Competition Medical Handbook

For Track and Field and Road Racing

A Practical Guide

Third Edition

INTERNATIONAL ASSOCIATION OF ATHLETICS FEDERATIONS

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IAAF PRESIDENT'S MESSAGE

I am pleased to introduce this newly revised Third edition of the IAAF Competition Medical Handbook for Track and Field and Road-Racing Competitions – A Practical Guide.

The IAAF believes strongly that all competitions should be held under conditions which assure the safest and most healthful conditions for all participants.

This Handbook is the result of ongoing experiences in providing medical care at athletics, road-racing and race-walk competitions and has been updated to reflect this new information. I wish to thank all of those who were involved in the preparation of this handbook.

I am sure that the organisers of medical care will find this a valuable contribution to their medical care for athletes and all of those involved in their respective competitions.

Lamine DIACK
President, IAAF

FOREWORD

This is the third edition of the IAAF Competition Medical Handbook for Track & Field and Road-Racing Competitions.

It has been revised and updated in several areas, including the addition of an "Executive Summary".

The section on Road-Race Medical Management has been revised and updated by Dr. William O. Roberts, President of the American College of Sports Medicine to include information on the prevention and management of hyponatremia.

Again, special thanks to the many LOC Medical Directors for their provision of workload statistics and suggestions for improving the Handbook, as well as to the members of the IAAF Medical & Anti-Doping Commission for their valuable comments.

Juan-Manuel Alonso, M. D., Chair
Medical & Anti-Doping Commission

C. Harmon Brown, M. D. - Editor
Birgir Gudjonsson, M. D. - Editor

Principles and Ethical Guidelines of Health Care for Sports Medicine

The Medical Commission of the International Olympic Committee recommends the following ethical guidelines for physicians who care for athletes and sports persons (here after termed athletes). These guidelines have been established and are based on those drafted by the World Medical Association (World Medical Journal, 28.8, 1981; adopted by the 34th World Medical Assembly, Lisbon, Portugal, September/October 1981; amended by the 39th World Medical Assembly, October 1987, and the 45th World Medical Assembly, Budapest, Hungary, October 1993).

1. All physicians who care for athletes have an ethical obligation to understand the special physical and mental demands placed upon them during training for and participation in their sport(s).

2. It is recommended that undergraduate and postgraduate training in sports medicine be available to medical students and those doctors who desire, or are required, to provide health care for athletes.

3. When the sports participant is a child or an adolescent, the physician must ensure that the training and competition are appropriate for the stage of growth and development. Sports training and participation which may jeopardise the normal physical or mental development of the child or adolescent should not be permitted.

4. In sports medicine, as in all other branches of medicine, professional confidentiality must be observed. The right to privacy over relating to medical advice or treatment that the athlete has received must be protected.

5. When serving as a team physician, it is acknowledged that the sports doctor assumes responsibility to athletes as well as to team administrators and coaches. It is essential that, from the outset, each athlete is informed of that responsibility and authorises disclosure of otherwise confidential medical information but solely to specified and responsible persons and for the express purpose of determining the fitness or unfitness of that athlete to participate.

6. The sports physician must give an objective opinion on the athlete's fitness or unfitness as clearly and as precisely as possible. It is unethical for a physician with any financial investment or incentive in a team to act as team physician.

7. At sports venues, it is the responsibility of the team or contest physician to determine whether an injured athlete may continue in or return to the event or game. This decision should not be delegated to other professionals or personnel. In the physician's absence these individuals must adhere strictly to the guidelines established by the physician. In all cases, priority must be given to safeguarding the athlete's health and safety. The outcome of the competition must never influence such decisions.

8. To enable him/her to undertake these ethical obligations, the sports physician must insist on professional autonomy over all medical decisions concerning the health, safety and legitimate interests of the athlete, none of which can be prejudiced to favour the interests of any third party whatsoever.

9. The sports physician should endeavour to keep the athlete's personal physician fully informed of relevant aspects of his or her health or treatment. When necessary, they should collaborate to ensure that the athlete does not exert himself or herself in a manner detrimental to his or her health and does not employ potentially harmful techniques to improve performance.

10. The sports physician should be cognisant of the contributions to athletic performance and health from other sports medicine professionals, including physiotherapists, chiropodists, psychologists and sports scientists, including biochemists, biomechanists, physiologists, etc. As the person with the final responsibility for the health and well being of the athlete, the physician should coordinate the respective roles of these professionals and those of appropriate medical specialists in the prevention and treatment of disease and injury from training and participation in sports.

11. The sports physician should publicly oppose and in practice refrain from using any method which has been banned by the World Anti-Doping Agency (WADA), or which is not in accordance with professional ethics or which might be harmful to the athlete.

11.1 Procedures which artificially modify blood constituents or biochemistry.

11.2 The use of drugs or other substances, whatever their nature and route of administration, which artificially modify mental and physical ability to participate in sports.

11.3 Procedures used to mask pain or other protective symptoms for the express purpose of enabling an athlete to participate and thus risk aggravation of the condition, whereas in the absence of such procedures participation would be inadvisable or impossible.

11.4 Training and participation which is incompatible with the preservation of the individual's fitness, health or safety.

12. The sports physician should inform the athlete, those responsible for him or her, and other interested parties, of the consequences of the procedures he is opposing, guard against their use, enlist the support of other physicians and other organisations with similar aims, protect the athlete against any pressures which might induce him or her to use these methods and help with supervision against these procedures.

13. Physicians who advocate or utilise any of the above-mentioned unethical procedures are in breach of this code of ethics and are unsuited to act or be accredited as a sports physician.

14. The sports physician must never be party to any contract which obliges him/her to reserve any particular form of therapy solely and exclusively for any individual or group of athletes.

15. When sports physicians accompany national teams to international competitions in other countries, they should be accorded the rights and privileges necessary to undertake their professional responsibilities to team members when abroad.

16. It is strongly recommended that a sports physician participate in the framing of sports regulations.

Executive Summary

This document should be read for IAAF Competitions in conjunction with the IAAF Procedural Guidelines for Doping Control. The LOC is financially responsible for all provisions detailed hereunder and in the IAAF Procedural Guidelines for Doping Control.

Medical Committee

The LOC should establish a Medical Committee or Team, headed by a Medical Director. The composition and scope of the committee/team may vary with the size of the competition and the responsibilities assigned to other departments of the LOC.

Medical Director

The Director is ultimately responsible for all care provided at all official sites, venues and accommodation areas and should preferably be a member of the local community so as to obtain co-operation from community resources. The Director reports to and co-operates with the IAAF, the LOC President, and the IAAF Medical Delegate.

The Director's responsibilities include the following, but for major championships, an assistant should be appointed to take charge of the organisational aspects of the Medical Committee and to assist the Director in his duties:

1. the recruitment and supervision of the various medical personnel;
2. ensure adequate facilities, supplies and equipment are available for medical services at all official sites, venues and accommodation areas;
3. ensure the correct accreditation and licensure of medical staff, volunteers and the official Team medical personnel;
4. assist the LOC in obtaining liability insurance for medical staff and volunteers and the negotiation of an insurance contract to cover care and consultative services for all accredited personnel;
5. assist the LOC in developing a Medical budget;
6. prepare a medical information manual or document for Teams, IAAF Family and Media.

Staffing Guidelines

These recommendations provide approximate staffing guidelines for the minimal number of on-duty personnel needed to cover all official sites and venues during Track and Field championships:

Physicians	*- one per 100 athletes*
Physiotherapists	*- one per 30-50 athletes*
Massage Therapists	*- one per 50-75 athletes*

Staffing for ancillary facilities and spectator care will depend on the number of official sites, venues and accommodation areas. The pharmacy is to be supervised by a licensed pharmacist. The size and complexity of the supplies to be kept on hand are listed in the annexes of this Handbook.

Medical & Health Services

The goal is to provide health care and sports medicine services to all accredited athletes, team members, officials, media, IAAF Family members, volunteers and staff as well as to spectators through an organisation of local personnel and facilities and by working with accredited national teams' medical personnel. These services shall be available at all training sites and competition venues, including officials and team accommodation areas.

Duties of the Health Care Services include:

1. recruit and co-ordinate the utilisation of community medical resources, including emergency room and hospital admissions;
2. provide primary and emergency care to all above mentioned people at the various venues and areas of the Championships;
3. provide a helicopter landing site in the vicinity of the stadium in case of emergency evacuation;
4. provide other medical support services needed to ensure the safety and health of the aforementioned and of the spectators;
5. supervise pharmacy services and medication supplies;
6. establish liaison for specialty services and consultations such as imaging studies (i.e.X-ray, ultra-sound, CT, MRI, etc), laboratory services, dental and eye care (X-ray and dental services may be on-site at major Championships);
7. co-ordinate services with the hospital network and emergency services, including the development of a liaison system with admitting hospitals to

assure timely reports of hospital admissions, daily progress reports and hospital discharges;

8. supervise environmental health and safety at all official sites, venues and accommodation areas;
9. organise training sessions for the various medical care teams including those in charge of walk and road race events.
10. ensure that injections for athletes' treatments at IAAF competitions are only administered by medical personnel (certified doctors or nurses with medical prescriptions).

Location of Medical Care Sites

Medical services must be available at all official sites related to the competition and available to all accredited persons including teams' medical staff. The facilities to be provided at each site are detailed in this Handbook

Poly-Clinic / Central Treatment Area

This is the primary care centre for medical evaluation and treatment. If athletes are dispersed over several locations, a central location must be selected. The clinic should include treatment areas, examining rooms, offices and waiting area with all necessary equipment.

Athletes' Accommodation

Medical care must be established at all official accommodations, staffed by physiotherapists/athletic trainers during the day and evening hours, according to the schedule of the competition. Physicians should establish medical care hours and be available on-call for emergencies at all other times. Each Team with a medical staff should be allocated a separate room for medical care as part of the Team's housing allocation.

Other IAAF/LOC Official Hotels

At minimum, first aid should be available on site, with access to physicians "on call" at all times.

Training and Warm-Up Areas

Medical care must be available whenever these sites are in use, staffed by a physician and physiotherapists. Ambulance service should be available by phone / radio.

Spectator Areas

The provision of emergency care and first aid for spectators is a responsibility of the medical organisation. Community resources such as the Red Cross may be recruited to assist in this endeavour.

Main Competition Stadium

Medical staff must be available at least 1 ? hours before the start of the competition and remain until the competition is over. The medical areas provided must include at minimum, a pre-competition treatment area (near the call room), a triage/emergency area (with an ambulance stationed near-by) and the main treatment area. At major championships, 3-4 field emergency medical teams should be stationed at specific sites around the track. Full details on facilities, location and equipment can be found in Part I.

Road Race/Walking Events

Medical care requirements and facilities for road race / walking events are listed in detail in Part II. Scope of services include critical care, first aid, environmental illnesses, as well as the general medical problems associated with road running.

Experienced medical personnel must be present at all the aid-stations and at the finish line, in addition to the roving medical vehicles and first-response teams. Advanced life support emergency ambulance coverage should be available along the whole course up to the finish line.

Doping Control

For details on doping control, please refer to the latest edition of the IAAF Procedural Guidelines for Doping Control. As a guideline, the following are the minimum requirements requested by the IAAF for the Doping Control Centre but these must be adapted to the anticipated number of doping tests to be conducted.

Staffing

1. Doctors and/or doping control officers
2. Assistants to witness the urine collection
3. An appropriate number of trained chaperons for the athlete's notification
4. The staff, headed by the Doping Control Director, must be experienced in doping control procedures.

Laboratory

The **OM** may propose the accredited laboratory which will carry out the tests but the IAAF will make the final decision.

Facilities, materials, number of samples

1. A waiting room with adequate seating (10-20 people), a variety of refrigerated sealed drinks and, if possible, TV screens
2. An adjacent working room equipped with the necessary furniture for at least four people attending the sampling procedure
3. WCs adjoining the working room, preferably 2 toilets (male and female)
4. Sampling material approved by the IAAF Medical & Anti-Doping Commission and IAAF Doping Control forms
5. Reagent strips (or refractometer) for specific gravity determination
6. The samples, stored in the appropriate conditions, must be dispatched to a WADA/IAAF accredited laboratory as soon as possible after the doping control
7. Transportation back to the hotel must be available for the athletes and the IAAF Doping Control Delegate at the end of the control
8. The IAAF will notify the LOC in advance of the number of doping tests that should be carried out during the competition. The possibility of testing for Records should be considered and additional doping control kits ordered accordingly.
9. The tests carried out for National and/or Continental Record, will be charged at the IAAF rate to the Member Federation and/or the Area Group concerned. The LOC is responsible for all other costs related to doping tests, including EPO tests.

At the World Championships in athletics, it is compulsory that the IAAF Doping Control Delegate receives the results of the doping control tests the day after the samples are taken. A secure fax machine must be made available to the IAAF Doping Control Delegate for this purpose.

For other major championships, the IAAF would appreciate receiving the results in as short a delay as possible after the controls.

Insurance

Although the Member Federations are supposed to have their athletes and officials insured, the IAAF recommends that the LOC also takes out an insurance policy for athletes and officials, which would cover the care and hospitalisation costs of said athletes and officials in case of injury or accident.

Part I Medical Management for Track and Field Athletics Competitions

PART I

MEDICAL MANAGEMENT FOR TRACK AND FIELD ATHLETICS COMPETITION

I. THE MEDICAL COMMITTEE ORGANISATION

1. Mission

The mission of the Medical Committee is to provide primary and emergency care to athletes, staff, officials, volunteers, and "IAAF Family" members at all competition, training, and other event sites; to provide other medical support services needed to ensure the safety and health of athletes, staff, officials, volunteers, family members, and spectators; and to arrange for referrals where necessary to a higher level of health care.

