize there is always the potential of contracting skin infections in the sport of wrestling, these controls are imposed with the idea of minimizing your exposure to possible skin infections. Our controls are stricter than those of any other camp, but we feel you will agree that this is an important and necessary precaution. If you have any questions, please contact the camp office. There are NO refunds for skin infections.

1. Precautions. J Robinson’s Intensive Camp takes to prevent skin infections from spreading:
   • All campers and staff are checked for skin infections upon arrival at camp.
   • Campers and staff are checked for signs of a skin infection on a daily basis.
   • Wrestling mats are washed with disinfectant 3 times daily.
   • Campers must bring an antibacterial soap to camp, such as Sport, Dial, or Phisoderm. All campers and staff are required to shower and wash with antibacterial soap after every practice.

2. If you have any skin infection, you must bring a letter from your doctor stating:
   • His/her diagnosis.
   • How you are being treated, and when treatment began.
   • You must bring adequate medication for the full amount of time you will be at camp. (10, 14 or 28 additional days worth of medication)
   • Your skin infection is not contagious and you are cleared for wrestling.

**If you have a skin infection and do not bring a signed Doctor’s statement, you will NOT be allowed to wrestle.**

3. Ringworm: If you have an outbreak of ringworm, you MUST be treating it with medication from your doctor. Treatment must have been started at least 5 days before camp starts. Bring an adequate supply of medication, and a refill prescription. You will not be allowed to wrestle until cleared by a doctor.

4. Herpes Gladiatorium: These guidelines apply to any wrestler diagnosed with herpes, even if the virus is dormant, non-contagious, and you do not currently have an outbreak. Due to the exhausting and stressful nature of our camp, it is very important that you are taking your medication - we want you to get through camp without an outbreak, and we do not want you to infect other campers.
   • You must take Zovirax or Valtrex daily - beginning at least 5 days before camp starts, and continuing every day while you are at camp. Plan for this and make sure you have a prescription for the quantity of pills you will need. Even if you do not have an outbreak, you will not be allowed to wrestle if you have not been taking medication for at least 5 days.
   • If you have a herpes outbreak while you are at camp, you must notify the trainers immediately and stop wrestling. YOU WILL NOT BE ALLOWED TO WRESTLE WITH A HERPES OUTBREAK.

5. Impetigo or Staph infection - Wrestlers infected with impetigo or staph will NOT be allowed to wrestle until cleared by a doctor.

A Note to Parents... Our Intensive Wrestling Camp is a highly motivating and demanding camp. It is not like any other wrestling camp in the country. One of our main goals is to push wrestlers through hard physical exercise. In making our camp demanding, we work to develop a positive mental attitude in the wrestlers who attend. We want you to be aware of the amount of work and dedication that is required for your child to graduate from our camp. Everything required of your camper at camp is done with the idea of each wrestler improving as much as possible—both physically and mentally. We think you will be impressed by your camper’s attitude when they return home.

J Robinson Camps Weight Loss Policy

In order to help make the best training environment possible, J Robinson Camps has put together a weight loss policy for all intensive campers. This policy is to help campers stay healthy while participating at camp. We realize that during the course of the camp, the campers will lose weight, which is why we allow for some weight loss. We are trying to keep them
from losing an unhealthy amount, so they can get the full benefit of their camp experience.

All campers will be weighed in on the first day of camp during the check-in process. This weight will be recorded and used as the camper's baseline weight. Daily weight checks will be performed and recorded. Any camper losing 1.5% of their original weight or previous day's weight will be held out of practices for a period of 24 hours. This is for health and safety purposes. During these 24 hours, the camper is to use the time to drink plenty of fluids to help re-gain the weight that they lost. Their weight will be checked again the next day, and if they have recovered the lost weight, they are allowed to continue participating in the camp.

Scales will be made available for campers to check their weight at anytime during the day.

