

Medical Services Provided at the Olympic Village Polyclinic During the 2002 Salt Lake City Winter Games

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INTRODUCTION

Since being established by Pierre de Coubertin in 1896, the modern Olympic Games have grown into the single largest sporting event in the world. Every 2 years people from around the world gather in the spirit of Olympism. Olympic disciplines are contested every 4 years, but are set up to overlap so that the Olympic Games occur every 2 years, alternating between the summer events and the winter events. Although many of the participants have no realistic chance of winning a medal, they still compete with passion for the sake of competition, and to bring honor to themselves and to their nations.

The athletes taking part in the Olympic Games represent the best athletic talent of their respective countries, and it is therefore a tremendous honor and responsibility for the host organizing committee to attend to their safety and security while they are participating in the Games. As part of this responsibility, comprehensive medical services must be provided for the athletes and their respective national delegations, in case of injury or illness. Although many of the wealthier countries in the Olympic family of nations can afford to bring teams of well-trained and well-equipped medical personnel to attend to their athletes, most of the athletes participating do not have that luxury. Indeed, it is well known that athletes and delegates from other nations often seek elective care during the

Games since expert medical assistance and advanced health care technology are readily available at no cost to the athletes or members of their delegation.

THE 2002 WINTER GAMES POLYCLINIC

Planning for medical care during the 2002 Winter Games began years before the opening ceremonies. At the Olympic Games, arrangements must be made for provision of spectator and athlete care, general medical and musculoskeletal medical care, and doping control (drug testing), among myriad other aspects of planning and preparedness (including readily available translation services). Typically, health care for the athletes and their support personnel is provided at a "polyclinic," which by definition offers multiple services, including medicine and dentistry. Accordingly, well in advance of the Salt Lake City (SLC) Games, administrative personnel were selected to head up the polyclinic medical services. (Co-authors Dr Mark Elstad and Dr Stuart Willick were medical director of the polyclinic, and deputy medical director and director of musculoskeletal medicine, respectively.) Observational/fact-finding visits to the polyclinic in Nagano, Japan during the 1998 Winter Games and to the polyclinic in Sydney, Australia during the 2000 Summer Games provided valuable insights and stimulated ideas that would ensure the excellence of the SLC polyclinic.

The polyclinic of the 2002 Winter Olympic Games was established within the Olympic Village on the campus of the University of Utah. The Olympic Village is the residential campus where the majority of athletes stay while participating in the Games. The SLC polyclinic occupied 840 square meters (9000 square feet), making it approximately twice as large as the Nagano polyclinic. The polyclinic was located just a few hundred yards from the University of Utah Health Sciences Center. Although the Games opened February 8, the polyclinic had already

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been operational for over a week to assist athletes who arrived prior to the Games to train. All told, the polyclinic was open for business around the clock from noon on January 29 through noon on February 26, 2 days after the closing ceremonies—a span of 29 days. Services available at the polyclinic included primary care medicine, musculoskeletal medicine, physical therapy, radiographic imaging (including plain film, ultrasound, and magnetic resonance imaging [MRI]), dentistry, optometry, podiatry, pharmacy, and diagnostic laboratory testing.

Health care provided at the polyclinic was available without charge to the estimated 2500 athletes participating in the Games, in addition to a similar number of coaches, officials, and judges. A small percentage of the SLC Games workforce, including volunteers, was also eligible to receive medical care at the polyclinic. The polyclinic was staffed with both salaried employees “on loan” from their regular positions with the University of Utah and Olympic volunteers. The majority of polyclinic physicians were volunteers who were selected by the same application process and subject to the same training process as other volunteers. Twenty-eight physicians provided primary care services at the polyclinic, while a total of 19 physicians from 14 states provided musculoskeletal medical care. For those physicians coming from out of state, temporary recognition of their licensure during the Games was granted by the Utah legislature, allowing them to serve in a volunteer capacity. Work was divided into shifts to provide uninterrupted primary care coverage 24 hours a day. Two sports medicine physicians and two primary care physicians were assigned to each of two shifts between 7 AM and 11 PM. One primary care physician “in house” typically staffed the overnight hours, while a musculoskeletal physician was available “on call.”

