

Medical Needs at Ultramarathons



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Disclosure



Goals of my talk

- 1) Roles of the medical director
- 2) Characterization of what you'll see in the medical tent
 - Western States
 - Two Oceans
 - Multi day events
 - Tahoe Rim

Why are ultra endurance races different?



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- Usually remote terrain (sometimes harsh)
 - More metabolic demands on the runner (hotter, colder, steeper, etc)
 - Communication much more difficult
 - EMS response times much more delayed
- Longer races= things are more spread out
- Typically not as many runners as big road races
- Ultrarunners themselves



Roles of Medical Director

- Help to establish this mission of the medical staff
 - Goal is to get as many athletes as possible to the finish SAFELY
- Supervise care provided by medical volunteers
- Oversee organization of equipment and supplies
- Develop/update medical race protocols
- Coordinate emergency planning in conjunction with RD
- Work with RD on scenarios that could result in race cancellation
- Oversee pre-race runner education and post-race follow up

Minimum responsibilities for a medical director



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- Figure out how/where injured or ill runners would need to go to for advanced care and how they would get there
- Communicate what medical resources will be available to athletes during the event
- Need to be **VERY CLEAR** with athletes about these issues prior to the race

Western States



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Western States Experience

(McGowan and Hoffman, Wilderness and Environmental Medicine 2015)

- Results from finish line only in 2010,2011 and from all aid stations in 2012, 2013
- 63 consultations for unique runners in 2012/2013 (8.2% of starters)
- 77% of consults occurred on course
- 55% were able to continue
- If you continued, 75% of runners finished
- 2 cases required transport- (bronchospasm and severe EAH)



Western States Experience

Table 2. Number (% of race starters) of consultations by reason/symptoms, location, and disposition for 2012 and 2013 events

| <i>Primary reason for consultation/symptoms</i> | <i>Competitor seen on course</i> | | <i>Competitor seen at finish</i> | | | <i>Total</i> |
|---|----------------------------------|-------------------------|----------------------------------|------------------------|----------------------------------|-----------------|
| | <i>Able to continue</i> | <i>Did not continue</i> | <i>After dropping</i> | <i>After finishing</i> | <i>Noncompetitor^a</i> | |
| Medical | | | | | | |
| Nausea/vomiting | 5 (0.7) | 3 (0.4) | 2 (0.3) | 4 (0.5) | 1 (0.1) | 15 (2.0) |
| Respiratory distress | 2 (0.3) | 4 (0.5) | | 1 (0.1) | | 7 (0.9) |
| Hypothermia | | 5 (0.7) | | | | 5 (0.7) |
| Dehydration | | 1 (0.1) | | 2 (0.3) | 1 (0.1) | 4 (0.5) |
| Postural hypotension | | | | | 3 (0.4) | 3 (0.4) |
| Overhydration | | | | 2 (0.3) | | 2 (0.3) |
| Allergic reaction | | | | 1 (0.1) | | 1 (0.1) |
| Cardiovascular issue | | 1 (0.1) | | | | 1 (0.1) |
| Hyponatremic seizure | | | 1 (0.1) | | | 1 (0.1) |
| Severe fatigue | 1 (0.1) | | | | | 1 (0.1) |
| Musculoskeletal | | | | | | |
| Sprain, strain or tendinitis | 4 (0.5) | 3 (0.4) | | | | 7 (0.9) |
| Muscle cramping | 4 (0.5) | 2 (0.3) | | | | 6 (0.8) |
| Muscular pain | 5 (0.7) | | | | | 5 (0.7) |
| Contusion | 2 (0.3) | | | | | 2 (0.3) |
| Other | | | | | | |
| Concussion | | 1 (0.1) | | | | 1 (0.1) |
| Skin wound | | | | | 1 (0.1) | 1 (0.1) |
| Vision impairment | 1 (0.1) | | | | | 1 (0.1) |
| Total | 24 (3.1) | 20 (2.6) | 3 (0.4) | 10 (1.3) | 6 (0.8) | 63 (8.2) |

^a Noncompetitors included 1 safety runner, 1 aid station volunteer, and 4 pacers.