Insurance: There is a non-duplication $10,000 accidental injury policy ($100 deductible) coordinated with primary insurance that covers each individual while at camp. This is a second payer policy that is in excess of any other medical coverage the participant may have. This policy is required to attend camp and costs $10.00. The policy covers injuries, but does not cover illness. Once you have submitted any hospital bills through your primary insurance, please forward them on to our office so we can start the claim process. All claims must be submitted within 90 days after camp ends.

Medical History/Emergency Contact Forms: Please fill out the enclosed Medical History and Emergency Contact forms and return them to the camp office at least 2 weeks prior to the start of camp.

The Medical History form does not need to be completed by a physician. You are required to have had a physical exam within the past year. All of the information requested is needed in order to provide the best possible medical care if necessary. If you are ill or injured at camp and medical attention is necessary, treatment will begin while efforts are being made to contact a parent. Please do not come to camp with a bacterial or viral infection. If an infection is detected, you will sit out and may be sent home.

Please send a photocopy (front and back) of your current insurance card or information. This information is vital - please provide an accurate account of phone numbers where your parents can be reached while you are at camp.

Please return your Medical History, Emergency Contact and Travel Information Forms and Final Payment to the camp office.

FYI: We accept MasterCard, Visa and Discover for your camp fees, when paid in advance. Fees paid at check-in must be in cash or money order. Credit cards are not accepted at check in.

J Robinson
Director

Fran Bejaun
Director of Wrestling Operations
# Medical History - Confidential

**Last Name:**

**First Name:**

**Middle Name:**

**Address:**

**City:**

**State:**

**Zip:**

**Home Phone:**

**Birthday:**

**Age:**

**Social Security Number:**

**Next of Kin Phone:**

**Address:**

**City:**

**State:**

**Zip:**

## Personal Medical History:

- **Measles**
- **German Measles**
- **Mumps**
- **Chicken Pox**
- **Hay Fever**
- **Asthma**
- **Tuberculosis**
- **High Blood Pressure**
- **Rheumatic Fever**
- **Heart Murmurs or Heart Condition**
- **Tumor, Cancer**
- **Jaundice or Hepatitis**
- **Diabetes**
- **Albumen/Sugar in Urine**
- **Gallbladder Trouble or Gallstones**
- **Rupture, Hernia**
- **Venereal Disease (Herpes)**
- **Urinary Infection**
- **Kidney Stones**
- **Handicaps**
- **Convulsive Disorder (Seizure)**
- **Mental Illness or Emotional Disorder**
- **Back Problems**
- **Injury/Disease of Joints**

## Immunization:

- **Tetanus**
- **Mumps**
- **Polio**
- **Measles**
- **Rubella**
- **Hepatitis**

**Weight:**

**Blood Pressure:**

---

We must receive this form at least TWO WEEKS prior to the start of camp.

CONFIDENTIAL MATERIAL
Answer ALL Questions (All "YES" answers require an explanation - please use the space to the left and at the bottom of the page)

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Have you ever been advised by a physician not to participate in athletic events?</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Have you been treated for a disease or illness during the past year?</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Has your physical activity been restricted during the past 5 years?</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Are you currently taking any medication - pills, sprays, or any other treatment?</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Are you currently under the care of a physician?</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Have you had any surgical operations?</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Have you been admitted to the hospital for disease, illness or injury?</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Do you wear glasses?</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Do you wear contact lenses?</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Have you had any difficulty with your eyes? (double or blurry vision, burning)</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Do you have difficulty hearing: frequent ear aches, ear drainage (other than wax)?</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Have you had:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Athlete's Foot</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Warts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. Boils</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. Herpes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e. Ringworm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f. Impetigo</td>
<td></td>
</tr>
<tr>
<td></td>
<td>g. Any contagious skin problem</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Do you have a stuffy nose when you DO NOT have a cold?</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Have you ever had a head injury with unconsciousness?</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Do you have any difficulty with chest tightness, cough, wheezing, or prolonged shortness of breath when you exercise?</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Have you ever had the symptoms listed in #15?</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Does cold air, smoke, fumes, dust or mold ever cause chest tightness, or cough or wheezing?</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Do you frequently have 'head colds' that end up with symptoms in your chest?</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Have you had any trouble with your stomach or intestines? (nausea, vomiting, gas, diarrhea, bloody stools)</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Have you had blood in your urine?</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Have you ever had weakness or trouble moving part of your body? (a &quot;stinger&quot;)</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Have you ever missed practice or a game due to an injury?</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Have you ever had:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Head Injury</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Neck Injury</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. Pinched Nerve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. Shoulder Injury</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e. Lower Back Injury</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f. Pulled Hamstring</td>
<td></td>
</tr>
<tr>
<td></td>
<td>g. Bruised Thigh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>h. Knee Injury</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i. Shin Splints</td>
<td></td>
</tr>
<tr>
<td></td>
<td>j. Ankle Injury</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Are you allergic to any drugs, medicines, foods, or stinging insects?</td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>Have you ever had manipulations or treatments for your back or joints by anyone other than a physician?</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Have you been found to have only one organ of usually paired organs? (one kidney, one eye, one testicle, etc.)</td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Do you consider yourself to be in good general health?</td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Will you be taking the preventative herpes medication?</td>
<td></td>
</tr>
</tbody>
</table>