Significantly, the SLC Games marked the first time that Olympic sports medicine musculoskeletal services were provided by a high percentage of physical medicine and rehabilitation specialists. Traditionally, orthopedic surgeons have dominated the discipline of sports medicine. However, during the 2002 Games, 8 of the 19 musculoskeletal physicians were physiatrists (10 were orthopedists and 1 was a rheumatologist). This new-found inclusion of physical medicine and rehabilitation physicians is understandable, as most athletic injuries are non-surgical in nature and can be effectively treated with conservative rehabilitation protocols. However, as recently as 10 years ago the composition of medical teams providing care to the US athletes at the Olympic Games consisted almost exclusively of orthopedic surgeons, family physicians, and pediatricians, prompting

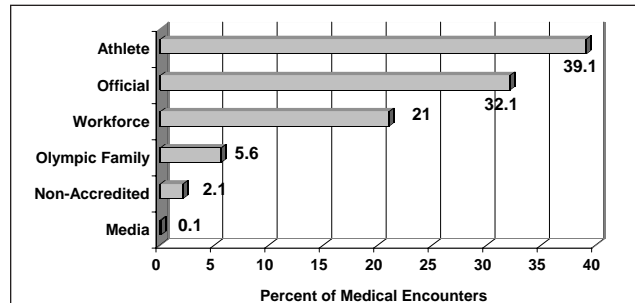


Figure 1. Percentage breakdown of polyclinic medical services rendered during the Salt Lake City 2002 Winter Olympic Games, according to accreditation status.

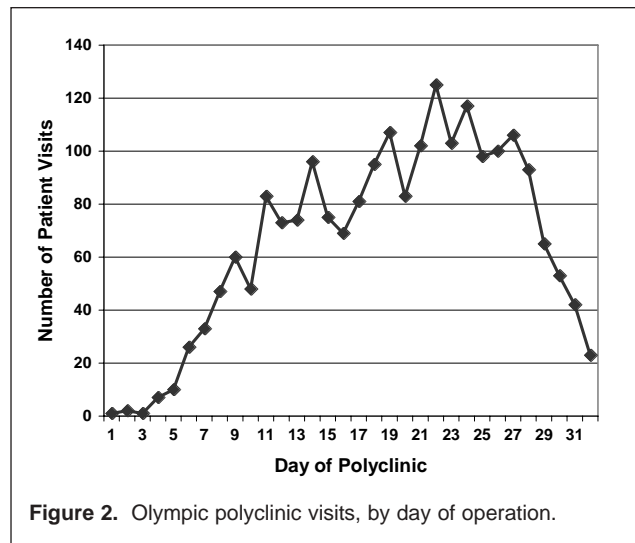


Figure 2. Olympic polyclinic visits, by day of operation.

Stone¹ to write “few physicians outside orthopedics or family medicine work as team physicians.” Clearly the situation is changing. Indeed, the sizable percentage of physiatrists staffing the SLC polyclinic reflects a growing trend within the specialty toward the management of musculoskeletal conditions. In recognition of this trend, several years ago members of the Academy of Physical Medicine and Rehabilitation formed the Physiatric Association of Spine, Sports, and Occupational Rehabilitation (PASSOR) to facilitate ongoing leadership in the field. Six of the eight Olympic polyclinic physiatrists were members of PASSOR.

During the SLC operational period, 2098 visits to the Olympic polyclinic were recorded with medical encounter forms completed on 1842 individuals. Seven hundred twenty (39%) of these visits were by athletes seeking care, while the remainder consisted of official members of the national delegations (32%) and members of the volunteer and support staff (27%) (Figure 1). Sixty-nine percent of the patients seen were male. Figure 2 tracks the number of polyclinic visits by day,