Table 3. Number (% of race starters) of consultations by broad diagnostic group and course location for 2012 and 2013^a

| <i>Year/diagnostic group</i> | <i>Course location</i> | | | | <i>Total</i> |
|------------------------------|------------------------|---------------------|-------------------|---------------|--------------|
| | <i>First third</i> | <i>Middle third</i> | <i>Last third</i> | <i>Finish</i> | |
| 2012 | | | | | |
| Medical | 4 (1.0) | 4 (1.0) | 4 (1.0) | 8 (2.1) | 20 (5.2) |
| Musculoskeletal | 0 | 1 (0.3) | 8 (2.1) | 0 | 9 (2.4) |
| Other | 0 | 1 (0.3) | 1 (0.3) | 0 | 2 (0.5) |
| Total | 4 (1.0) | 6 (1.6) | 13 (3.4) | 8 (2.1) | 31 (8.1) |
| 2013 | | | | | |
| Medical | 1 (0.3) | 9 (2.3) | 2 (0.5) | 8 (2.1) | 20 (5.2) |
| Musculoskeletal | 0 | 11 (2.9) | 0 | 0 | 11 (2.9) |
| Other | 0 | 1 (0.3) | 0 | 0 | 1 (0.3) |
| Total | 1 (0.3) | 21 (5.5) | 2 (0.5) | 8 (2.1) | 32 (8.4) |
| Combined total | 5 (0.7) | 27 (3.5) | 15 (2.0) | 16 (2.1) | 63 (8.2) |

^a Data are inclusive of 6 noncompetitors.



WS IV use by year

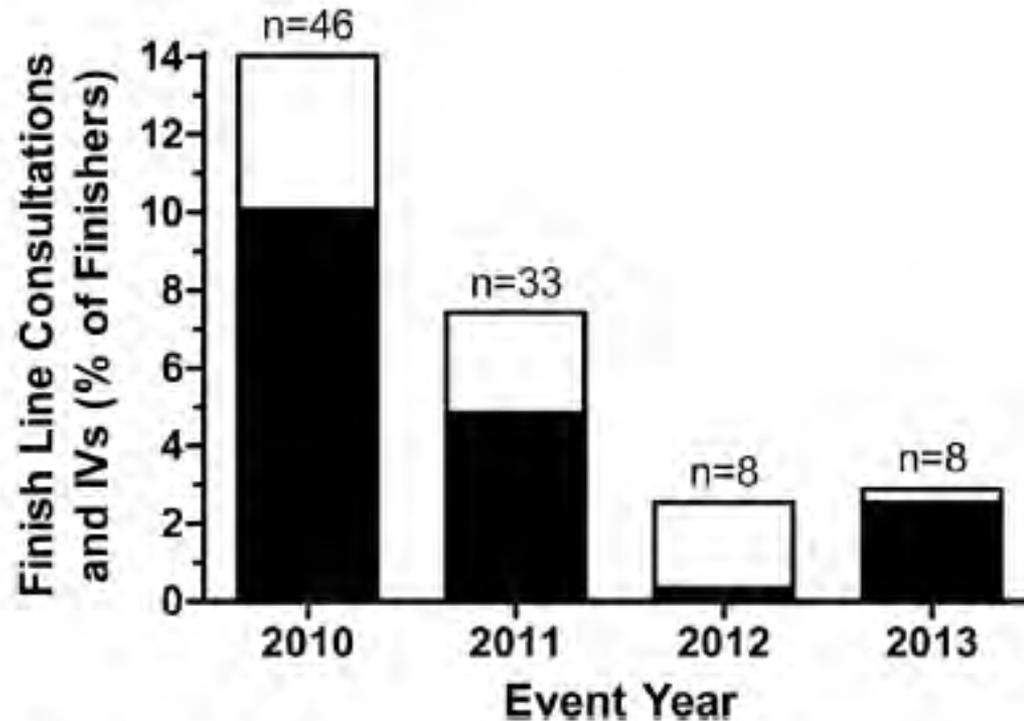


Figure 1. Use of intravenous (IV) fluids (black bars) and consultations (summation of black and white bars) at the finish line expressed as percentages of finishers. The number of finish line consultations each year is also provided.