Explanation of any "YES" answers (no explanation needed for #27)(for "YES", please indicate the name of the medication you will be taking):

PLEASE LIST ANY INFORMATION PERTAINING TO YOU CAMPER WE MAY NEED TO KNOW

CONFIDENTIAL MATERIAL
J Robinson’s Intensive Camps offer a life changing experience. In order to gain full benefit from your camp experience, we have some suggestions. These suggestions will help your body adjust from your current lifestyle to one set to handle the rigors of daily camp life. If you are already on an exercise program, consider these alterations, or amendments to your current program.

**Hydration**

- Hydration is the most important aspect of training. Without proper hydration your performance will greatly suffer. In cases of severe dehydration, heat stroke and exhaustion can occur. These are the basics you need to know about staying hydrated.
- Water is the best re-hydrating agent based on its easy access and relative simplicity of composition. Water offers basic hydration. It is simply water, and is a vital component to your overall health.
- Sport drinks have many misconceptions about their use. These drinks have been hailed as the best addition to your workout. They are also said to have no beneficial qualities for performance, the correct answer is that they are both good and bad for your body. Sport drinks have the ability to enhance performance by a couple of factors. One factor is the rate at which water uptake occurs. Sport drinks with the appropriate amount of sodium, and carbohydrate will give your body not only energy, but also help with the absorption rate of fluid. The appropriate composition is about 6-8% of carbs per eight ounces of water. While working out your body flushes out electrolytes, having a sports drink that has at least 100 mg of sodium per eight ounces of fluid will help with re-absorption of those fluids.
- Avoid diuretics. Diuretics are substances that increase the amount of water the kidneys remove from your body and will speed the dehydration process. Dehydration will also cause the body’s cooling system to work improperly. Alcohol and caffeine are two common diuretics.
- Here are a few ways to combat against dehydration. First, drink proper fluids before you work out (proper fluids are described above). About eight to sixteen ounces, fifteen minutes to one hour before you begin. Continue drinking during the actual workout session. Four to eight ounces for every 10-15 minutes you exert yourself. Drink proper fluids, sixteen to 24 ounces within 30 minutes after completing the work out. Finally, when re-hydrating during a workout, drink fluids slowly. Drinking to quickly can upset the stomach and cause nausea.

**Nutrition**

- Proper nutrition is also vital to ensuring optimal performance. The best diet to adhere to is a balanced diet. Eating a balance of 65%-15%-20% for your caloric intake during the day will suffice. 55-65% carbohydrates, 10-12% proteins, and 25-30% of fats will help your body to process food into energy faster.
- Avoid foods high in sodium, like fast food and preserved foods. You will get enough sodium in your diet by eating fresh foods, like vegetables, fruits and meats. The extra sodium from preserved foods will actually draw the water out of your muscles and into your stomach. This can contribute to dehydration-like effects.
- Along with eating a balanced diet is eating on a regular schedule. Developing a regular schedule for eating will help your body to determine when to devote time to digestion and when to save that blood for other tasks. Even if eating two times a day at regular times, is better than one big meal at random times each day.
Rest

- Rest is another important component in training. Your body needs adequate rest in order to perform at its best. A way to ensure that you are getting adequate rest is to set a schedule. Go to bed around 11:00 pm and wake up around 7:00 or 8:00am. Your body will then begin to function at a higher level in those times when it is awake. This will directly coincide with the camp, where you wake up early to work out and go to bed shortly after you work out.