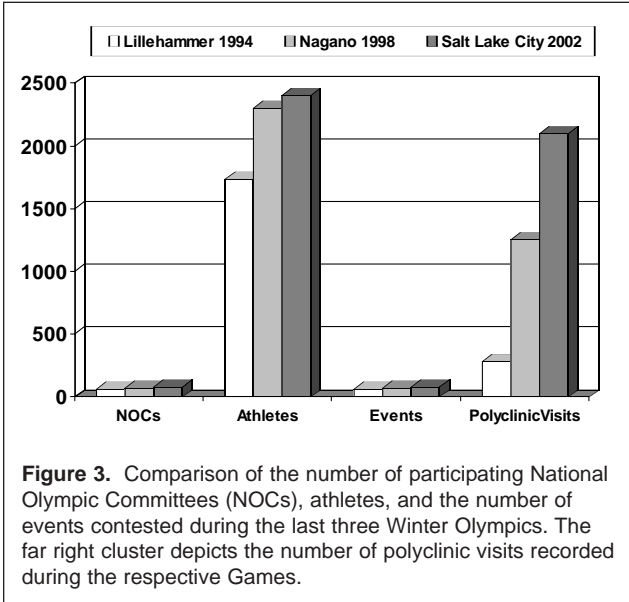


Figure 3. Comparison of the number of participating National Olympic Committees (NOCs), athletes, and the number of events contested during the last three Winter Olympics. The far right cluster depicts the number of polyclinic visits recorded during the respective Games.

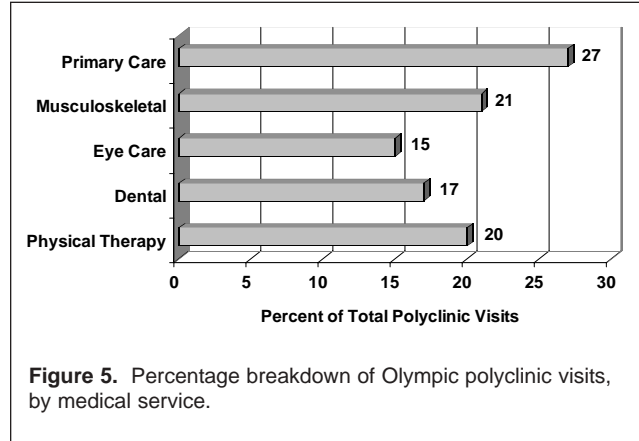


Figure 5. Percentage breakdown of Olympic polyclinic visits, by medical service.

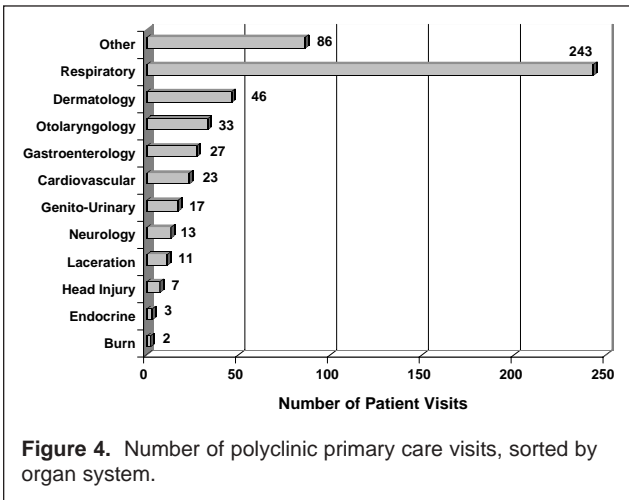


Figure 4. Number of polyclinic primary care visits, sorted by organ system.

Table 1. Body Areas Treated by Polyclinic Physical Therapy Staff During the Salt Lake City 2002 Olympic Games

Body Part Treated	Number of Visits	Percent of Total
Knee	136	28.2
Ankle	62	12.9
Shoulder	54	11.2
Lumbar spine	53	11.0
Thigh	52	10.8
Cervical spine	46	9.5
Hand	17	3.5
Elbow	11	2.3
Foot	11	2.3
Wrist	11	2.3
Sacroiliac joint	10	2.1
Hip	7	1.5
Thoracic spine	5	1.0
Leg	5	1.0
Arm	2	0.4

revealing a steady increase in demand for polyclinic services as the Games progressed. By comparison, 1347 visits were made to the Nagano polyclinic during the 1998 Winter Games. Data presented in Figure 3 suggest that the ratio of polyclinic visits to the number of participants was greater for the SLC Games than either the Lillehammer or the Nagano Olympics, indicating a steady growth in the demand for polyclinic services over time.

The Summer Olympic Games tend to be roughly 8 times larger than the Winter Games. In 2000, 9408 visits were recorded at the Sydney polyclinic. During the 1996 Atlanta Summer Games, the polyclinic recorded 16,519 patient encounters, of which 64% were athletes.² However, recorded visits to the Atlanta polyclinic included over 3000 females on whom gender verification testing was performed. Such tests were not performed during the Sydney or SLC Games, as the requirement that female competitors provide genetic proof of their sex has been (at least temporarily) discontinued by the International Olympic Committee (IOC). The Atlanta polyclinic figures also included some athletes undergoing doping control. Doping control during the SLC Games was generally performed at the various venues. (Detailed information regarding the doping control program and the testing performed during the SLC Winter Games is available on-line at www.olympic.org.)