WS summary

- Majority of consultations took place during the middle third of the race (43%)
- 10% of people receiving care were not in the race (1500 volunteers and most competitors use a pacer)
- 60% of the issues are medical in nature

Two Oceans

(Schwabe K, Schweltnus M, Derman W, Swanevelder S, Jordaan E.
BJSM 2014)



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- 21 K and 56K road races
- 2008-2011
- Total runners over 4 years-65,865 (41026 males and 24,839 female)
- Overall incidence of medical complications was 8.27/1000 runners
- Overall incidence of serious life threatening events was very low (37 events or 0.056% of all runners)



Two Oceans

Table 3 Demographics of participation (starters and finishers) by year of the race and type of race participation

| Race type | 2008 | 2009 | 2010 | 2011 | All (2008–2011) |
|------------------------|--------|--------|--------|--------|-----------------|
| Total starters | | | | | |
| All | 15 742 | 16 844 | 17 358 | 15 921 | 65 865 |
| 21 km | 9723 | 10 696 | 9550 | 9542 | 39 511 |
| 56 km | 6019 | 6148 | 7808 | 6379 | 26 354 |
| Total finishers | | | | | |
| All | 15 541 | 16 635 | 17 071 | 15 173 | 64 420 |
| 21 km | 9714 | 10 689 | 9539 | 9169 | 39 111 |
| 56 km | 5827 | 5946 | 7532 | 6004 | 25 309 |



Table 4 Incidences (per 1000 runners starting the race: 95% CI) of any medical complications and serious medical complications by race type in the 4 years of study

| | 2008 | 2009 | 2010 | 2011 | All years |
|--------------|-----------------------|------------------------|-----------------------|------------------------|------------------------|
| All | | | | | |
| All | 7.11 (5.91 to 8.56) | 8.43 (7.15 to 9.94) | 7.55 (6.36 to 8.96) | 10.05 (8.61 to 11.73) | 8.27 (7.61 to 9.00) |
| Serious | 0.57 (0.30 to 1.10) | 0.42 (0.20 to 0.87) | 0.63 (0.35 to 1.14) | 0.63 (0.34 to 1.17) | 0.56 (0.41 to 0.78) |
| 21 km | | | | | |
| All | 4.73 (3.54 to 6.32) | 3.93 (2.90 to 5.31) | 5.03 (3.79 to 6.67) | 7.02 (5.53 to 8.92) | 5.14 (4.48 to 5.90) |
| Serious | 0.51 (0.21 to 1.24) | 0.47 (0.19 to 1.12) | 0.63 (0.28 to 1.40) | 0.42 (0.16 to 1.12) | 0.51 (0.33 to 0.78) |
| 56 km | | | | | |
| All | 10.97 (8.61 to 12.93) | 16.27 (13.37 to 19.79) | 10.63 (8.57 to 13.18) | 14.58 (11.90 to 17.86) | 12.98 (11.67 to 14.43) |
| Serious | 0.66 (0.25 to 1.39) | 0.33 (0.08 to 1.30) | 0.64 (0.27 to 1.54) | 0.94 (0.42 to 2.09) | 0.65 (0.40 to 1.04) |

Incidence of Medical complications by organ system- 56K



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| Systemd | Incidence per 1000 | 95% CI |
|-----------------|--------------------|-----------|
| Cardiovascular | 3 | 2.4-3.74 |
| Musculoskeletal | 1.82 | 1.37-2.42 |
| Derm | 1.48 | 1.08-2.03 |
| Muscle Cramps | 1.90 | 1.44-2.5 |
| GI | 1.86 | 1.41-2.46 |
| Respiratory | 0.80 | 0.52-1.22 |
| Electrolyte | 0.57 | 0.34-.094 |
| CNS | 0.15 | 0.06-0.40 |



New findings

- Incidence of sudden death was high in the 21 K (1/20,000 race starters)
- Postural hypotension, dermatitis, muscle cramps and GI complications were the most common specific medical complications
- Risk of EAH, muscle cramps, GI complications, musculoskeletal complications and fatigue were higher in the 56 K racers than 21K
- Incidence of symptomatic hyponatremia was 0.23/1000

Multiday events



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Al Andalus Ultra

(Volker Sheer B, Murray A. Clin J Sports Med 2011)

- 219 K race in Spain over 5 days
- 69 Runners (48 Male/21 female)



A1 Andalus

- 99 episodes of medical care
- Blisters accounted for 1/3 of all medical care
- MSK issues accounted for 22/99 cases
- Only 3 cases of EAC, 4 cases of vomiting, 3 cases of cramps