2. Role in the Competition Organisation

The Medical Committee is only one of the many components of the meeting organisation which is necessary to conduct a successful competition. The members of the Medical Committee must integrate all aspects of their operation into the functions of the other departments if their mission is to be carried out successfully (see Figure 1-Medical Organisation.)

3. Scope of Services

The scope of Medical Committee responsibilities may vary with the size of the competition and the responsibilities assigned to other departments in the organisation. Factors which affect the scope of services depend upon the location, duration and type of competition, as well as the type and number of patients expected, and the nature of the incidents which are anticipated. Patient groups may include not only athletes, but also staff, officials, volunteers, IAAF "family" and VIP's, media, and spectators.

1. Sports medicine and general health care for athletes at training sites, competition venues, and housing areas.
2. First aid and emergency care for staff, volunteers, IAAF "family", media and spectators.
3. Integration of services with the Doping Control program.
4. Public health and safety surveillance

5. Coordination of services with the hospital network and emergency services
6. Establish liaisons for specialty services and consultations such as laboratory services, X-ray studies, dental and eye care. (X-ray and

The medical organization

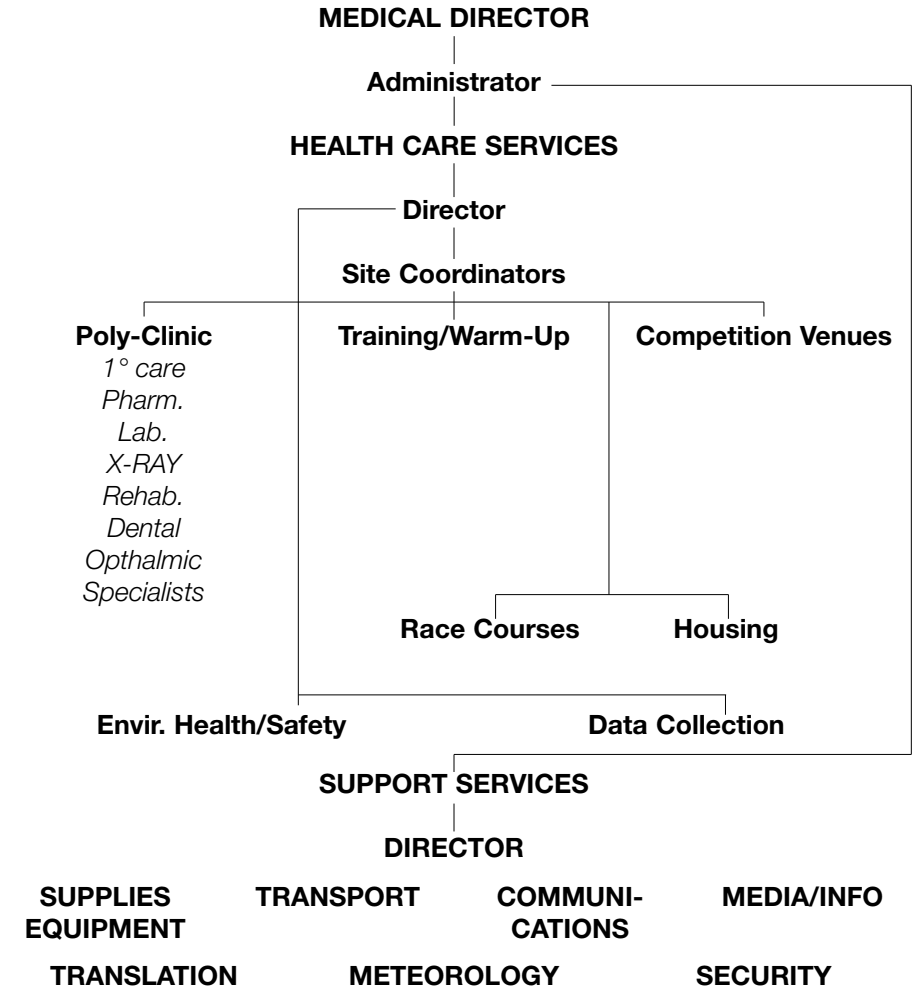


Figure 1

laboratory services may be on-site at major competitions such as the World Championships).

7. Maintain a record system for all incidents, illnesses and treatment services provided.
8. Meteorological surveillance and reporting of environmental conditions and stresses to the Medical and Technical Committees.
9. Maintain administrative liaison with the IAAF Medical and Anti-Doping Commission and the Medical / Doping Control Delegate. At major championships, assign a Commission member to serve as a liaison to the IAAF Medical/Doping Control Delegate.
10. Assign a Commission member to serve as a liaison with visiting teams' medical staffs.
    - Conduct an orientation session for visiting teams' medical staff, outlining available medical services and doping control procedures.
    - When feasible, conduct a sports medicine educational seminar for all medical personnel
    - Work with Security Services to facilitate access to medical areas for accredited team medical personnel when necessary for athlete care.
11. Provide emergency and urgent medical services at no charge to all eligible persons.

4. Medical Committee Organisational Structure *(see Figures 2 and 3)*

5. General Policies

1. The Medical Director is ultimately responsible for all care provided at each venue and housing area. The Assistant Director is responsible for the operational aspects of the Medical Committee. The Medical Director and the Assistant Director will share reporting duties to the Chair of the Organising Committee or to the person he nominates.
2. In cases of medical emergency involving an athlete or an IAAF "family" member, the venue medical officer will notify the Medical Director directly, in order to assist in coordinating transport, hospital admission, and notification of the patient's delegation.

3. For information and coordination purposes, the venue medical officers, polyclinic medical officers, hospital liaison officer, public health officer and other department heads will report to the Medical Director's office.

II. ADMINISTRATION

1. Medical Director

Qualifications :

For National or International competitions, the Medical Director shall be a physician with organisational and administrative skills as well as knowledge of sports medicine. For local or regional competitions, other health professionals who are knowledgeable in sports medicine may be utilised. The Director should preferably be a member of the local medical community, so as to be able to obtain cooperation from community resources. The Medical Director is responsible for the overall coordination of the medical organisation, and represents the Medical Committee of the Organising Committee.

Duties and Responsibilities

1.1 The recruitment and supervision of the various Department Heads;

1.2 Work with the Organising Committee to ensure that adequate facilities are available for medical services and that the health concerns of the athletes are represented;

1.3 Work with the IAAF Medical/Doping Control Delegate to ensure that all IAAF Rules and Regulations are met.

As the Medical Director may be a volunteer with other medical responsibilities, it is essential that there is a full-time staff administrator or an Assistant Medical Director present.

2. Assistant Director

Qualifications:

A sports medicine or health care professional with capabilities and experience in organisation and administration.

Duties and Responsibilities (see Figures 1, 2, 4 and 5)

The medical organisation

MANAGEMENT FUNCTIONS

POLICIES/ PROCEDURES	STAFFING	EQUIPMENT/ SUPPLIES	HOUSING/ FOOD	CREDENTIALS
ETHICS	RECRUITMENT	DONATED		LICENSURES
RX PROTOCOLS	*MD'S*	LOANED		STAFF
INJURY	*PHYSIO.*	PURCHASED		VISITORS
ILLNESS	*RN*			
WEATHER	MASSAGE			
HOSPITAL	SUPPORT			
ADMIT.	NUMBER			
	SCHEDULING			
	ORIENT & TRAIN		TRANSPORT/ PARKING	

Figure 2

The medical organisation

SERVICES

FIRST AID	PRIMARY CARE	SPECIALITY CARE	METEOR-OLOGY	DATA COLLECTION	ENVIR. HEALTH
		ON-SITE	*HISTORICAL*	*MED. REC.*	*FOOD*
		REFERRAL	*LOCAL*	*SUPPLY*	*WATER*
			AMBIENT	*STAT. ANALYSIS*	*ENVIR.*

Figure 3

2.1 Clerical/administration

Provide administrative support to the Medical Committee. Maintain records, prepare communication, provide clerical support to Department Heads in the organisation, and maintain records of meetings. Disseminate information and directives to Committee members.

Develop policies and procedures for all departments of the medical organisation for final approval by the Medical Director and Meeting Organiser.

2.2 Accreditation, Licensure, and Liability Insurance

a. Accreditation. Work with the Games Committee's Accreditation and Security Departments to accredit medical staff and volunteers, and the official medical personnel of visiting teams.

   Ensure that the accredited medical personnel of the visiting teams will have access to all medical treatment areas.

b. Licensure. All medical staff should be licensed to practice in the country or state in which the competition is held. Visiting volunteer staff and national teams staff should be provided with information necessary to obtain temporary licensure, as required by existing medical practice laws of the country / state

c. Liability insurance. All staff and volunteer medical personnel should have liability insurance, if that is the local standard of practice. Each person should be expected to have his own insurance, unless the Organising Committee wishes to fund temporary insurance for the duration of the competition.

d. Advise national teams medical staff of any government regulations required for the importation of medication and medical supplies and provide forms necessary to meet these requirements.

2.3 Finance

a. Obtain information from venue coordinators and Department Heads in order to develop a Medical Committee budget. Work with the Organising Committee Finance Department to establish a system for fund expenditure and accounting for purchases of supplies, equipment, and vendor and personnel payments.

b. Insurance. Work with the Organising Committee's business management to negotiate an insurance contract which will cover emergency care, hospital care and consultative services for all accredited personnel in the meeting.

2.4 Supplies and Equipment

Work with venue coordinators and department heads to develop supply and equipment needs. Determine whether these materials must be obtained by

purchase, or by loan or donation from local medical sources. Develop a purchase order system, in collaboration with the Committee's Supply Department

Develop a tracking system for those materials which are loaned or donated, so that they will be returned, or the donation acknowledged, as appropriate.

Medical/Management interactions

I

FINANCE	SUPPLY	SECURITY CREDENTIALS	TRANSPORT PARKING
BUDGET INSURANCE	EQUIPMENT SUPPLIES	SITES SUPPLIES CREDENTIALS STAFF/VISITORS	TRANSPORT AMBULANCE EMERG.VEHICLES PARKING PERMITS

Figure 4

Medical/Management interactions

II

COMMUNI- CATIONS-	VENUES	COMP. MGMT.	FOOD/ HOUSING	TRANSLATION	DOPING CONTROL
FIXED *MOBILE* *RADIOS* *CELL. PH.*	*MED. SPACES* *FIELD SITES* *EMER. TEAMS* *ENVIR. CONTROLS* *WATER* *SHADE/FANS*	*RULES.* *RESTRICT-.* *IONS.* *IN EMERG.*	*STAFF* *ENVIR.* *HEALTH*	*INTERPRET*	*POST-COMP* *FLOW*

Figure 5

2.5 Food and Housing

Work with the Food Services Department and the Support Services Chair to assure that meals and beverages are available for Medical and Doping

Control personnel. Be sure that meal services are adapted to the unique early and late work schedules of these staff members.
Work with the Housing Office to provide for the housing needs of Medical and Doping Control members, especially Medical staff who are scheduled for on-call emergency care during the night.

2.6 Information

Develop a medical information manual to include all medical services, pharmaceutical services, and doping control information to be provided to the Organising Committee, visiting teams, VIP's, "family" and media.

2.7 Medical Records

Develop appropriate medical record forms for injuries, illnesses, accidents, and other health-related contacts. Compile records of all medical activities from various sites, in order to prepare a Daily Medical Report for review by the Medical Director and other officials on a 'need to know' basis. Prepare statistical data summary of all medical incidents for future analysis. Provide information for insurance claims.In order to make valid comparisons among athletics events world-wide, it is strongly recommended that all medical encounters be classified using the International Statistical Classification of Diseases and Related Health Problems Tenth Revision (ICD-10). A sample record is found in the Appendix of Section I for track and field events, and in section II for road races / walk events.

2.8 Risk Management

In the event of an adverse outcome, such as death, a protocol should be in place for notification of family, and of the public through the press. The Medical Director or designated representative and the Competition Director or Chief Administrator should act as spokespersons, and all other personnel should refrain from discussing the case outside the immediate medical team. This protocol should be presented to all volunteers before the competition begins, and implemented when necessary.

III. HEALTH CARE SERVICES

Goal : Provide health care services to athletes, national team "families", media, officials and spectators through an organisation of local personnel and facilities and by working with accredited national teams' medical personnel.

1. Coordinator: Duties and Responsibilities

1.1 Staffing

The recruitment, orientation and deployment of all health care personnel, including physicians, nurses, physiotherapists/athletic trainers and massage therapists and ancillary staff. In larger organisations these tasks may be delegated to specialists in each field. The number of personnel depends upon the scope and duration of the competition and will be addressed under Workload.

1.2 Community Resources

a. Recruit and coordinate utilisation of community resources, including emergency room and hospital admissions.

b. Establish liaison for speciality services and consultations such as laboratory services, X-ray studies, dental and eye care. (X-ray and laboratory services may be on-site at major competitions such as World Championships).

c. Develop a liaison system with admitting hospitals to assure timely reports of hospital admissions, daily progress reports, and hospital discharges which should be given to the Medical Director, or whoever he nominates, and to team delegations where appropriate.

1.3 Pharmacy

Supervision of pharmacy services and medication supplies.