General medical issues were the most common reason for athletes to seek out polyclinic care. Five hundred fifty-seven medical encounters (27% of all visits) were seen by primary care medicine. Upper respiratory infection (URI) was the most common diagnosis among this cohort (Figure 4). Musculoskeletal and physical therapy services ranked second and third in terms of patient encounters. During the Olympic Games, the musculoskeletal service saw 466 patients (21% of all visits). Upper limb injuries represented 25% of the

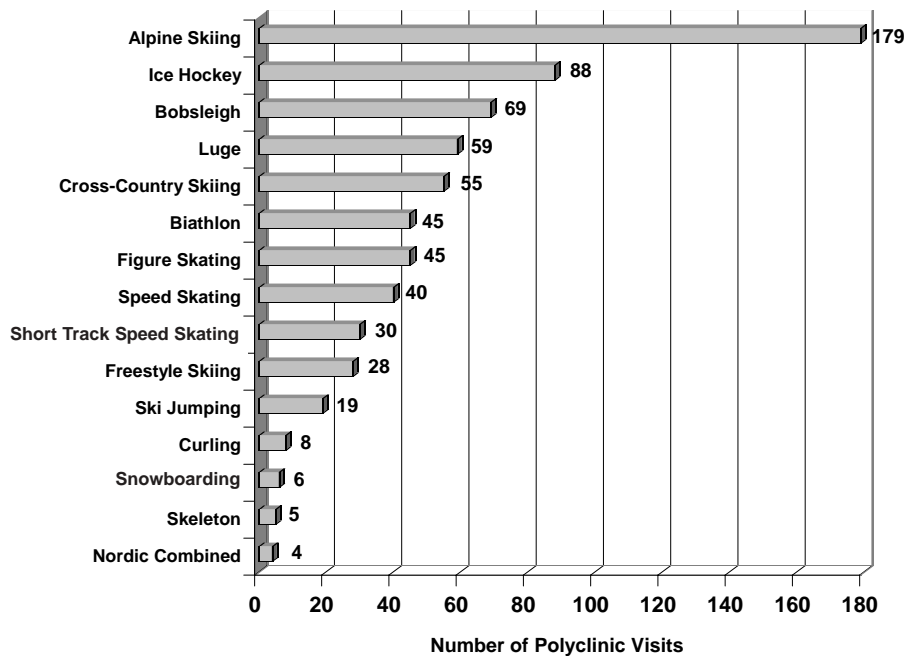


Figure 6. Number of polyclinic visits made by athletes, according to sporting discipline.

cases, while lower limb injuries accounted for 55% of the diagnoses. Thirteen percent of the cases were spine related. There were seven concussions. Physical therapy services were available from 7 AM to 11 PM. One hundred twenty-four patients from 43 delegations made 418 visits to physical therapy. Fifty-six percent of the patients treated were athletes. Knee (28%), ankle (13%), and shoulder (11%) represented the most common areas treated (summarized in Table 1). Figure 5 depicts the distribution of polyclinic visits by service.

Among the athletes presenting to the SLC polyclinic, alpine skiing generated the most visits (Figure 6). This observation would appear to be somewhat inconsistent with results from published epidemiological studies investigating winter sports injuries, which suggest that alpine skiing has the third highest injury rate behind hockey and snow boarding.³⁻⁶ However, while hockey players presented to the polyclinic in sufficient numbers to rank second overall in number of visits, it is likely that most of the Olympic hockey teams were attended to by their own medical personnel, thus reducing the probability of seeking care at the polyclinic.

Diagnostic radiology services were provided between 7 AM and 11 PM. The radiographic imaging service was entirely digital, and included a 1.5 Tesla General Electric mobile MRI and a Philips HDI 5000 Sono computerized tomography (CT) ultrasound unit. Three

hundred ninety imaging studies were performed during the Olympics: 199 x-rays, 135 MRIs and 41 ultrasounds. Four CT scans were performed at University Hospital. Table 2 lists the breakdown of MRIs by body part imaged. During the 1996 Atlanta Summer Games, a total of 204 MRIs and 112 ultrasounds were performed, in addition to 634 plain film exams.⁷ Clearly, on a per athlete basis there was increased reliance on cross sectional imaging during the SLC Games, a trend that extends beyond the realm of sports medicine. Radiology (and laboratory) services were available directly upon request from team physicians, obviating the need for redundant clinical assessment by polyclinic staff.