TABLE 3. Presentation to Medical Staff by Day

| Day | No. Clinical Encounters (%) | Daily Distance | Cumulative Distance |
|------------|------------------------------------|-----------------------|----------------------------|
| 1 | 17 (17.2) | 37 | 37 |
| 2 | 13 (13.1) | 42 | 79 |
| 3 | 24 (24.2) | 42 | 121 |
| 4 | 28 (28.3) | 61 | 182 |
| 5 | 17 (17.2) | 37 | 219 |



Racing the Planet Desert Race

- 5 Day race-
 - 40K first 4 days then 80K last day
 - Used data from 4 races in 2005-2006
- Total of 407 runners (396 consented)
 - 323 men /84 women
- 85% of participants needed medical care at some point



Racing the Planet

TABLE 1. Ultramarathon runner medical encounters by diagnosis.

| Diagnosis | Major, ^a n (%) | Minor, ^a n (%) |
|--|---------------------------|---------------------------|
| Medical illnesses | | |
| EAC ^b | 35 (56.5) | 43 (3.9) |
| Altitude sickness | 0 | 11 (1.0) |
| Serious medical diagnosis ^c | 1 (1.6) | 1 (0.1) |
| Other medical diagnosis ^d | 0 | 27 (2.4) |
| Musculoskeletal injuries | | |
| Bursitis | 1 (1.6) | 11 (1.0) |
| Sprain | 2 (3.2) | 25 (2.3) |
| Strain | 1 (1.6) | 27 (2.4) |
| Tendonitis | 7 (11.3) | 115 (10.3) |
| Other ^e | 3 (4.8) | 29 (2.6) |
| Skin disorders | | |
| Abrasion | 0 | 43 (3.9) |
| Blister | 10 (16.2) | 642 (57.8) |
| Cellulitis | 1 (1.6) | 8 (0.7) |
| Hematoma (subungual) | 1 (1.6) | 106 (9.5) |
| Other ^f | 00 | 23 (2.1) |

^a Major, unable to continue in race; minor, able to continue in race.

^b Hyperthermia, normothermia, hypothermia.

^c Hyponatremia, hematuria, renal stone.

^d Blurry vision, conjunctivitis, diarrhea, dyspepsia, epistaxis, hematochezia, insect bite, neuropathy, pharyngitis, upper respiratory infections.

^e Fracture, metatarsalgia, contusion, costochondritis, laceration, splinter.

^f Callous, nail avulsion, rash, paronychia, wart.



Injuries by stage

| Type of injury | Stage 1 | Stage 2 | Stage 3 | Stage 4 | Stage 5 |
|----------------|-----------|-----------|------------|------------|------------|
| Major Medical | 17 (47.2) | 3 (8.3) | 6 (16.7) | 10 (27.8) | 0 (0) |
| Minor Medical | 25 (30.5) | 18 (22) | 15 (18.3) | 17 (20.7) | 7 (8.5) |
| Major MSK | 0 (0) | 2 (14.2) | 6 (42.9) | 6(42.9) | 0 (0.0) |
| Minor MSK | 17 (8.4) | 43 (21.2) | 58 (28.6) | 47 (23.2) | 38 (18.6) |
| Major Skin | 1 (8.3) | 1 (8.3) | 5 (41.7) | 2 (16.7) | 3 (25) |
| Minor Skin | 95 (11.5) | 149 (18) | 200 (24.3) | 191 (23.1) | 191 (23.1) |