1.4 Environmental Health and Safety

Supervise environmental health and safety at all venues, including housing facilities, and training and competition sites. Work with local public health authorities and food services to ensure the sanitation of food and beverages.

Receive and act on reports of communicable and food-borne illnesses, in co-operation with local public health authorities, especially those infectious diseases manifested by a rash and fever (measles, rubella, varicella, etc.), gastro-intestinal illnesses, hepatitis, influenza-like illnesses, and sexually-transmitted diseases.

Plan for the isolation or hospital admission of individuals with communicable diseases.

Provide clearly-marked "biohazard waste" disposal containers at all medical sites, including visiting teams' medical treatment areas. Arrange for collection and disposal of contaminated medical waste.

1.5 Staff Training

Organise training sessions for the various medical care teams so that they are able to provide a prompt, coordinated response to a wide variety of medical emergencies, and operate emergency equipment correctly.

2. Scope of Services

Medical services must be available at all sites related to the competition. These include:

1. Athlete housing areas (hotels, dormitories, "village," etc.)
2. Training and warm-up areas
3. Competition venues
4. Spectator areas

2.1 Housing Areas

Medical care must be established at main housing areas, staffed by physiotherapists/athletic trainers during the day and evening hours, as dictated by the schedule and length of the competition. Physicians should establish "sick call" hours and be available on-call for emergencies. On-call emergency care should be available at other times.

2.2 Training and Warm-up Areas

Medical care should be available whenever these sites are in use, staffed by physiotherapists/athletic trainers. An emergency physician and ambulance service should be available by phone or radio.

At major competitions and championships a physician should be assigned as a part of the on-site medical staff.

2.3 Competition Venues

Medical care must be provided at these sites as described in the "Facilities" and "Staffing" sections. Medical staff (physiotherapists/athletic trainers, physicians) must be available at all warm-up and competition sites at least 1 1/2 hours prior to the start of competition, and remain until the competition is completed.

2.4 Spectator Areas

The provision of emergency care and first aid for spectators must be considered as a responsibility of the medical organisation when large numbers of “healthy persons” attend an athletics event.

Community resources such as the Red Cross may be recruited to assist in this endeavour.

An Advanced Cardiovascular Life Support system should be in place to provide care within five minutes when the stadium is at full capacity. There should be an ambulance service available to evacuate the patient to a critical care facility within 30 minutes.

First aid should be available at easily accessible, well-identified areas for the treatment of minor medical problems. (Ref’s. 1-9; Appendix III)

3. Staffing Guidelines

These recommendations provide approximate staffing guidelines for the minimal number of on-duty personnel needed to cover all of the venues during a major competition.

Physicians - one per 100 athletes

Physiotherapists/athletic trainers - one per 30-50 athletes

Massage Therapists - one per 50 - 75 athletes

3.1 Physicians

Physicians should be primary-care sports physicians able to care for a broad range of general health problems, as well as the management of sports related health matters.

Specialist in the fields of orthopedic surgery, general surgery, and emergency medicine should be available as regular medical staff or as on-call consultants.

3.2. Chiropractors

Chiropractors with experience in sports medicine are preferred.

3.3 Physiotherapists/Athletic Trainers

Use of licensed physiotherapists/athletic trainers with experience in sports medicine is required. Students may be used, but must be directly supervised by one of the above. The recommended ratio is at least one licensed therapist per four students.

3.4 Massage Therapists

Therapists trained in sports massage are preferred.

4. Workload

Poly-clinic - general medicine / sports care 40 - 60 visits/1,000 athletes/day.

Physio - therapy 40 - 50 visits / 1,000 athletes / day.

Massage therapy 40 - 50 visits / 1,000 athletes / day.

Stadium - small, variable work-load of acute injuries / illnesses; 5 - 10% of total.

Road race / race walking staffing: Refer to Part II of this manual.

Anticipate 1 - 2% heat casualties in races of 10km or longer, depending on weather conditions.

Staffing for ancillary facilities and spectator care will depend upon the number of venues required for training, housing of teams, officials, VIPs and media.

There is a paucity of information concerning the number and type of injuries and illnesses seen during major athletics competitions. Medical Directors are urged to maintain complete records, and to utilise record forms as illustrated in the Appendix to compile standardised information which should be included in the report to the Meeting Director and to the IAAF.

5. Site Coordinator

An experienced sports medicine professional should be appointed to supervise the medical function at each medical station. These personnel are the key to delivery of high-quality medical care.

Duties:

5.1 Supervise venue health care services.

5.2 Work with the Health Care Services Director to determine daily staffing needs.

5.3 Assign daily duties of all medical personnel.

5.4 Ensure adequate supplies and equipment for the station.

5.5 Coordinate requests for consultations with physicians.

5.6 Coordinate requests for ancillary support services, transportation, speciality referral, and E.R. and hospital transfers etc. to the Medical Director or whoever he nominates.

5.7 Ensure maintenance of complete medical records.

6. Pharmacy: Prescribing Guidelines

The pharmacy will be supervised by a licensed pharmacist. All attending staff physicians and visiting team physicians should be provided with adequate medication so as to provide optimal medical care. The size and complexity of the supplies kept on hand will vary considerably and will be determined by the size and number of teams and the duration of the competition (see Appendix I).

6.1 Medication should be dispensed only by a pharmacist or by a staff member of the local Medical Committee.

6.2. Only prescriptions from the staff physicians and accredited team physicians will be honoured.

6.3 Team physicians may only prescribe medication for members of their own delegation.

6.4 Physicians will make every effort to utilise medication which is on the medication list. For medication not kept on hand, the pharmacist will make every effort to obtain such promptly from a local source, with payment being made by the national team or patient.

6.5 Prescriptions should be written on a form provided by the organiser or on national team stationery. The prescription should contain:

Date, patient's name, country, ID number (if any); status (athlete, staff, etc.).

Drug name, strength, quantity directions for use.

Physician's printed name, signature, team, accreditation number.

Prescriptions should be written for a maximum of seven days' therapy.

6.6 Controlled Substances:

Prescriptions for controlled substances must be counter-signed by a local staff physician. Patients should be counselled by the prescribing physicians and advised by the pharmacist if the prescription contains forbidden or restricted medications before the prescription is given.

6.7 IAAF/WADA Banned Substances:

All banned medication should be kept separately, and clearly marked. The responsibility for using these substances will lie with the prescribing physician and the patient.

Banned substances should be avoided, unless there is no therapeutic alternative. All prescriptions should be counter-signed by a staff

physician. The pharmacist will counsel the patient that the medication is banned, and the patient will acknowledge this fact by counter-signing the prescription prior to dispensing.
Prescribing physicians must submit a TUE application to the IAAF Medical/Doping Control Delegate or other representative whenever a banned or restricted substance is administered, providing the athlete's name, I.D. number, country event, date, route and time of administration of the drug and quantity (dose).

IV. SUPPORT SERVICES

Goal: To work within the structure of the Championship Organisation to obtain appropriate support Services for the medical organisation to fulfil its responsibilities.

Administrator

Qualifications:

An individual with medical administration experience who is capable of working well with a wide variety of support personnel within the overall Organisation.

Duties and Responsibilities:

1. Communication:

1.1 Fixed stations - ensure telephone service between all fixed medical care facilities, including doping control station. Make sure that all phone numbers are in the Championship Directory or in the information package to all Teams.

1.2 Mobile service - arrange portable radios (walkie-talkies or cellular phones) for key medical personnel, especially Chairman, Department Heads, field facilities and staff and doping control station.

2. Transportation/Ambulances:

2.1 Pre-competition - Ambulances service or emergency vehicle transportation should be available on-call to all training venues, headquarters hotel, meeting sites, media headquarters, etc. This is

best arranged with community service organisations. Site and route maps should be provided to emergency ambulance personnel, as they may not be familiar with the training sites and access routes.
Ambulance services must be coordinated as part of the entir emergency response. The response time must be five minutes or less.

2.2 Competition :

2.2.1 Stadium

During the competition, an ambulance should be located as close as possible to the athlete emergency treatment station. Another ambulance should be placed near the spectator First Aid Station, if spectator care is part of the responsibility of the medical organisation. Ambulances should be capable of providing advanced cardiovascular life support (ACLS) unless a hospital emergency room is within five minutes.

2.2.2 Road Race/Walk Competition :

An ambulance should be at the finish line Aid Station and another should be moving along the race course behind the competitors.

All should be in communication with the finish line and course Aid Stations (see Section II).

2.3 Staff

Transportation (vehicles, motor pool, shuttle) and adequate parking spaces should be arranged for key staff, volunteers and IAAF medical personnel.

3. Coordination of Facilities

Adequate work spaces are essential for the provision of high-quality medical care. Medical care areas must be identified early on, in cooperation with the various venue managers, and adapted to the needs of the Medical Committee, if necessary.

3.1 Poly-Clinic /Central Treatment Area.

This is the primary care centre for medical evaluation and treatment. Many of the medical conditions seen here may not be sports-related,

but are of a general medical nature, including respiratory, gastrointestinal, and other illnesses. If the 'Village' is part of a university housing complex, the university health services facilities may be an ideal site for the Clinic. If athletes are dispersed in several housing areas, another central location must be selected.

The Clinic areas should include :

Waiting area for patients and accompanying personnel; clerical area for staff, records, and record storage; nursing triage area; physician offices and examining rooms; treatment areas for physio-therapy, with tables and therapy equipment; massage therapy area with tables.

Pharmacy (locked) for storing and dispensing medication and supplies.

Laboratory and X-ray services may be available on-site at large competitions, but may also be arranged through community resources. Dental and ophthalmology services may also be made available at major competitions.

3.2 Training Sites

Minor treatment areas must be established at each training venue.

These may be situated in a tent, trailer, or medical room of the training facility. Acute care for minor emergencies and limited care for sub-acute conditions should be provided. There must be telephone or radio contact to call for consultations or ambulance evacuation in case of emergencies.

National Teams medical treatment spaces should be provided for each visiting team, or access permitted to the regular treatment area if it is large enough.

3.3 Warm-up Area

This may be one of the training venues, and should be adequately staffed and equipped for minor medical care. It should provide separate work spaces for all national teams and their medical staff. Sufficient toilets should be provided, as well as water and a variety of refreshments.

3.4 Main Competition Stadium

3.4.1 Pre-competition treatment area.

A small area near the call (check-in) room may be established for last minute medical situations and massage. This will require minimal staffing. It may become of greater value and require

larger staffing during the multi-events, depending upon the stadium layout, and access to other medical care by these athletes.

3.4.2 Triage / Emergency Area

This area (often a tent) should be located close to the finish line, if the main treatment area is located at some distance from the field itself. There should be secured access from the field for rapid athlete evacuation. Staff should include a physician, physiotherapist/athletic trainer, and possibly a nurse. Basic equipment for the management of acute injuries, heat stress, and cardiac emergencies should be on hand. There must be communication with ambulance services, and with the Main Treatment area.

3.4.3 Main Treatment Area

This is the central treatment space for most acute injuries and illnesses seen during the competition. Ideally, it should be located near the finish line with security zones for rapid access into and out of the stadium, possibly near the post-competition "Mixed Zone." In this location, there may be no need for a Triage Area. There should be a large number of treatment spaces and tables, preferably curtained off for privacy.

3.4.4 Field Emergency Teams

At major competitions, 3-4 emergency medical teams should be stationed at specified sites around the perimeter of the track, so as to be able to reach injured athletes immediately. Ideally, each team should consist of a physician and a therapist, equipped with an emergency equipment kit and radios. An emergency vehicle (electric cart or ambulance) equipped with a stretcher, intravenous supplies, cardiac emergency equipment, and other emergency medications and supplies should be available immediately.

Locations of these teams and arrangements for immediate field access must be clearly arranged before-hand with venue management, competition management, the Technical Committee, and Security forces.

3.5 Spectator Care Areas

First aid stations should be strategically located throughout the stadium, clearly marked, and staffed by nurses and para-medics. In

addition, an emergency response system should be in place throughout the stadium, staffed by personnel with basic life support skills (CPR), and supported by a team of physicians who are trained and equipped to provide advanced cardiac life support.

3.6 National Teams Housing Medical Space

Each National Team with a medical staff should be allocated a separate room for medical care, as part of the team's housing allocation. This may need to be arranged as requested by each National Team's managerial staff.

3.7 Headquarters Hotels and Media Centre

First aid and minor treatment facilities should be make available on site. Alternatively, arrangements may be made through the on-call medical resources of the hotel or accredited persons may be taken to the Poly-clinic through the Organisation's Medical Care System.

Headquarters staff should be able to arrange or call for emergency transportation (ambulance) if necessary.

4. Supplies and Equipment

Responsibilities :

a. Manage requests for supplies and equipment .
b. Coordinate inventory, delivery, and removal of medical supplies and equipment.
c. Coordinate equipment repairs with site coordinators.
d. Assure that borrowed equipment is returned in good working order.

Furniture, supplies and equipment must be obtained for each medically related area. This will be determined by the size and scope of the meeting and spaces allocated for the medical services.

Supply staff must work with the Medical Services and Doping Control personnel to determine the needs in these areas. Consideration should include:

4.1 Medical Care Areas

Waiting room chairs, clerical desks, chairs, typewriters, record files. Examining room tables and chairs, examining equipment; therapy/massage tables; ice-making equipment (freezer); ultra sound and electrical stimulator; hot pack machine.

Minor surgery equipment (for suturing lacerations and removal of foreign bodies).

Fluids, containers and cups for training venues, warm-up areas, treatment area, field facilities, and technical officials.