Training

- Finally in preparing for camp, it is important to familiarize your body with working out and feeling fatigue. There are three aspects that you should pay attention to when preparing for the camp system.
  - Running: There will be a lot of running done while you are at camp. It would serve you best to add some mileage into you workout routine. Running for fifteen to thirty minutes, three to five times a week will adequately adjust your body to the training you will be exposed to at camp.
  - Weight Training: Weight training is another part of camp that should be addressed prior to entering the system. It is not necessary to bulk up for camp, but it is important to familiarize your body with the stress involved in weight training. One or two lifting sessions a week will make your body aware of changes that you will be exposed to at camp.
  - Wrestling: Wrestling is the final aspect of training to be covered. Forty-five minutes to an hour of mat time 1-2 times a weeks will suffice. In these sessions, moderate drilling, and 10-20 minute, hard wrestling period will best prepare you for camp.

The above suggestions are set to help your body prepare for the training conditions you will be exposed to at camp. These are only suggestions for you to use as guidelines for your pre-camp training. Consult your physician before beginning any exercise program, especially if you currently live a sedentary or less active lifestyle.
J Robinson Camps
2520 East Hennepin Ave #220
Minneapolis, MN 55413

AIR / TRAIN / BUS - TRAVEL INFORMATION FORM

Camper Name: ____________________________

Traveling with a Cell Phone?: ____________

Flying Campers: Is the camper traveling as an “Unaccompanied Minor”? (CIRCLE ONE): YES NO

If yes, $20 will be added to your camp balance.

If your camper is under 18, that does not automatically qualify them as an “Unaccompanied Minor.” You would have been given this information when you purchased your airline ticket. PLEASE CHECK WITH YOUR AIRLINE to see if your camper falls in this category.

- Please send a copy of your travel itinerary along with this form to the camp office at least 2 weeks prior to the start of camp.
- Do not make arrangements before 10:00 a.m. on the first or last day of camp (CA Campers-not before 11:00 am on the last day).
- Transportation is provided to and from the airport/train/bus station at no extra charge.
- We suggest you use Tolls' Travel Planners if traveling by air. Contact Marcia: 1-800-233-3325 (M-F 8:30am-5:30pm, PST.) Marcia@Travel-Planners.com, www.Travel-Planners.com. Identify yourself as a J Robinson Wrestling Camp participant.

<table>
<thead>
<tr>
<th>Arrival Information:</th>
<th>Connecting Leg</th>
<th>Final Leg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airline (Train/Bus):</td>
<td>Airline (Train/Bus):</td>
<td>Airline (Train/Bus):</td>
</tr>
<tr>
<td>Flight (Train/Bus): #</td>
<td>Flight (Train/Bus): #</td>
<td>Flight (Train/Bus): #</td>
</tr>
<tr>
<td>Departure Airport (Station):</td>
<td>Departure Airport (Station):</td>
<td>Departure Airport (Station):</td>
</tr>
<tr>
<td>Arrival Airport (Station):</td>
<td>Arrival Airport (Station):</td>
<td>Arrival Airport (Station):</td>
</tr>
<tr>
<td>Date: <em><strong>/</strong></em>/____</td>
<td>Date: <em><strong>/</strong></em>/____</td>
<td>Date: <em><strong>/</strong></em>/____</td>
</tr>
<tr>
<td>Time: __<em>:</em> _ am/pm</td>
<td>Time: __<em>:</em> _ am/pm</td>
<td>Time: __<em>:</em> _ am/pm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Departure Information:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Airline (Train/Bus):</td>
<td>Departure Airport (Station):</td>
</tr>
<tr>
<td>Flight (Train/Bus): #</td>
<td>Date: <em><strong>/</strong></em>/____</td>
</tr>
<tr>
<td>Parent/Guardian Name (PLEASE PRINT):</td>
<td>Time: __<em>:</em> _ am/pm</td>
</tr>
<tr>
<td>Parent/Guardian Signature:</td>
<td>Date: <em><strong>/</strong></em>/____</td>
</tr>
</tbody>
</table>