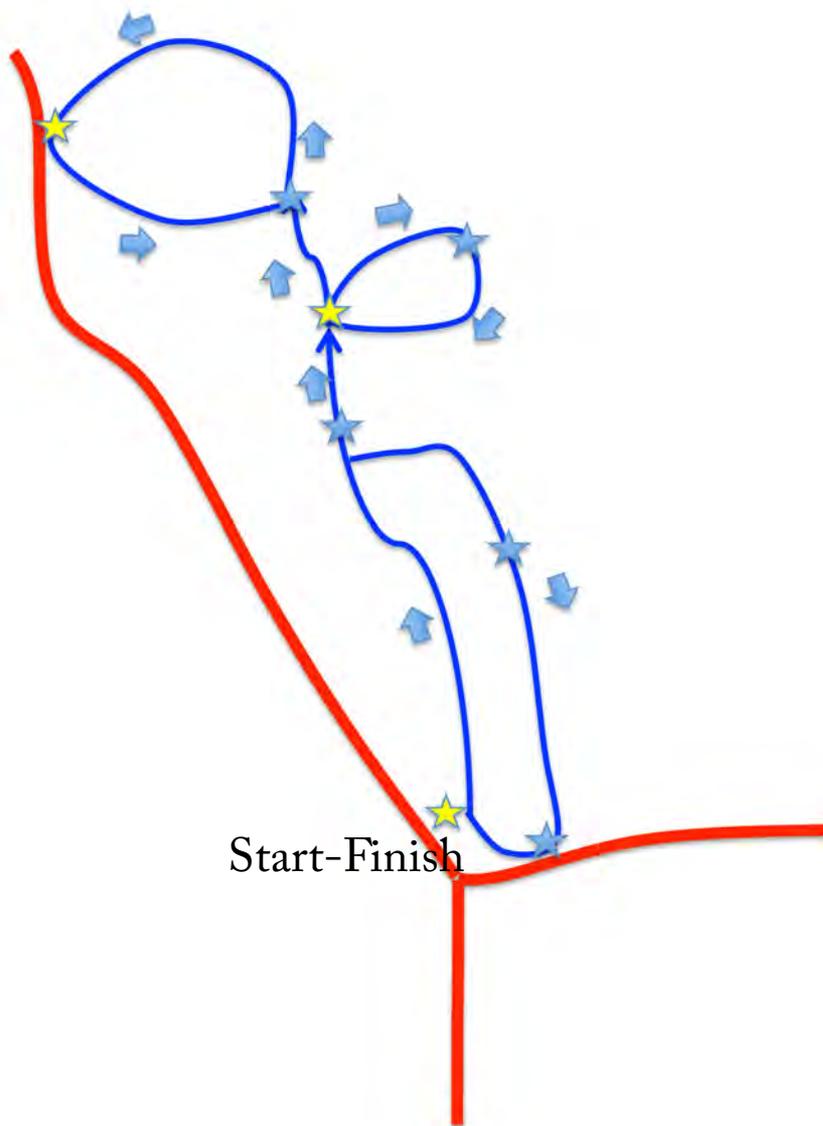
Race the Planet summary

- 3.8 injury/illness rate per runner and 65/1000H run
- 95% were minor
- Medical issues (as opposed to MSK/Derm) more likely to cause drop out
- Increasing age associated with decreased risk of illness/injury
- Medical issues more common in first stage of the race

Tahoe Rim Trail Endurance Races



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Tahoe Rim Experience (PRELIMINARY)!

- 2010-2015- including 50 K/50 Mile/100 mile
- Three aid stations- Two on course and one at start/finish/50 mile mark
- Race consists of 55K, 50 mile and 100 mile races
 - 600 runners total- participants roughly equally divided
- 113+ Runners received medical care (2014 s/f data destroyed due to flooding)



Care by distance

- Cases by distance
 - 55K- 14 cases (2.8 cases/year)
 - 50 miler- 32 cases (6.4 case/ year)
 - 100 miler- 55 cases (11 cases/year)
 - 9 unknown, 1 volunteer, 3 pacers
- On course vs start finish
 - 49 cases start/finish
 - 64 cases on course



Tahoe Rim Experience

- 42 cases GI issues
- 11 cases Exercise Associated Collapse
- 11 cases MSK issues (pain and abrasions)
- 8 cases “dizziness”
- 6 cases muscle cramps
- 4 insect stings
- 2 concussion/headache



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Tahoe Rim Experience

| Year | I stat use | IV |
|-------|------------|----|
| 2010 | 2 | 1 |
| 2011 | 5 | 2 |
| 2012 | 7 | 3 |
| 2013 | 4 | 1 |
| 2014 | 5 | 0 |
| Total | 23 | 7 |



Medications given

- Zofran- 17 doses
- Albuterol/beta agonist- 3
- Antihistamines-2
- Epi pen-1



Next level of care

- 3 instances of needing to call for immediate transport
 - 1 Helicopter
 - 2 Ambulance
- 10 Cases sent to ER
 - 2 head injuries, suspected renal failure, rhabdo, cholecystitis, GI bleed (vol), testicular pain, hyponatremia, asthma, syncope/seizure