Adequate cooled water, bottled water, and non-caffeinated drinks should be provided. Treatment supplies should include various dressings, bandages, tape, under-wrap, ointments, massage lotions, syringes, needles, alcohol wipes, as well as supplies and equipment for managing major emergencies, etc. (see Appendix II).

5. Translation Services

Arrange with the Organising Committee to ensure that adequate interpreters are available in medical care areas and the Doping Control Station.

6. Media Relations

Provide information to the media, within the rules of medical confidentiality. Refer queries or concerns to the Chairman or Assistant Chairman of the Committee.

7. Environmental Safety and Meteorology

7.1 Work with the Supply Department, Venue Management, and Competition Management to ensure that during competitions held in hot or cold weather, adequate shelters (tents, canopies, awnings, umbrellas, etc.) are provided for athletes and officials in the field events and multi-events, where prolonged exposure is likely to occur. Ensure that adequate water and glucose/electrolyte solutions are provided at each site.

7.2 Meteorology

Work with local meteorology sources to provide information on prior weather patterns, in order to assist competition organisers in developing the competition schedule.

Arrange to take hourly reading of temperature and humidity, or Wet Bulb Globe Index (WBGT) in order to assess possible heat stress for athletes, officials, and spectators. If adverse weather conditions develop, especially heat stress, periodic announcements should be made by the public address system, advising athletes, coaches, officials, and spectators of the need for preventive measures, especially frequent hydration and protection from solar radiation.

8. Security

Work with the Organising Committee to ensure that Security personnel are posted at key medical areas to control access. These areas include stadium emergency treatment, main treatment areas and doping control station. Security personnel must allow medical staff rapid access to competition venues in cases of emergency.

V. DOPING CONTROL

Goal : To carry out doping control procedures in accordance with IAAF Rules and Guidelines. For details, refer to IAAF Procedural Guidelines for Doping Control.

Chairman of the Doping Control Committee

Qualifications:

A physician who is familiar with the IAAF Rules and Guidelines concerning Doping Control.

1. Duties and Responsibilities:

1.1 Follow all IAAF Rules and Guidelines for Doping Control.

1.2 Work with the IAAF Medical/Doping Control Delegate and staff to determine the number of tests to be conducted. For domestic competitions, national Federation Guidelines should be followed.

1.3 Recruit and train an adequate staff of chaperons and doping station attendants. The size of staff will depend on the number of tests to be conducted.

1.4 Facilities - Work with the Supply Staff to obtain adequate supplies: fluids, ice, storage containers, television, reading material, furniture, etc.

1.5 Laboratory - Arrange for samples to be analysed at an IAAF-accredited laboratory. Laboratory management and personnel must be informed if the competition is an IAAF-approved international meeting which requires rapid analysis and reporting of results via IAAF channels. Laboratory staffing must be adequate to process the number of samples expected each day. If no local IAAF accredited laboratory exists, contact a courier for transportation of the samples.

1.6 Transportation - Work with the Transportation staff to arrange daily shipment of samples to the laboratory, by air, if necessary.

1.7 Security - Arrange for Security staff to be available at all times to prevent unauthorised entry.

1.8 Communication - Arrange for portable radio communication between the Doping Control station and the courier chief on the field.

2. Doping Control Station

The Doping Control Station should be located in a secure area, separated from other activities. The Station should consist of:

2.1 A waiting area with comfortable furniture, adequate ventilation, reading material, a television for viewing the competition, if possible, and a refrigerator or cooler for drinks for hydration of athletes (water, non-caffeinated soft drinks and juices; avoid caffeinated and alcoholic beverages). There should be adequate seats for athletes and the team chaperones.

2.2 A work room for sample processing including at least one or two tables, 6 chairs, lockable storage for samples and space for supplies. For major competitions, two separate work stations should be available.

2.3 Toilet facilities, separate for men and women, with adequate space for the athlete and an observer **of the same sex**.

VI. GENDER VERIFICATION

The LOC should have a team of experts in appropriate fields such as gynecology, endocrinology, and genetics available if a question of gender verification arises. **(See Rule 113).** Any decision made in connection with a competition is subject to review and revision after further consultation and must be reported to the IAAF Medical & Anti-Doping Commission for any necessary further action.

Part II Medical Management and Administration for Long Distance Road Racing

PART II

MEDICAL MANAGEMENT AND ADMINISTRATION MANUAL FOR LONG DISTANCE ROAD RACING

INTRODUCTION

With increasing numbers of runners in mass participation road races, medical complications ranging from minor exhaustion and musculoskeletal injuries to death from serious heat injury, cardiovascular collapse, and recently, hyponatremia have also multiplied. Medical problems encountered in road racing are generally of a minor nature but occasionally can be life threatening. Race promoters should plan for and provide adequate medical coverage to minimise these hazards. Even slight variations from an ideal exercising environment can rapidly increase the risk of both heat and cold related injuries, and both can occur in ideal conditions. While the incidence is rare, cardiovascular collapse and sudden death can occur in any climate, and preparations for rapid response to these emergencies must be incorporated into the medical response plans. Over the past decade, marathon and ultramarathon deaths have occurred from exertional hyponatremia, largely due to ingestion of too much fluid before, during, and immediately after the race. The International Association of Athletics Federations (IAAF) Medical Committee and the ***Endurance Interest Group*** of the American College of Sports Medicine have developed the following guidelines for administrators, sponsors, and medical directors of distance running events. The goal of this manual is to establish an outline of care to promote safe participation for road racing participants. Although the primary focus of the manual is marathon racing, the principles can be applied to any distance race event or mass participation endurance event.

Anywhere from 0.1% to 20% of runners seek medical attention as a result of road racing, largely dependent upon the weather conditions and the race distance. The shorter distance races of 5-15 km carry the greatest risk for heat injury in hot, humid conditions due to the metabolic heat load produced by the fast pace and the relative ease of entering the race without adequate conditioning and acclimatisation, while longer distance races incur more exercise associated collapse and hyponatremia. Cardiovascular deaths occur at all distances and on nearly any part of the course. Planning for adequate medical coverage based on anticipated conditions and race distance will help minimise the potential hazards to road race participants. The primary goal of the medical

team is to reduce injury to competitors by providing athletes the safest competitive environment available on race day and stopping the progression of concurrent injury during the event. As the knowledge base for endurance activities in the heat and cold increases, the liability to race organisations will rise if sensible modifications in event structure are not made to decrease risk to competitors. It may be noted that “elite” competitors may be able to tolerate more extreme environments than citizen racers, with less risk of physical injury, but this will be at the expense of performance. Every effort should be made on the part of the medical team and race administration to give every competitor a chance for the optimal performance.

OBJECTIVES

Optimum medical support for road race events should: (1) Minimise the potential hazards of road racing by scheduling events at the safest possible time of the year and day, and by modifying events in extreme conditions. (2) Organise the medical personnel, communications systems, equipment and supplies to swiftly handle medical emergencies. (3) Appropriately triage and manage the injuries and illnesses that affect competitors. (4) Educate runners by means of printed material in race packets and pre-race announcements to allow informed and rational decisions with respect to participation in an event given the environment, distance, and individual factors which affect risk on a specific race day.

Scope of Services

1. ***Critical Care.*** Equipment and supplies for obtaining vital signs, instituting basic cardiopulmonary resuscitation (CPR) and advanced life support (ALS) should be available in the roving medical vehicles, at major on-course medical stations, and at the finish line field hospital. Although the goal is to provide CPR within 4 minutes and ALS within 8 minutes of an emergency; participants and spectators often impede the medical team, and some race courses have remote sections that are difficult to access easily. This goal necessitates thorough course monitoring and efficient communications to roving medical and first response teams in vehicles and on bicycles. The critical care response teams should be prepared to evaluate and treat cardiac arrest, exertional heat stroke, hyponatremia, diabetic insulin shock, status asthma, and exercise or allergic anaphylaxis.

2. ***First Aid and General Medical Problems.*** Initial field care for major medical, minor medical, dermatologic, and orthopedic problems. Evaluate and treat environmental and exercise related medical problems like dehydration, hyperthermia, hypothermia, and exercise associated collapse; and problems associated with road racing, including allergic responses such as anaphylactic shock, hives, asthma exacerbation, and diabetic insulin reactions.

3. ***Special Problems.*** Facilities available for dealing with wheelchair athletes and other types of disability.

1. ADMINISTRATION

1. ***Personnel***

1.1 ***Medical Director.*** Each race should appoint a medical director, knowledgeable in the particular concerns and problems of runners, preferably a medical physician (MD, DO), with overall control of the medical operations. For races of less than 10K distance or 500 runners, a non-MD medical professional may serve as medical director if an MD/DO is available for advice. The medical director and medical team should be included in the insurance coverage of the race organisation.

1.2. ***Medical Personnel.*** a) physicians with experience and expertise in sports medicine and emergency medical care; b) nurses (RN) with critical care and/or emergency room experience; c) paramedics and emergency medical technicians (EMT); d) sports physiotherapists and physical therapists (PT); e) podiatrists (DPM); f) certified athletic trainers (ATC); and g) first responders. All of these personnel should be familiar with medical problems associated with runners and be recently CPR certified. Non-professional personnel with first aid training can serve as spotters for surveillance between aid stations and as transporters, assistants, and record keepers at the finish line. h) Non medical support personnel to act as recorders, transporters, and supply technicians. i) Massage therapists are used by many race organisations but are not a necessary part of the emergency medical team.

1.3. ***Staffing Requirements.*** The number of medical personnel required to adequately deliver medical care to a race will depend on the number of entrants and the injury rate of each individual race and can be calculated after 2-3 years of experience. As a general guide for recruiting the initial medical team, 5 to 10 medically trained and 4 to 6 non-medical support volunteers per 1,000 runners will adequately staff an event with “average” casualty rates. Races staged in hot, humid or very cold conditions will require a greater staff to runner ratio. An out-and-back course will require fewer personnel than a point-to-point or loop course.

2. ***Personnel Organisation***

a). Aid stations: Physician, RN, paramedic, and/or EMT. (PT, ATC, DPM, or massage therapist optional).

b). Roving medical vehicles: Physician, RN, paramedic, or EMT. Defibrillator or automatic defibrillator experience is helpful. Roving medical vehicles and mobile medical aid offer the best solution to rapid response to the collapsed athlete on a road course. The use of fully

equipped ambulances on the course is advantageous and increases the medical response capabilities.

c). First response teams: Defibrillator-equipped motorcycles or bicycles to have rapid access to the collapsed athlete with potential cardiac arrest. Operators must be trained in the use of the automatic defibrillator and the team must be integrated into the local emergency medical system. Several teams assigned along the course to follow the main pack and separated by 2-4 km will give rapid access to most of the runners.

d). Finish line personnel: a) A Triage Officer and team to direct the flow of casualties to the proper area for care. b) Field hospital personnel divided into medical care teams that can manage medical illness, dermatological conditions, and orthopedic injuries. Larger medical areas may separate the teams by injury or illness category, but the triage team must make appropriate decisions when directing the runners to the proper care centre. Non-medical staff should also be available for recording medical data, retrieving dry clothing, distributing census information to concerned parties, and general assistance.

3. ***Volunteer Education.*** A medical staff meeting prior to race day to discuss organisation of medical coverage, delivery of medical services, and the particular medical concerns of runners is very important to the overall function of the medical team on race day. When a formal meeting is not feasible, a written instructional handout may be substituted. A brief meeting on race day in each medical area can be used to update the staff and make on site adjustments to the medical care plan.

4. ***Medical Staff Identification.*** Distinctive identification markers including caps, arm bands, T shirts and/or "disaster" vests labelled with individual training level (physician, physio [PT], nurse, DPM, EMT, ATC) allows for easy recognition of the medical team by the competitors. Specific credentials may be necessary in large races to keep volunteers in their assigned positions. Races have used the general volunteer shirt labelled with "medical volunteer" or a designated colour shirt with the race and sponsor logos to easily identify the medical team.

5. ***Transport.*** Advanced life support emergency ambulance coverage should be available at the finish line and along the course. At a minimum, plan on one ambulance for races under 25 km and two for races over 25 km. As a general guideline, the goal of emergency response along the course should be to have first aid available within 4 minutes and emergency vehicle response within 8 minutes. Course configuration and access may dictate a greater number of vehicles or the use of "first response teams" on bicycles,

motorcycles, or motorised carts equipped with minimal supplies and automatic defibrillators. If longer response times are anticipated, the information should be published in the pre-race education packets.

Transportation for well drop-outs should be arranged so those who cannot complete the event due to fatigue or minor injury or illness do not become ill due to exposure after their race participation has ceased. Medical support vehicles should not be used as transportation for well runners who are unable to finish the race.

6. ***Public Authority Notification.*** It is essential to coordinate with local hospitals, emergency medical vehicles, fire fighters, and police. They must be notified of the race date, start and completion times, course route and intersection closures, and anticipated casualties. If the proposed course involves traffic lanes or intersection closures, permission and traffic controls may need to be arranged with local police, and proper permits obtained. The telephone-accessed emergency notification system should be used by the race volunteers when available.

7. ***Risk Management.*** In the event of an adverse outcome, such as a death, a protocol should be in place for medical confidentiality, notification of the family, and public comment through the press. The Medical Director or designated representative and the Race President or chief administrator should act as spokespersons, and all other race personnel should refrain from discussing the case outside the immediate medical team. This protocol should be presented to all volunteers before race day and implemented when necessary.

8. ***Supplies and Equipment.*** See Appendix I.