10-Day Iowa
Bus Station: Greyhound - Rochester, MN
Train Station: N/A
Airport: Rochester International (RST)

14-Day Pennsylvania
Bus Station: Greyhound - Edinboro, PA
Train Station: Amtrak - Erie, PA (EII)
Airport: Erie International (EII)

28-Day Minnesota
Bus Station: Greyhound - Minneapolis, MN
Train Station: Amtrak - Minneapolis/St. Paul (MSP)
Airport: Minneapolis/St. Paul International (MSP)

14-Day California
Bus Station: Greyhound - Reno, NV
Train Station: Amtrak - Reno, NV (RNO)
Airport: Reno/Tahoe International (RNO)
APPENDIX B

Specific Demographics of Participants affected with Heat Illness
<table>
<thead>
<tr>
<th>Weight</th>
<th>Age</th>
<th>Region</th>
<th>Running Group</th>
<th>Date(s) Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>93.3</td>
<td>14</td>
<td>3 (IN)</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>101.7</td>
<td>15</td>
<td>4 (NY)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>104.4</td>
<td>15</td>
<td>5 (VA)</td>
<td>UNKNOWN</td>
<td>3</td>
</tr>
<tr>
<td>105.6</td>
<td>16</td>
<td>4 (NY)</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>106.9</td>
<td>Ukn</td>
<td>1 (UT)</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>111.1</td>
<td>15</td>
<td>5 (SC)</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>111.3</td>
<td>15</td>
<td>1 (WY)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>114.2</td>
<td>17</td>
<td>5 (FL)</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>114.5</td>
<td>15</td>
<td>4 (NY)</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>115.3</td>
<td>17</td>
<td>2 (TX)</td>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>117.6</td>
<td>14</td>
<td>3 (MN)</td>
<td>7</td>
<td>3, 5, 6, 11</td>
</tr>
<tr>
<td>119.9</td>
<td>17</td>
<td>4 (CT)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>121.6</td>
<td>17</td>
<td>3 (MN)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>125.9</td>
<td>15</td>
<td>4 (NY)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Ss 15</td>
<td>123</td>
<td>14</td>
<td>2 (TX)</td>
<td>10</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
<td>-----</td>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>Ss 16</td>
<td>124.1</td>
<td>15</td>
<td>1 (WA)</td>
<td>11</td>
</tr>
<tr>
<td>Ss 17</td>
<td>124.4</td>
<td>17</td>
<td>4 (CT)</td>
<td>8</td>
</tr>
<tr>
<td>Ss 18</td>
<td>124.6</td>
<td>15</td>
<td>4 (NY)</td>
<td>6</td>
</tr>
<tr>
<td>Ss 19</td>
<td>124.7</td>
<td>16</td>
<td>4 (NY)</td>
<td>5</td>
</tr>
<tr>
<td>Ss 20</td>
<td>127.6</td>
<td>15</td>
<td>3 (OH)</td>
<td>7</td>
</tr>
<tr>
<td>Ss 21</td>
<td>128</td>
<td>16</td>
<td>4 (NY)</td>
<td>3</td>
</tr>
<tr>
<td>Ss 22</td>
<td>128.7</td>
<td>18</td>
<td>5 (KY)</td>
<td>4</td>
</tr>
<tr>
<td>Ss 23</td>
<td>130.7</td>
<td>15</td>
<td>1 (WY)</td>
<td>6</td>
</tr>
<tr>
<td>Ss 24</td>
<td>130.9</td>
<td>15</td>
<td>1 (CA)</td>
<td>5</td>
</tr>
<tr>
<td>Ss 25</td>
<td>132.5</td>
<td>Ukn</td>
<td>Ukn</td>
<td>Ukn</td>
</tr>
<tr>
<td>Ss 26</td>
<td>133.5</td>
<td>14</td>
<td>3 (WI)</td>
<td>Ukn</td>
</tr>
<tr>
<td>Ss 27</td>
<td>133.8</td>
<td>17</td>
<td>1 (CA)</td>
<td>8</td>
</tr>
<tr>
<td>Ss 28</td>
<td>133.8</td>
<td>17</td>
<td>4 (MA)</td>
<td>9</td>
</tr>
</tbody>
</table>
### Wrestling Group Three Data