Medical forms



Medical Team/Evaluator: _____

Date: _____

Arrival Time: _____ Departure Time: _____

Location (circle one): Start/Finish Tunnel Creek Diamond Peak

Athlete Name: _____ Age: _____

Gender (circle one): M / F

Race Number: _____

Distance (circle one): 50k 50 mi 100 mi

PMH:

Allergies:

Meds:

SYMPTOMS/SIGNS :

- | | | | |
|--|--|--|--|
| <input type="checkbox"/> Fatigue | <input type="checkbox"/> Abdominal Pain | <input type="checkbox"/> Confusion | <input type="checkbox"/> Blisters |
| <input type="checkbox"/> Lightheaded | <input type="checkbox"/> Nausea/Vomiting | <input type="checkbox"/> Wheezing | <input type="checkbox"/> Chafing |
| <input type="checkbox"/> Blurred Vision | <input type="checkbox"/> Diarrhea | <input type="checkbox"/> Muscle Cramps | <input type="checkbox"/> Skin Abrasion |
| <input type="checkbox"/> Chest Pain | <input type="checkbox"/> Feeling Hot | | <input type="checkbox"/> Skin Laceration |
| <input type="checkbox"/> Shortness of Breath | <input type="checkbox"/> Feeling Cold | | |

| Vital Signs | Time: | | | |
|----------------|-------|--|--|--|
| Temp | | | | |
| BP Sitting | | | | |
| BP Lying | | | | |
| Heart Rate | | | | |
| Resp Rate | | | | |
| Pulse Oximeter | | | | |
| Weight | | | | |

| | |
|--------------------------------|---|
| <p>HPI:</p> | <p>Exam:</p> <p><u>Labs/Other findings:</u></p> |
|--------------------------------|---|

DIAGNOSIS:

- | | | |
|--|--|--|
| <input type="checkbox"/> Exercise Assoc Collapse | <input type="checkbox"/> Blisters | <input type="checkbox"/> Muscle Cramps |
| <input type="checkbox"/> Dehydration | <input type="checkbox"/> Skin Abrasion | <input type="checkbox"/> Muscle Strain |
| | <input type="checkbox"/> Skin Laceration | |
| <input type="checkbox"/> Hypothermia | <input type="checkbox"/> Ankle Sprain L. R | <input type="checkbox"/> GI Distress |
| <input type="checkbox"/> Heat Exhaustion | <input type="checkbox"/> Knee Sprain L. R | <input type="checkbox"/> Asthma Exacerbation |
| <input type="checkbox"/> Hyponatremia | | |

Other: _____

TREATMENT:

- | | | |
|--|--|--|
| <input type="checkbox"/> Supine with legs elevated | <input type="checkbox"/> Blister Care | <input type="checkbox"/> Albuterol Inhaler |
| <input type="checkbox"/> Oral Fluids | <input type="checkbox"/> Wound Dressed | |
| <input type="checkbox"/> NS IVF _____ L infused | <input type="checkbox"/> Ace Wrap | <input type="checkbox"/> Ice Pack |
| <input type="checkbox"/> Other: _____ | | |

Final Dispo Plan (check all that apply):

- | | | |
|--|--|---|
| <input type="checkbox"/> Continue participation | <input type="checkbox"/> Disqualified from further participation | |
| <input type="checkbox"/> Patient able to ambulate independently. | <input type="checkbox"/> Patient able to tolerate po | <input type="checkbox"/> Patient urinating normally |
| <input type="checkbox"/> Discharged to self | <input type="checkbox"/> Discharged with friend/family member | <input type="checkbox"/> Ambulance evacuation |

Provider Signature: _____

Date: _____



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Summary

- Majority of medical care provided is fairly minor
 - Blister care
 - GI distress
- Seems to be a trend for less medical care near the end of races
- Need for emergency transport is low but does happen

Restaurant Recommendations in the area



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- Casual food and Burgers- Lodge at Tahoe Donner, Burger-Me, Jax on the Tracks, Bridgetender
- Pizza- Pizzabar
- Sushi-Drunken Monkey
- Nice Italian- Pianetta
- Breakfast/brunch- Squeeze In, Coffeebar, Wild Cherries, Fire Sign cafe
- Mexican- Tacos Jalisco, Blue Agave