2. ENVIRONMENTAL CONSIDERATIONS

The potential for heat and cold injuries is related to environmental conditions of temperature, relative humidity, direct sun exposure, wind speed, and altitude plus individual factors of conditioning level, acclimatisation to heat, running pace, fluid intake, and type of clothing worn.

1. ***Race Day Selection.*** When scheduling a new event, avoid temperature extremes by choosing an environmentally friendly time of the year and scheduling the start and finish during the coolest part of the day for spring, summer, and fall months; and during the warmer parts of the day during winter in the temperate latitudes. When advising an existing race, make every effort to move starting times to the early morning hours to give the elite

competitors the coolest hours for optimum performance and the citizen runners a chance to finish before the temperatures start to drop in the late afternoon if race day is unexpectedly cool.

Reviewing the average high and low temperatures and relative humidity for a proposed race day from historical meteorological data will suggest the likely risk of environmental injury. The risk of heat injury rises above 21ºC (70ºF) and 50% relative humidity (Ref. 12). The odds ratio for medical illness rises in both the half and full marathon distances if the starting temperature is above 15ºC (60ºF) (refs. 33, 34). If the historical weather data anticipates an ambient temperature greater than 28ºC (82ºF) with a relative humidity near 100% in the coolest part of the suggested day, consider scheduling the race for a cooler time of the year. Mass participation races greater than 5K distance with anticipated high humidity and ambient temperature greater than 18ºC (65ºF) during the race require a start near sunrise or sunset. A similar guideline is optimal for elite competitions to maximise performance. In urban areas, it is important to consider the stored heat energy that accumulates in the streets and buildings during a hot, sunny day. If the year-to-year weather conditions are less than ideal, the race start time should be moved to the coolest part of the day. If the expected conditions at the coolest part of the day are in the higher risk ranges, the race date should be changed to a cooler part of the year. For cold-weather races, start times should be postponed to the warmer parts of the day in high-risk temperature conditions. If the weather information is not within acceptable risk ranges for the proposed start and finish times, regional and national federation officials should withhold sanctions for the race.

2. ***Race Day Modifications.*** The primary concern of the medical team is the health and safety of the competitors entered in an event. A hazardous (unsafe) condition protocol should be agreed upon in advance by the race administration and medical team. The ethical considerations of the medical profession require that the Medical Director act in the best interest of the competitors when making recommendations to the race administration. The responsibility of the race administration lies not only with the competitors but with the volunteers staffing the course who may also be at risk during hazardous weather conditions.

3. ***Cancellations.*** It is difficult to imagine cancelling a major mass participation event, especially when television and sponsors are involved. The influence of large financial sponsorships and the time constraints of television programming have an impact on the decisions made by race administration

which are separate from the medical and safety issues involving the medical team. The race administration may elect not to follow the medical recommendations based upon their constraints. In these circumstances, it is recommended that the Medical Director present the medical recommendations to the competitors prior to the start of the race to give the competitors the necessary information to reach an individual participation decision. There is very little question that a race would be postponed during a lightning storm or tornado, or cancelled for a hurricane. Extreme heat and cold stress are equally hazardous to the health and safety of the competitors, and event modification, including cancellation may need to be considered. A death due to heat or cold in a competition held in extreme conditions is a preventable occurrence and competitors depend on the race administration to act in their best behalf. A strong working relationship between the Medical Director and the Race Director will facilitate an intelligent analysis of the risks and the benefits of altering the event through postponement or cancellation. The liability for such decisions will most likely be shared by both parties if an adverse outcome is experienced during the event.

4. ***Medical Considerations.*** The medical team and event administration should be especially cautious of a warm race day following several days of cool weather or an extremely hot, humid race day which is preceded by one or more extremely hot days, as the risk of exertional heat stroke rises dramatically in these situations. In these cases, acclimatisation may not be ideal or the competitors may enter the competition dehydrated from the previous heat exposure. If the race day is unexpectedly hot and the decision is made to start the event, announce before the race that many runners will not be acclimated to the heat or fully hydrated, and will be at increased risk for collapse and heat stroke. In severe cold conditions, cautions for appropriate dress, hydration, and hypothermia and frostbite risk should be given in the pre-race announcements.

   The risk of heat illness increases above 21ºC (70ºF) and 50% relative humidity. The American College of Sports Medicine has suggested a temperature cascade for risk modification in endurance running events utilising the wet bulb globe temperature (WBGT) which measures the combined thermal stress from the wet bulb (WBT), dry bulb (DBT), and radiant energy or black globe (BG) thermometers. The WBGT = 0.7WBT + 0.2BGT + 0.1 DBT. Some authors have called the WBGT the Heat Stress Index (HSI). A corresponding colored flag system can be used to visually signal the thermal injury risk of current weather conditions to competitors.

5. ***Environmental Stress Indices.*** The WBGT and colour coded flags to indicate the risk of thermal stress are :

BLACK FLAG : Extreme Risk - When WBGT is above 28ºC (82ºF). Races should be cancelled, postponed, or modified if conditions exceed this level at starting time. If unable to cancel or modify the event, it may be prudent to advise the participants of the risks and advise no competition.

RED FLAG : High Risk - When WBGT is 23-28ºC (73-82ºF). This signal would indicate that all runners should be aware that heat injury is possible and any person particularly sensitive to heat or humidity should not run. Advise participants to slow pace and stress adequate, but not excessive, hydration.

YELLOW FLAG : Moderate Risk - When WBGT is 18-23ºC (65-73ºF). It should be remembered that the air temperature and radiant heat load will increase during the course of the race if conducted in the morning or early afternoon. Participants with high risk for heat stroke should withdraw from the competition.

GREEN FLAG : Low Risk - When WBGT is below l8ºC (65ºF). Participation should be safe, but this does not guarantee that heat injury will not occur, only that the risk is low. Both hyperthermia and hypothermia are likely to occur in this temperature range.

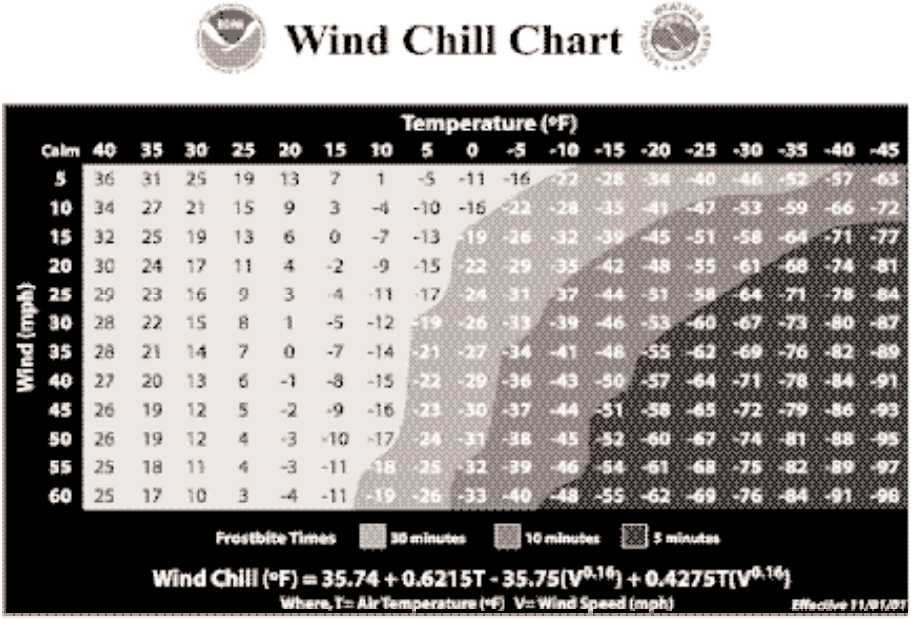
WHITE FLAG : Lower risk for hyperthermia, but increasing risk for hypothermia - When WBGT is below 10ºC (50ºF). Hypothermia may occur, especially in slow runners during long races, and in wet and windy conditions.

The dewpoint temperatures may be used as a guide when the WBGT is not available, but the dewpoint does not measure the radiant heat load from the sun and surroundings. Dewpoints (ºF) in the 60s are stressful, 70s are oppressive, and 80s are extremely dangerous for athletes competing at high levels of exertion. Another simple guideline for judging the level of heat stress is to add the ambient temperature in ºF to the relative humidity. If the sum is greater than 160, the conditions are very high risk and postponement, modification, or cancellation should be considered.

The temperature cascade developed for the military services may be a reasonable guide for elite competitions. This is an extremely high temperature range for racing and is used by the military to judge the safety of troops in training. It far exceeds the levels recommended by the American College of Sports Medicine for road racing in the heat.

WBGT (ºC/ºF)	**Military Guide** (Barthell 1990)
26/78	Caution for heat stroke
28/82	Discretion for unseasoned troops - no heavy exercise
30/85	Suspend exercise if < 3 weeks hot weather training
31/88	Curtail exercise if < 12 weeks hot weather training
32/90	Suspend all training and exercise

In cold conditions, temperatures less than 32ºF (0ºC) with wind chill require clothing precautions for hypothermia and frostbite. At temperatures less than -20ºC (-4ºF) consideration should be given to postponing races longer than 5K until later in the day, if warmer temperatures are expected. Snow and ice will be most “slippery” with temperatures in the -6 to 0ºC (20 to 32ºF) range and traction will increase as temperatures drop to colder levels. At lower temperatures, especially less than -29ºC (-20ºF) or wind chills less than -40ºC (-40ºF), it may be prudent to cancel all races.



3. RUNNER EDUCATION

1. ***Race Packet Instructions.*** Information regarding adequate training and preparation for the race, typical race conditions, condition specific risks, warm and cold weather self care, environmental heat stress warning system based on WBGT index using colour coded flags, fluid replacement, potential medical problems encountered during the run, and an outline of available race medical coverage should be included in the registration form, pre-race runners guide, or the pre-race packet. Inform the entrants in advance that they should not participate on race day if they feel ill or have just been ill. Many medical emergencies occur in people who have been ill, but do not wish to miss the start. If an entrant feels feverish, has been vomiting, has had severe diarrhoea, or has had any chest pains or discomfort, or otherwise does not feel well, it is unfair to the entrant, the family, and the race support staff to risk creating a medical emergency situation during or after the race. Instruct participants to wear appropriate clothes for the weather. On a cold wet day, a runner can become very cold if the pace is slow with low intrinsic heat production. A hat and gloves prevent heat loss and are easily carried. A polypropelene top will wick the moisture away from the skin surface and decrease heat loss. If it is hot, wear loose mesh clothing, start slowly, run in the shade, and drink fluids to replace sweat losses. Start the race well hydrated (urine looks pale yellow like lemonade) and drink regularly as fluid is lost “insensibly” and through sweating. This will help runners feel better late in the race, and may prevent cramping, heat illness, and collapse. Runners should not drink fluids in excess of the sweat rate as there is a risk of ingesting too much fluid and developing dilutional hyponatremia which can be fatal. This is most prevalent in slower marathon runners who require more than 4 hours to finish the race and drink excessively at each fluid station.

   A reasonable guideline is for runners to drink at least 10-20 ounces per hour (300-600cc/hr) to prevent loss of more than 2-3% of body mass in 3 –6 ounce portions every twenty minutes. Ideally, runners should learn their hydration needs during training by routinely weighing themselves nude immediately before and after runs to estimate fluid losses as a per hour rate. Runners should towel off sweat before re-weighing. An ounce or kilogram of weight loss requires an ounce or litre, respectively, of fluid replacement. Post race, runners should drink 16 ounces (480cc) of fluid for each pound of weight lost.

After the finish a runner should not stand about allowing the body to over-cool. Go straight to the clothing check area and change into warm dry clothing. Encourage runners to use the dry clothing transport system, get changed immediately, and then go to the reunion area, rather than expecting to find a friend with dry clothes in the reunion area. Foil or plastic sheets act only as windbreakers and do not have any insulating value.

Many of the major races around the world have more detailed pre-race information sheets which are available upon request and are not reproduced in this manual.

2. ***Medical Information***. Instruct the runners to print their name, address, phone number, any ongoing medical problems, allergies, and current medications and supplements on the back of runner entry number.

3. ***Pre-race Announcement.*** At the start, the announcer should state the current and predicted weather conditions (temperature, humidity, wind speed and cloud coverage) with resulting WBGT index or dewpoint, predicted high or low temperature, aid station location with fluids and medical personnel available, type of fluids offered, warm or cold weather self-care information and colour coded flag system for the current environmental heat stress level and where the flags will be displayed along the course if changes in the heat stress level are anticipated. The runners at increased risk from adverse conditions should also be warned at the start (e.g., the young, unfit, overweight, past heat victims, etc).

Pre-Race Announcement Outline

The following information should be announced by loud speaker at least 15 minutes and immediately prior to the start:

a. Current weather conditions including temperature, humidity, dewpoint, wind speed, and cloud coverage with predicted maximum (or minimum) temperature expected.

b. Resulting flag colour based on WBGT index with risks for hyper or hypothermia.

c. Location of aid stations with medical personnel and types of fluid available.

d. Emphasise importance of appropriate race fluid intake and the risks of ingesting too much fluid. Drink immediately post race until urine is pale yellow.

e. Explanation of warm or cold weather self-care.
f. Availability of medical coverage during the race.

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4. ***Medical Education.*** Consider pre-race seminars, runners' clinics, and local print and electronic media for additional dissemination of medical information.

4. RACE-DAY ORGANISATION

1. Start Area

1.1. ***Spectator and Vehicle Control.*** There must be adequate crowd and traffic control to allow for unimpeded flow of runner traffic.