<table>
<thead>
<tr>
<th></th>
<th>Weight</th>
<th>Age</th>
<th>Region</th>
<th>Running Group</th>
<th>Date(s) Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ss 29</td>
<td>134.4</td>
<td>16</td>
<td>4 (NY)</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>Ss 30</td>
<td>134.5</td>
<td>17</td>
<td>4 (MA)</td>
<td>11</td>
<td>12, 14</td>
</tr>
<tr>
<td>Ss 31</td>
<td>136.8</td>
<td>16</td>
<td>3 (MN)</td>
<td>7</td>
<td>4, 24</td>
</tr>
<tr>
<td>Ss 32</td>
<td>136.9</td>
<td>17</td>
<td>3 (IL)</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Ss 33</td>
<td>137.2</td>
<td>16</td>
<td>3 (MN)</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Ss 34</td>
<td>137.6</td>
<td>17</td>
<td>4 (MA)</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Ss 35</td>
<td>137.8</td>
<td>15</td>
<td>1 (WY)</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Ss 36</td>
<td>138</td>
<td>Ukn</td>
<td>ukn</td>
<td>ukn</td>
<td>3</td>
</tr>
<tr>
<td>Ss 37</td>
<td>138.3</td>
<td>17</td>
<td>4 (CT)</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Ss 38</td>
<td>138.4</td>
<td>16</td>
<td>3 (MI)</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Ss 39</td>
<td>138.7</td>
<td>15</td>
<td>4 (CT)</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Ss 40</td>
<td>139.7</td>
<td>16</td>
<td>3 (MI)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Ss 41</td>
<td>140.3</td>
<td>17</td>
<td>4 (ME)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Ss 42</td>
<td>142.2</td>
<td>17</td>
<td>2 (AZ)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ss 43</td>
<td>142.9</td>
<td>16</td>
<td>Japan</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Ss 44</td>
<td>143.4</td>
<td>14</td>
<td>3 (SD)</td>
<td>10</td>
<td>12, 14</td>
</tr>
<tr>
<td>Ss 45</td>
<td>145.3</td>
<td>16</td>
<td>4 (RI)</td>
<td>11</td>
<td>3, 13</td>
</tr>
<tr>
<td>Ss 46</td>
<td>148.6</td>
<td>17</td>
<td>4 (PA)</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>
### Wrestling Group Four Data