1.2. ***Fluids.*** A 240 ml (8 oz) cup of water per runner for races less than one hour duration, and two 8 oz cups of water plus two 8 oz cups of carbohydrate-electrolyte solution per runner for races lasting longer than 1 hour should be available.

1.3. ***Adequate Toilet Facilities****.* Toilets or portable commodes should be provided for the runners. Be sure there are adequate facilities for the female participants. The providers of this service have charts to estimate the number of commodes necessary for an event based on the duration of the event, the number of expected participants, and the gender distribution.

1.4. ***Seed Times.*** Well-marked pace seeded areas will help runner flow at the start and help novice runners establish a reasonable pace, hopefully decreasing the dropout rate and need for medical intervention.

1.5. ***Dry Clothing Check and Transport.*** A clothing check system is essential for races under 21ºC (75ºF) to allow a change of wet clothing at the finish area. Clothing storage should be available for all races.

1.6. ***Health and Weather Announcement****s.* A pre-race announcement should be made describing the current and anticipated weather conditions; the race medical organisation including aid station locations, medical volunteer identification, and types of fluid available; and hot and cold weather self-care and hydration advice (See

discussion in the Runner Education Section). Ideally, weather records should be kept each year to better understand the race environment.

1.7. ***Heat Stress Flags.*** Color coded WBGT index flags for heat stress should be displayed prominently in the start area, if used, and announced in the pre-race weather announcement. For longer races like the marathon, flags can be placed at selected aid stations along the course to alert runners to changing conditions.

1.8. ***Hydration Assessment.*** Although somewhat impractical in large races, warm weather road races should consider providing accurate scales at the start for runner weigh-in and writing this number on the back of the runner's race number. Additional scales can be made available at course aid stations and the finish line to check for more than 3% loss of body weight and weight gains above the baseline. This is especially important and should be required for ultramarathons and 24 hour runs.

2. Course Management

2.1. ***Traffic Safety.*** Course monitors or marshals should be located at every intersection and change of course direction. Vehicular traffic should be detoured if possible or directed across intersections during breaks in the runner flow. An inadvertent vehicle on the course can lead to disastrous consequences for the runners and the race administration.

2.2. ***Crowd Control.*** At start and finish, cordon off the starting pens, the finish line area, and the finish line medical area to provide efficient flow of runner traffic. At the finish line, good security will allow an efficient flow of runners through the chutes, medical triage, cool down, fluid replacement, T-shirt pickup, dry clothing, and reception areas with easy transfer to the medical facility if necessary.

2.3. ***Communications.*** The use of amateur radio or citizen band (CB) radio-equipped spotter vehicles located at the start, aid stations, stationary points on the course, and finish line, or in roving medical vehicles, dropped out runner vans, and sweeper busses can speed the delivery of medical care. The suggested spacing for spotters is every 1 to 2 kilometres early in the course and every 200 to 400 meters late in the course and in high risk areas of the course. Report all medical problems to the medical communications director to implement an appropriate medical response. Spotters or bikers patrolling between aid stations

with radio communications should improve the response time to an on course emergency. In urban areas with telephone emergency systems every volunteer can become a medical spotter by identifying the nearest telephone and accessing the system to report an emergency on the course. Cellular telephone technology has made communication between race and medical officials much easier and should be used when available. A phone directory for the race printed on a small card distributed to all volunteers will speed communications via cell phone.

With the organisation outlined above, the structure of medical communications will allow for information regarding an injured or collapsed runner to be relayed by other runners, race course monitors or bikers patrolling between aid stations to the nearest radio or nearest aid station. Communications volunteers should be easily identified, and like the medical volunteers, can be outfitted with a special colour shirt for identification. Information can then be relayed to the medical communications director who can dispatch the nearest medical or pickup van to the scene. A finish line telephone or direct communication to emergency aid vehicles can act as a backup source of communication for medical assistance.

2.4. Vehicles

a) *Roving medical vans* equipped with a radio, medical personnel, and supplies adequate to deliver Advanced Life Support (ALS). The race aid vehicles should be supported by local emergency vehicles through the communications network. Medical vehicles should have access lanes to the course.

b) *Vehicles for runners who drop out of the event* should be equipped with communications equipment, fluids, and blankets. One vehicle can be used for most 10K races and a minimum of one vehicle per 2,000 runners per 20 kilometres is suggested for longer races (e.g., a marathon with 4,000 runners requires four pickup vehicles). One pickup vehicle should function as a trailing sweeper van to close the course. To decrease the response times for pickup of the dropped out runner, a large bus can be stationed at each aid station to use as a warming hut and drop off point for smaller vehicles which can sweep the course in small segments at rapid intervals.

c) *A radio-equipped supply van* should be available with additional medical and aid station supplies to replenish depleted stock.

2.5. ***Medical Evaluation of Impaired Runners.*** Medical evaluation of impaired runners should be allowed at the discretion of the medical staff, but should not result in automatic runner disqualification. Any authorised medical official has the authority to examine a runner who appears ill and to remove that runner from further competition, if in the official's opinion; it is in the runner's best interest for health and safety. The medical staff should evaluate runners who appear compromised and are not proceeding toward the finish without staggering or weaving; are not oriented to person, place and time; are not maintaining good running posture; or are not appearing clinically fit. Runners and medical staff should be informed in registration materials and pre-race announcements of the evaluation criteria, and that aggressive or emotional behaviour is an early sign of heat and cold injury which will be interpreted as such by the medical staff. Stopping the runner and checking rectal temperature, blood pressure, pulse, respirations, and mental state will allow for decision on medical disqualification and transport to Finish Line medical station or local hospital emergency facility. A medical evaluation does not disqualify a runner, and if medically warranted, the runner may return to the race.

2.6. ***Time Limits.*** Establish a reasonable time limit for competitors and volunteers and make transportation available to those who are not able to finish within the allotted time. (e.g., 6 hour marathon = 13-14 minutes/mile pace).

3. *Aid Stations*

3.1. *Type*

a) *Major aid stations* are equipped and staffed with the capacity to deliver the same care provided at the finish line medical station.

b) *Minor aid stations* are usually located in conjunction with water stations to provide comfort cares and minor first aid with the intent of transporting any serious medical condition to a facility equipped to deliver definitive care.

3.2. ***Location.*** Major aid stations are usually placed at high risk areas on the course which have high casualty rates or difficult access for evacuation. Minor aid stations should be located every 3 kilometres (2 miles) so runners can access fluids every 20 minutes and positioned 50-100 meters downstream from fluids. Very large fields may require more frequent water stations to assure fluid access, but runners and staff should be cautioned regarding excessive fluid intake.

3.3. ***Medical Personnel.*** Aid station staff should include an MD, paramedic, EMT, RN, or CPR trained first aid volunteers (DPM, PT, AT optional), communications person, and a recorder. The most qualified person should be in charge at each aid station.

3.4. ***Supplies.*** Aid stations should have available ice and small plastic bags, towels, petroleum jelly, blankets for races under 21ºC (70ºF), athletic therapist kit, and supplies for minor musculoskeletal injuries, chairs, cots and covered shelter (van or tent) beyond 25 kilometres (see Appendix 1 for a detailed supply list).

3.5. ***Fluids.*** 180-300 ml (6 to 10 oz) of water and appropriately mixed glucose-electrolyte replacement drink solutions per runner with cups totalling 1.5 times number of entrants for each fluid type should be provided at all water stations. Double this total if the course is out-and-back. Provide cups with lids and straws. Sponges are of no physiologic value for heat dissipation through evaporation and are an unnecessary expense if the budget is limited. Encourage drinking fluids instead of sponging.

3.6. ***Signs.*** Provide adequate signs notifying competitors of the fluid type and the location of medical personnel. Colour-coded flags describing current environmental heat stress can be located at each station or at a central aid station if marked changes in conditions are expected during the race.

3.7. ***Toilet Facilities.*** Portable toilets should be located at aid stations on course based on the number of entrants and the recommendations of the portable toilet vendor.

4. ***Finish Line***

4.1. ***Medical Facility Area.*** The medical facility should be located less than 100 meters downstream from the finish line. This will minimise the transport of runners who collapse in the post chute area and preserve the flow of well finishers.

4.2. ***Security.*** The area should be cordoned off and secured from spectators and media. Rigid barriers such as snow fencing are recommended. Credentials should be required to enter the medical area. Runners should be permitted to enter only if they are injured. An area for family or friends to wait for injured runners should be placed near the medical area.

4.3. ***Personnel.*** The medical staff should include a triage officer (for races over 1,000 runners), preferably a primary care or emergency room physician with special interest in sports medicine. Other physician staffing can include Family Practice, Emergency Room, Internal Medicine, and intensive care physicians from cardiology, pulmonology, and anesthesiology. A podiatrist and an orthopedic surgeon can be helpful with care of bone and joint problems. Critical care and emergency room nurses, physicians assistants, nurse practitioners, EMTs, paramedics and athletic trainers make up the remainder of the medical team. The number necessary to staff the medical area will be determined by the casualty rate of each race. For new races a guide would be to recruit 2-3 physicians, 4-6 nurses, and 4-6 other professional staff per 1,000 runners. Non-medical personnel including stretcher bearers, walkers, clothing fetchers, and recorders should total 4-6 per 1,000 runners.

4.4. ***Supplies.*** Finish-line field hospital supplies should include a large tent or adequate shelter from weather with heaters if cool weather is expected, or fans and ice immersion tubs if hot weather is expected; toilet facilities; lighting, electricity source or generator; defibrillator, cardiac resuscitation drug kit, intubation kit, oxygen tank and administration sets; hand washing stand; cots, chairs, blankets, towels; water in large containers, ice in plastic bags or ice chest; tables for medical supplies and equipment; stethoscopes, blood pressure cuffs, rectal thermometers including standard clinical thermometers, hyperthermia thermometers to 44ºC (110ºF) and hypothermia thermometers to at least 21ºC (70ºF); elastic bandages, inflatable arm and leg splints; intravenous fluids and administration equipment (supervision by a physician required); dressings, moleskin and adhesive dressings for minor musculoskeletal injuries (see Appendix 2 for a detailed Field Hospital supply list).

4.5. ***Injury Record Forms.*** Medical records will serve as a record of care for medicolegal purposes and allow for better planning for future races as injury rates are calculated and staffing and supplies are adjusted accordingly (see Appendix 3). It is important to record the meteorological conditions so injury rates based upon environment and entrant number can be estimated.

4.6. ***Fluids.*** Water or carbohydrate-electrolyte replacement drink with two to four 240 ml (8 oz) cups per runner. Fruit juices and soft drinks are

also acceptable post-race fluid replacements. A salty fluid like bouillon broth is a good initial fluid to improve hydration and replace salt losses.

4.7. ***Clothing Check***. Clothing should be easily accessible to the runners after the finish, especially in cool conditions to avoid post-race hypothermia.

4.8. ***Physical Layout of the Medical Area***. The layout of the medical area should allow for efficient movement and easy access from finish line, runners chutes, triage area, adjacent cool down or walking area with runner movement to the fluid replacement, clothing pickup and reception areas. The medical area can be divided by function into medical and skin, bone and joint sections. It is most efficient for delivery of care to group the casualties requiring intravenous lines in the same section of the tent. Emergency vehicle access should be arranged to allow unimpeded entrance and exit to the medical area.

4.9. ***Sweep Teams.*** Personnel should be stationed throughout the cool-down and reunion area to look for post-race collapse injuries.

4.10. ***Casualty Information***. An easily accessible injured runner list updated every 15 minutes and available to family in an information area will help allay the fears of relatives and friends of runners who have not been located in the reunion area. Runner numbers can be used for confidentiality, but are often not known by the family. Computerised check-in and check-out in the medical area speeds this process.

5. MEDICAL CARE SYSTEM

1. ***Overview***

Medical personnel should be familiar with the wide variety of medical situations which may be associated with road racing. Education in these areas should be addressed as part of a medical team orientation.

1.1. ***Exercise Associated Collapse (EAC).*** The most common medical problem will be the athlete who collapses at or after the finish. A simple

way to organise the medical team to evaluate and treat the collapse victim is to use the EAC protocol (see *Medical Protocols,* below).

1.2. ***Cardiovascular Collapse.*** Sudden death of cardiac origin occurs more frequently in runners with known heart disease and those with clearly defined risk factors. The risk of death from cardiac events at all ages during marathon competition is in the range of 1/100,000 finishers. Heat strain markedly increases the cardiac workload and ultimately increases the risk of cardiovascular collapse, especially when combined with dehydration. Warn runners of the risks on the entry form and with pre-race announcements. Advise competitors to seek medical clearance from their personal physician and to avoid "sprinting" to the finish line, especially if they are in higher risk categories. Pre-race medical questionnaires to identify high-risk runners are used by some race organisations, but are difficult to administer and enforce. A competitor's past medical history, current health problems, and current medications printed on back of the runner's entry number for immediate access during race is invaluable to the medical personnel on the race course.

1.3. ***Allergic Reactions.*** Asthma, hives, and anaphylactic shock are rare and if not controlled medically should preclude racing. The medical team must be prepared to handle these problems on an emergent basis and transport to established medical facilities if necessary.

1.4. ***Dehydration.*** Encourage fluid intake before, during and after the race in runner education material and pre-race announcements, but remind race staff and athletes that it is possible to get too much fluid which can be fatal. Runners should replace their sweat losses but should not assume that fluid replacement beyond the losses is beneficial. Fluid stations should be located to allow a minimum fluid intake of 200 ml (6 oz) prior to and every 15-20 minutes during the race. In very large events more frequent stations are advised to allow every competitor easy access to fluids. Fluids should be cooled to speed gastric emptying and intestinal absorption. Water alone is adequate for optimum performance up to 50 minutes of exercise and carbohydrate-electrolyte drinks benefit performance in exercise lasting >50 minutes. Maintaining the intravascular volume is the critical factor for thermoregulation (refs. 37, 38). Rapid rehydration after the race will speed recovery and decrease the incidence of post race collapse.

1.5. ***Hazardous Materials.*** The issue of blood-borne pathogens must be addressed by the medical team. The proper disposal containers must be made available for the medical delivery sites and the medical staff should be instructed in the protocol to be used by the event. At a minimum, sharp instrument and needle containers, red contaminated waste disposal bags, and medical exam gloves should be employed. Blood spills and needles should be handled carefully and disposed of promptly. Blood borne pathogens present another reason for securing the medical area from non-essential personnel, press, relatives, and friends.

2. Medical Protocols

2.1 ***Exercise Associated Collapse (EAC).*** The most common medical problem will be the athlete who collapses at or after the finish, but EAC is a diagnosis of exclusion. EAC is most accurately viewed as a symptom with many possible etiologies or diagnoses including post-exercise positional hypotension The basic differential diagnosis for a collapsed athlete is cardiac arrest (check for spontaneous breathing and pulse), exertional heat stroke (check for rectal temperature elevated > 40ºC [104 ºF] and altered CNS function), exertional hyponatremia (Na+ levels range from 110 to 130 mmol/L and may present with muscle cramping), and exercise associated collapse. A simple way to organise the medical team to evaluate and treat the collapse victim is to use the EAC protocol. The EAC protocol is a clinical system of classification and treatment for athletes who have collapsed during or after endurance activities. The athletes have a varied presentation with symptoms which do not reflect body temperature and usually recover rapidly. EAC is simply defined as a situation involving an athlete requiring assistance during or after endurance activity not of orthopedic or dermatologic origin; including post-exercise positional hypotension, exertional heat induced and associated injury, exercise exhaustion, exertion leg cramps, and hypothermia. Symptoms include exhaustion, fatigue, feeling hot or cold, nausea, stomach cramps, lightheaded, headache, leg cramps, and palpitations. Signs include abnormal body temperature, unconsciousness, altered mental status, CNS changes, inability to walk unassisted, leg muscle spasms, tachycardia, vomiting, and diarrhoea. The diagnosis is made with the presence of signs or symptoms and classified as outlined in the table. The major criteria include body temperature, mental status, and ambulation status.

Exercise Associated Collapse

	Mild	Moderate	Severe
Hyperthermic	T > 39.5ºC (103ºF) Any symptom or sign Walk with or without assistance Stable VS sBP > 100 HR < 100	T > 40.5ºC (105ºF) Walk assisted Vomiting Diarrhea Severe muscle spasm No oral intake sBP > 100 HR < 100	T > 41ºC(106ºF) Unable to walk CNS changes LOC Hyperventilation sBP < 100 HR > 100
Normothermic	36ºC (97ºF) < T < 39.5ºC (103ºF) Any symptom or sign Walk with or without assistance Stable VS sBP > 100 HR < 100	36ºC (97ºF) < T < 39.5ºC (103ºF) Walk assisted Vomiting Diarrhoea Severe muscle spasm No oral intake sBP > 100 HR < 100	97ºF (36ºC) < T < 39.5ºC (103ºF) Unable to walk CNS changes LOC Hyperventilation sBP < 100 HR > 100
Hypothermic	T < 36ºC (97ºF) Any symptom or sign Walk with or without assistance Stable VS sBP > 100 HR < 100	T < 35ºC (95ºF) Walk assisted Vomiting Diarrhoea Severe muscle spasm No oral intake sBP > 100 HR < 100	T < 32ºC (90ºF) Unable to walk CNS changes LOC Hyperventilation sBP < 100 HR > 100

The management protocol uses the following outline :

i. Diagnosis and documentation
ii. Fluid redistribution and replacement
iii. Temperature correction
iv. Fuel (energy) supply
v. Transfer or discharge

Diagnosis and documentation includes initiating the medical record; recording the presenting symptoms; medical history; vital signs including a *rectal* temperature, blood pressure, pulse, and respirations; mental status and orientation; walking status; other physical exam findings; treatment rendered; and treatment times. Tympanic membrane temperature analogs (aural canal thermometers), oral, and axillary measurements are influenced by shell temperature, are not accurate for core temperature assessment in athletes, and should not be used.

Redistribution of body fluid by placing the patient in the supine position with elevation of the legs and buttocks to restore pooled blood to the circulation is the most important initial intervention in the collapsed athlete. If ambulatory, assisted walking has been useful for speeding recovery in some patients. Oral fluids are the preferred method of rehydration in all mild cases and all moderate cases who can tolerate oral intake. Intravenous fluids are often required in the severe classes and in moderate cases not responding to oral fluids or in those unable to tolerate oral fluids. The recommended oral fluids include simple sugar-electrolyte drinks, fruit juices, water, and soft drinks. Intravenous fluids may be indicated in athletes who are clinically dehydrated. The recommended intravenous fluids are dextrose 5% - normal saline or normal saline for all events. Lactated Ringer's contains K^+ and probably should be avoided until the serum K^+ is known and lactate should not be used in hypothermic casualties. Hyponatremia occurs in marathon and longer races, usually in slower runners who require more than 4 hours to finish, and may be a reason for poor response to initial conservative treatment and a reason to transfer a casualty who is not responding to the usual treatment protocol. If possible, a sodium analyser should be utilised to assess sodium levels before starting an intravenous drip unless the runner is obviously dehydrated. IV fluids should not be given to athletes who have severe headache, confusion, or seem puffy in the hands and feet until normal serum sodium is documented on site or in an emergency facility.

Temperature correction, maintenance, and suggested medical interventions in the following outline:

a. Hyperthermic EAC

i.	Move to cool or shaded area
ii.	Remove excess clothing

iii. Active cooling (temp > 40.5ºC [105º F]; cooling at lower rectal temperatures may be indicated for mental status changes)
  (1) Ice water tub immersion (most effective for rapid cooling)
  (2) Ice packs in neck, axilla, & groin
  (3) Fan sprayed, atomized mist

iv. Control continued muscle contractions to stop endogenous heat production
  (1) Neuromuscular inhibition techniques
  (2) Medications
    (a) Diazepam 1-5 mg by slow IV push
    (b) Magnesium Sulfate 1-5 grams by slow IV push

v. Monitor temperature every 5-10 minutes
  (1) Prevent missing delayed temperature rise
  (2) Assess efficacy of treatment
  (3) End active cooling at 39ºC (102ºF)
  (4) Monitor for rebound or overcooling

vi. Pre-cool IV fluids

vii. Consider intravenous dextrose 50% in water

viii. Leg cramp protocol
  (1) Fluid and fuel replacement
  (2) Prolonged stretch to full muscle length
  (2) Assisted walking
  (3) Avoid massage until well hydrated
  (4) Consider diazepam 1-5 mg IV
  (5) Consider Mg^{++} Sulfate 1-5 gr IV

b. Hypothermic EAC

i. Handle gently

ii. Move to warm area

iii. Remove wet clothing
  (1) Clothes dryer

iv. Dry skin

v. Insulate with blankets
   (1) Pre-warm
   (2) Clothes dryer

vi. Breath warmed, humidified air
   (1) Bennett respirator
   (2) Bird respirator

vii. Warm packs in neck, axilla, & groin
   (1) Hot water bottles
   (2) Warmed IV bags

viii. Pre-warm IV fluids

ix. Monitor temperature at regular intervals

x. Walk to generate intrinsic heat
   (1) T > 35ºC (95ºF)

xi. Consider IV dextrose 50% in water ($D_{50\%}W$)

c. Normothermic EAC

i. Maintain temperature

ii. Monitor temperature if not improving
   (1) Delayed hyperthermia
   (2) Post-race hypothermia

Fuel supply for energy replacement can be accomplished with the following fluids; oral glucose solutions, intravenous glucose solutions with dextrose 5% in the stock IV solutions; and with dextrose 50% in water ($D_{50\%}W$) 50 ml by IV push. Blood glucose can be measured from the great toe or ear lobe prior to administering D50%W or if hypoglycemia is suspected. Change to IV NS if the blood glucose is elevated above normal levels.

Transfer to an emergency facility should be considered if a casualty is not responding to usual treatment, if a severe casualty is not responding rapidly, and if any previously agreed upon automatic transfer criteria are met. Discharge from the race medical facility can occur when the runner is clinically stable and normothermic. Discharged patients should be instructed in fluid and energy replacement, criteria for re-evaluation if a change in status occurs, and a follow-up exam should be recommended for severe casualties.

2.2. ***Exertional Hyponatremia.*** Athletes who ingest more fluid than lost through sweating or who lose excessive salt in the sweat can dilute the serum sodium to dangerous levels and develop cerebral and pulmonary edema. Athletes should be encouraged to replace their sweat losses, but never to drink as much as possible. Exertional hyponatremia should be suspected in the marathon when a collapsed or ill runner has a finish time > 4 hours; a high fluid intake, usually water with "two full glasses at every water stop;" is not acclimated to current temperature and humidity; complains of or presents with weight gain, muscle cramps, progressive headache, dyspnea, feeling of "impending doom" or "not feeling right"; and is lightheaded, dizzy, nauseated, vomiting, "puffy" from water retention, confused, ashen-gray in appearance, convulsing, or obtunded. Blood pressure, pulse, and respiratory rate are usually normal in the early stages. The serum Na^+ is < 130 mmol/L in most symptomatic cases, and the mean Na^+ in obtunded patients is 121±3 mmol/L with a range of 111 to 127 mmol/L (Aryus, 2000). The hematocrit is decreased in over hydration and increased in dehydration (salt loss type).

Treatment of hyponatremia often requires hospitalisation; however, runners who are clinically stable may be treated on site. Frequently the athlete with a serum Na^+ of 125-130 mmol/L and clinical signs of dehydration may be treated with IV normal saline in the medical tent, if the serum sodium levels can be monitored. If the initial Na^+ level below 130 mmol/L and the athlete is fluid overloaded; allow natural diuresis to remove excess water with close observation if asymptomatic, and if symptomatic, combine hypertonic saline and diuretics to slowly correct the water intoxication over 24-48 hours in a hospital setting. Remember that too rapid correction has the potential to cause osmotic demyelination although this catastrophic outcome has not been documented in exertional hyponatremia.

2.3. ***Cardiac Arrest.*** If cardiac arrest occurs, the chances of survival are low in the marathon, especially in the last 15 km of the race. Cardioversion should be attempted as soon as the cardiac rhythm is determined and repeated as needed. Substrate repletion with 50% dextrose in water, high dose intravenous epinephrine(5-10 mg), and sodium bicarbonate should be considered early in the resuscitation effort. The use of

automatic external defibrillators, bretylium, amiodirone, and other cardiovascular medications may improve the outcomes.

2.4. ***Anaphylaxis.*** Subcutaneous epinephrine should be administered as soon as possible. This can be followed with intramuscular or intravenous diphenhydramine (50 mg).

2.4. ***Hypoglycemia.*** Hypoglycemia may occur in a diabetic athlete and present as sweating, tremor, mental confusion and combativeness. Treatment is outlined above for restoring energy supplies.

2.5. ***Skin.*** Blisters and blood blisters should not be opened. If the lesion is on a pressure area or is very tense, it may have to be drained. Prep the area with alcohol or betadine. Puncture the edge of the blister and drain it. Make several openings in the blister roof, but do not remove the skin. Cover with antibiotic compound and a sterile bandage or blister pad. If the athlete wants to continue running, a low friction tape will decrease the shear stresses on the blister area. Suggest follow-up care.

Subungual fluids may be drained dorsally through the nail plate by use a heated needle or drilling through the nail with an 18-22g hollow bore needle.

LONG DISTANCE / ROAD RACE SUPPLEMENT

APPENDIX A.

Equipment suggested at aid stations (estimated amounts per 1,000 runners; actual numbers will vary based on injury rates and field size)

No.	Item
	Ice in small plastic or ziplock bags
1	Stretcher (2 at 10 miles and beyond)
1	Chair (2 at 10 miles and beyond)
2	Blankets - wool or cotton (especially beyond 10 miles)
2 each	6 in. and 4 in. ace bandage
	One package 4 in. x 4 in. gauze pads
	2 rolls each 1 in. and 1 1/2 in. porous athletic tape
1 box	Elastic adhesive bandages -regular size
1 box	Moleskin
1 each	Surgical tape
1	Scissors
1 container	Petroleum jelly / skin lube
	Athletic trainer's kit
1 box	Hand towels and/or wet wipes
1 box	Garbage bags (use for cleanup and for windbreakers for dropouts) or mylar/plastics sheets
1-2	Albuterol MDI
1 box	Lancets or sterile needles for I&D of blisters
1 box	Alcohol or betadine preps
1 box	Latex exam gloves
1 box	Tissues
1 box	Feminine pads

APPENDIX B.

Equipment needed at Field Hospital (Suggested amounts per 1,000 runners for a marathon with average finish time of 3.5 hours in cool conditions. Larger fields that are more spread out will not require the same quantity as the casualties will be not be as concentrated.)