<table>
<thead>
<tr>
<th></th>
<th>Weight</th>
<th>Age</th>
<th>Region</th>
<th>Running Group</th>
<th>Date(s) Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ss 47</td>
<td>149.3</td>
<td>16</td>
<td>5 (TN)</td>
<td>6</td>
<td>3, 20</td>
</tr>
<tr>
<td>Ss 48</td>
<td>150.6</td>
<td>16</td>
<td>3 (MI)</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Ss 49</td>
<td>151</td>
<td>16</td>
<td>4 (NY)</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Ss 50</td>
<td>151.3</td>
<td>15</td>
<td>4 (MD)</td>
<td>3</td>
<td>12, 14</td>
</tr>
<tr>
<td>Ss 51</td>
<td>151.7</td>
<td>17</td>
<td>3 (IL)</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Ss 52</td>
<td>152</td>
<td>17</td>
<td>4 (NY)</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Ss 53</td>
<td>153.5</td>
<td>16</td>
<td>3 (MN)</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Ss 54</td>
<td>153.6</td>
<td>15</td>
<td>1 (AK)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ss 55</td>
<td>154.8</td>
<td>16</td>
<td>3 (MI)</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Ss 56</td>
<td>155.2</td>
<td>16</td>
<td>5 (FL)</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Ss 57</td>
<td>157.1</td>
<td>16</td>
<td>4 (NY)</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>Ss 58</td>
<td>158.5</td>
<td>17</td>
<td>1 (UT)</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Ss 59</td>
<td>158.6</td>
<td>16</td>
<td>3 (MI)</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Ss 60</td>
<td>158.8</td>
<td>15</td>
<td>1 (CA)</td>
<td>10</td>
<td>3, 14</td>
</tr>
<tr>
<td>Ss 61</td>
<td>159.1</td>
<td>16</td>
<td>1 (CA)</td>
<td>ukn</td>
<td>3</td>
</tr>
<tr>
<td>Ss 62</td>
<td>160.3</td>
<td>16</td>
<td>3 (SD)</td>
<td>10</td>
<td>18, 20</td>
</tr>
<tr>
<td>Ss 63</td>
<td>160.5</td>
<td>14</td>
<td>3 (WI)</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Ss 64</td>
<td>162.2</td>
<td>17</td>
<td>3 (IA)</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Weight</td>
<td>Age</td>
<td>Region</td>
<td>Running Group</td>
<td>Date(s) Affected</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>-----</td>
<td>--------</td>
<td>---------------</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>Ss 65</td>
<td>160.6</td>
<td>16</td>
<td>4 (NY)</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Ss 66</td>
<td>162.7</td>
<td>16</td>
<td>5 (FL)</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>Ss 67</td>
<td>164.8</td>
<td>17</td>
<td>3 (ND)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Ss 68</td>
<td>165.1</td>
<td>17</td>
<td>3 (MN)</td>
<td>10</td>
<td>3, 6, 17</td>
</tr>
<tr>
<td>Ss 69</td>
<td>167.5</td>
<td>15</td>
<td>3 (MI)</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Ss 70</td>
<td>168.7</td>
<td>16</td>
<td>5 (KY)</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Ss 71</td>
<td>169.9</td>
<td>15</td>
<td>3 (MN)</td>
<td>4</td>
<td>3, 4</td>
</tr>
<tr>
<td>Ss 72</td>
<td>172.5</td>
<td>15</td>
<td>3 (WI)</td>
<td>9</td>
<td>3, 13</td>
</tr>
<tr>
<td>Ss 73</td>
<td>178.1</td>
<td>16</td>
<td>1 (ID)</td>
<td>6</td>
<td>3, 13, 20</td>
</tr>
<tr>
<td>Ss 74</td>
<td>182.9</td>
<td>16</td>
<td>4 (MD)</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>Ss 75</td>
<td>187.8</td>
<td>17</td>
<td>4 (CT)</td>
<td>10</td>
<td>3, 13</td>
</tr>
<tr>
<td>Ss 76</td>
<td>188.4</td>
<td>17</td>
<td>4 (NY)</td>
<td>ukn</td>
<td>6, 13</td>
</tr>
<tr>
<td>Ss 77</td>
<td>189.8</td>
<td>16</td>
<td>4 (NY)</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Ss 78</td>
<td>192</td>
<td>15</td>
<td>4 (NY)</td>
<td>11</td>
<td>3, 12</td>
</tr>
<tr>
<td>Ss 79</td>
<td>228</td>
<td>17</td>
<td>4 (NY)</td>
<td>11</td>
<td>12, 20</td>
</tr>
<tr>
<td>Ss 80</td>
<td>238.9</td>
<td>18</td>
<td>3 (MI)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Ss 81</td>
<td>244.7</td>
<td>16</td>
<td>4 (NJ)</td>
<td>10</td>
<td>3, 14</td>
</tr>
<tr>
<td>Ss 82</td>
<td>255.5</td>
<td>15</td>
<td>3 (MN)</td>
<td>11</td>
<td>3, 12</td>
</tr>
</tbody>
</table>
REFERENCES