No.	Item
200 sq ft	Tent(s)
5-10	Cots
1-2	Stretchers or wheelchairs
20	Blankets
5	Intravenous setups with D5%NS and NS
50 lbs	Ice
30	Plastic or ziplock bags
3 rolls	1 in (2 cm), and 1/2 in (1 cm) tape
5	4 in (10 cm) and 6 in (15 cm) elastic bandage wrap
20	4x4 in (10x10 cm) gauze pads
30	adhesive bandages-regular size
2	Surgical soap containers
20	Lancets or sterile needles for I&D of blisters
40	Alcohol or betadine preps
100	Exam gloves
1	Small instrument kit
5	Rectal thermometers (range to 46ºC or 115ºF)
1-2	Hypothermic thermometers (range 20ºC or 70ºF)
20	Cotton towels
100	8 oz (250 ml) cups
2	Tourniquets
3	Blood pressure cuffs
3	Stethoscopes
3	Emesis basins or airline emesis bags
1	Crutches
1 box	K-Y Jelly-l oz.
5	Blood glucose strips
2	Albuterol MDI
1	Diazepam 5 mg IV prefills
10	Acetaminophen 325 mg
10	Benadryl 25 mg
2	D50%W
1	ACLS Drug Kit

In each tent

1	Glucose meter
1	Autolet
1	Serum sodium analyser
1	Inflatable splints - arm and leg

1	Oto/ophthalmoscope
1	Oxygen tank with regulator and mask
1	ECG monitor and defibrillator
1-2	Electric fans or heaters as indicated
1	Portable washstand or liquid hand disinfectant
1	Hot and cold water supply
1	Generator or electric source
1	50 gallon trash can with drinkable water
1-2	Sharp medical waste container
1-4	“Red bag” hazardous medical waste containers
1	Portable toilet (near tent)

In finish area

2 or more	Advanced life support ambulances
1 or more	Automatic external defibrillator

ROAD RACE / WALK

APPENDIX C.

Injury Record Form: This form can be printed on 2 sides of an 8 1/2" X 5 1/2" heavy paper card.

(side 1)

TWIN CITIES MARATHON MEDICAL RECORD - CONFIDENTIAL

Date _____

Race # _____ **Location:** Finish / Aid Station Mile _____

Arrival time_____ Name _____

Discharge time_____ Age_____ Gender M / F

Finish Time _____ Best previous time _____

Previous marathons: Entered _____ Finished ____ Weekly Mileage _____

Pre-race injury/illness: Y / N Describe _____

Medical History: _____

Symptoms:	Exhaustion Fatigue Lightheaded Hot Cold
Mobility:	Independent With assistance Wheelchair
Mental Status:	Alert Confused Unresponsive
Neuro symptoms:	Headache Syncope Weak
Orientation:	Person Place Time
Cardiac symptoms:	Chest pain Tachycardia Palpitations
Resp symptoms:	SOB Wheeze Cough
GI status:	Nausea Vomiting Diarrhoea Stomach cramps
Muscle cramps: Y / N	Location: Calf Thigh Abdomen Back
Skin:	Hot Cold Sweaty Dry

Other: _____

Lab: O_2 Sat (ra) % **Na^+** **K^+** **Hct**

Time	Temp (rectal)	BP	Pulse (r/ir)	Glucose	Meds/Rx/Additional labs

PO Fluids: _____ **IV**

Fluids: **IV #1** 1L D_5NS **IV #2** 1L D_5NS or NS **IV #3** 1L D_5NS or NS

D_{50}W: #1____ #2_____

Discharge status: Home / ER transfer (ER Follow-up: Admit/Home)

Notes:

Diagnosis

EAC: Hyperthermic: Normothermic: Hypothermic - mild / mod / severe

Exercise Assoc Cramps **Other:** _____

Signature: _____ **MD 8**Wm Roberts MD

Signature: _____ **Athlete**

(side 2)

Race # _____ Arrival Time_____ Discharge time_____

Skin, Bones, &Joints

Complaint: Pain Blister Abrasion Bleeding Swelling

Other _____

Tissue: Skin Muscle Tendon Ligament Bone

Other _____

Location:				
	Toe	R / L	Knee	R / L
	Foot	R / L	Thigh	R / L
	Ankle	R / L	Hip	R / L
	Calf	R / L	Back	R / L

Other _____

Diagnosis:		
	Blister	Abrasion
	Sprain	Tendinitis
	Strain	Stress Fx (suspected)

Other _____

Notes _____

_____

Treatment:	**Musculoskeletal**	**Skin**	**General**
	Ice pack	Prep	Fluids
	Compression	Lance	D/C instruction sheet
	Elevation	Bacitracin	
	Stretching	Dressing	
	Massage		
	Phys Rx		

Other _____

Treatment Refused

Signature: _____ **MD/DPM/RN/EMT**8Wm Roberts MD

Signature: _____ Athlete

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– William O Roberts MD, President, American Road Race Medical Society, Medical Director of the Twin Cities Marathon, Minneapolis-St Paul, MN 2002

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Greg Ewert MD, Medical Director of the Chicago Marathon, Chicago, IL

Scott Pyne MD, Medical Director of the Marine Corps Marathon, Washington, DC

In memory of:
Andres Rodriguez MD, Past Medical Director of the New York City Marathon

Appendices

APPENDICES

Appendix I. Medication Supplies

1. **Anti infective agents**
   Antibacterials - oral and systemic
   Anti-fungal - oral and topical
   Anti-viral - oral and topical

2. **Anti-histamines**

3. **Central Nervous System Agents**

   a. Analgesics, Anti-pyretic and Anti-inflammatory (Acetaminophen, Salicylates, NSAID's, Morphine and Pentazocine for emergencies).

   b. Anxiolytics, Sedative - Hypnotics, Diazepam, flurazepam, etc.

4. **Electrolyte and Fluid Balance**
   Calcium gluconate
   Sodium Chloride 0.9% in Water
   Sodium Bicarbonate injection (1gm/20 ml)
   Dextrose 5% in water
   Dextrose 50% in water

5. **Eye, Ear, Nose and Throat Preparations**

   a. Anti-bacterial
   Ophthalmic solution and/or ointment
   Otic solution

   b. Anti-inflammatory
   Ophthalmic ointment; nasal aerosol

   c. Vasoconstrictor
   Oxymetazolone nasal spray

   d. Expectorant/Anti-tussive
   Dextromethophan

6. Gastro-intestinal
Antacids
Anti-diarrhoeal
Stool softeners
Histamine (H2) antagonist

7. Hormones and Synthetic Substitutes

a. Cortico-steroids
Beclomethasone nasal aerosol
Methylprednisone - depot form

b. Oral contraceptives

8. Local Anaesthetics
Lidocaine (for local injection only)

9. Skin and mucous membranes

a. Anti-cholinergic
Atropine; belladonna alkaloids

b. Sympathomimetic Agents
(i) Epinephrine - for anaphylaxis, cardiac arrest
(ii) Salbutamol aerosol

Appendix II. Supplies and Equipment

Tape
4 cm
2.5 cm
2.5 cm elastic tape
5 cm elastic tape
7.5 cm elastic tape
under wrap

Suture Supplies
suture sets w/tape envelopes
disposable suture sets
3-0, 4-0, 5-0, 6-0 polypropylene sutures

4-0, 5-0, 6-0 vicryl, chromic gut
suture removal sets
sterile gloves
sterile towels
eye drapes
sterile saline
instrument germicide
instrument trays
alcohol preps
betadine preps
60 mm & 30 mm steristrips
Xylocaine 1% with epinephrine

Pharmaceutical Supplies

Assorted prescription and non-prescription medications needed by physicians - additional list (see Appendix I).

Record Keeping

Pharmaceutical record forms
injury/illness forms
treatment forms
referral forms
insurance forms
prescription pads
banned substance list
"safe" substance list
drug information booklets
prescription/non-prescription
clipboards
pens/pencils/markers/hi-lighters
tape - packing/mending
stapler
file folders
post-it notes
note pads
legal pads

Chemicals

skin lube
analgesic lotion

athletic lineament
massage lotion/oil
tape adherent
powder
ammonia inhalants
isopropyl alcohol
tape remover

Syringes/Needles

TB syringes w/needles
3 ml syringes w/needles
5 ml syringes w/o needles
20 ml syringes w/o needles
needles, assorted gauges

Diagnostic Instruments

oto/opthalmoscopes
stethoscopes
sphygmomanometers
reflex hammers
neurological pinwheels
tuning forks
nasal specula
ear syringes
ear curettes
vaginal specula
electronic thermometers w/probe covers
rectal thermometers; or
tympanic membrane thermometers
lab supplies

Treatment Modalities

Cardiac and respiratory monitor
Cardiac defibrillator and resuscitation equipment
(Laryngoscopes, endotracheal tubes, various adult sizes)
Hydrocollator w/covers
ultrasound
galvanic muscle stimulator
respond II muscle stimulators

quadriflex muscle stimulators
TENS units
phoresor units w/electrodes
pression unit w/sleeves
ice tubs
small basins
emesis basins
portable whirlpool

Miscellaneous

felt padding
rolls 125 mm vinyl foam
rolls 30 mm adhesive foam
7.5 cm x 7.5 cm adaptic dressings
large dermicel pads
XL band-aids
ointment tins
betadine solution
moleskin
topper sponges
cotton swabs
cotton balls
plastic bags
prep razors
KY jelly
eye-aid eye wash
aspirin
tylenol (acetaminophen)
pill envelopes
assorted foam
60 mm adhesive foam
Steripads
7.5 cm x 20 cm adaptic dressings
2.5 cm band-aids
bacitracin ointment
betadine scrub
hydrogen peroxide
packages 2nd skin

tongue blades
back plasters
#15 sunscreen
scalpel, #11 & #15
exam gloves
flexible collodion
paper towels
150 ml paper cups
300 ml paper cups
electrolyte drink

Non-Expendable Items

thermometers w/cases
air splints
spine boards/scoop stretchers
15-litre coolers
30-litre coolers
1-litre squeeze bottles

universal knee mobilizers
Air-cast standard ankle brace, right
Air-cast standard ankle brace, left
Air-cast training ankle brace, right
Air-cast training ankle brace, left
heel cups, padded/non-padded
felt podiatry supplies
tape cutters
7.5 cm elastic wraps
10 cm elastic wraps
15 cm elastic wraps

portable massage tables
large crutches
medium crutches
cervical collars (s,m, l)
clavicle straps (s,m, l)
triangular bandages

3D knee braces
3D ankle walkers

thigh elastics (m,l,xl)
neoprene knee sleeves (s,m,l,xl)
patellar knee sleeves (s,m,l,xl)
sorbothane heel pads, lt blue (s,m,l)
sorbothane heel pads, dk blue (s,m,l)
hair clippers
double length 10 cm elastic wraps
double length 15 cm elastic wraps

Appendix III. Guidelines for Spectator Care

1. Advanced Life Support (ALS) care available within five minutes to all persons in the stadium when it is at full capacity.

2. A large network of CPR (Cardiopulmonary-Pulmonary Care)-trained persons throughout the stadium (possibly ushers) who can identify patients in cardiac arrest and initiate CPR immediately.

3. Communication capabilities between all sections of the stadium to initiate immediate dispatch of ALS personnel.

4. On-line medical control either by radio contact with an ALDS base hospital or from physicians present at the scene. These physicians preferably trained in emergency medicine and / or critical care, should be accustomed to the frequent management of cardiac arrest.

5. Emergency transport vehicles easily accessible and immediately available for transport to the nearest available hospital.

6. Surveillance of public areas, particularly just before and immediately after the event. This will provide early ALS care when the local emergency system will not be able to respond because of traffic controls in the area.

7. First aid available in easily accessible, well-identified areas for routine care of minor medical problems.

Ref. Spaite DW et al. Ann. Emerg. Med. 1988, 17(8):825-828.

Appendix IV. Injury Record Form

This form can be printed on 2 sides of an 8 1/2" X 5 1/2" heavy paper card and **is to be signed by the athlete who receives a copy.**

.

(side 1)

MEDICAL RECORD - CONFIDENTIAL Date____

Athlete #____ Location Finish / Aid Station ___

Arrival Time___

Name_____Nationality____

Discharge time_____

Age _____ Gender M / F

Pre-race injury/illness Y / N

Describe _____

Skin, Bones, & Joints

Complaint: Pain Blister Abrasion Bleeding Cramps Swelling
Other

Tissue: Skin Muscle Tendon Ligament Bone
Other

Location:

Toe	R / L	Knee	R / L
Foot	R / L	Thigh	R / L
Ankle	R / L	Hip	R / L
Calf	R / L	Back	R / L

Other

Diagnosis:

Blister	Tendinitis
Sprain	Abrasion
Strain	Cramps
Bursitis	Stress Fx (suspected)
Fasciitis	

Other

Notes:

(side 2)

Medical Problems Arrival Time _____

Athlete # _____ Discharge time _____

Symptoms & Signs

Exhaustion	Lightheaded	Stomach cramps
Fatigue	Confused	Leg cramps
Hot or Fever	Headache	Rapid heart rate
Vomiting	Nausea	Palpitations
Unconscious	CNS changes	Muscle spasms

Other _____

Mental Status: Alert or Responds to: Voice / Touch / Pain

Orientation: Person / Place / Time

Walking Status: Alone / With assistance / Unable

Other _____

Time	Temp (rectal)	BP	Pulse	IV Fluids	Meds/Rx

Notes:

Diagnosis _____

Disposition _____

Signature athlete :

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