The dental clinic handled a surprisingly high volume of patients. Initially, patients were seen on a walk-in basis, but due to exceptionally high demand, after the first several days patients were seen on an appointment-only basis. Athletes were given scheduling priority. Three hundred forty-seven patients were seen. Fifty-six dental cleanings, 46 amalgam restorations, 178 composite restorations, 48 endodontic teeth, 22 extractions, and 66 other procedures were performed. There were several cases of oral trauma, including broken teeth and one tongue laceration.

Eye care services provided included both optometry and ophthalmological consultations. Patients were seen on a walk-in basis between the hours of 8 AM and 11 AM

Table 2. Radiographic imaging by category performed during the Salt Lake City 2002 Winter Olympic Games (375 exams over 28 days)

Images	Percent of Total (n/total)
MRI	
Knee	32% (43/135)
Spine	21% (28/135)
Lower limb	20% (27/135)
Upper limb	16% (22/135)
Ankle	5% (7/135)
Pelvis	4% (5/135)
Hip	1% (1/135)
Brain	1% (1/135)
Chest	1% (1/135)
X-ray	
Knee	21% (42/199)
Spine	20% (39/199)
Foot, toe, ankle	16% (31/199)
Chest	15% (29/199)
Wrist, hand, finger	11% (22/199)
Ribs, hip, pelvis	9% (17/199)
Shoulder, clavicle	8% (15/199)
Abdomen	2% (4/199)
Ultrasound	
Extremity	71% (29/41)
Scrotum	10% (4/41)
Retroperitoneal	10% (4/41)
Abdomen	5% (2/41)
Breast	5% (2/41)

Table 3. Selected data comparing the 1980 Lake Placid Winter Olympics with the 2002 Salt Lake City Games, indicating the tremendous growth of this quadrennial event over the past two decades

	Lake Placid 1980	Salt Lake City 2002
Athletes	1072	2500
National Olympic Committees	37	77
Events contested	38	78
Broadcast countries	40	160
Broadcast fees (in millions of dollars)	21	738
Sponsors	230	63 (10 global, 53 national)
Sponsorship fees (in millions of dollars)	30	705

and 6 PM to 9 PM daily. During the Olympics, there were 311 patient encounters, with 214 pairs of glasses and 34 pairs of contact lenses issued. Podiatry services were in less demand during the SLC Games (40 patients seen) than during the Sydney 2000 Summer Games, perhaps due to the differing biomechanics of the winter sports compared to the summer sports. Laboratory services performed 860 tests during the

Games, mostly for URI diagnostic purposes, including rapid streptococcus A panel (131), influenza A and B antigen tests (151), and respiratory viruses direct immunofluorescence (146). The polyclinic pharmacy was open 7 AM to 11 PM. Medications were dispensed free of charge with a polyclinic physician prescription (or by registered team physician prescription). The pharmacy formulary flagged all banned substances on the World Anti-Doping Association and IOC list of prohibited substances. During the Olympics operational period, 1300 prescriptions were dispensed. Among the most-prescribed medications were ibuprofen, naproxen, acetaminophen, amoxicillin, Tamiflu, albuterol metered-dose inhalers, and guaifenesin. Over 15,000 condoms were dispensed for free during the combined Olympic and Paralympic periods (compared to 50,000 distributed during the Atlanta Games).⁸

Hospital services were available through the University of Utah. Twenty-five patients were transferred from the polyclinic to University Hospital for further evaluation during the Olympics. Most of these patients were referred to obstetrics and gynecology, cardiology, and gastroenterology. This is comparable to a similarly low number of hospital referrals made during the 1996 Atlanta Summer Games.⁹

There were several research projects carried out at the polyclinic during the Olympic Games. Most notably, one investigation sought to evaluate the efficacy and clinical impact of rapid diagnostic testing for viral pathogens in URI. The investigators hoped that by starting antiviral therapy early in the clinical course of proven viral URIs, the athlete could be spared from the most severe and limiting symptoms, and that the risk of transmission within the Olympic Village would thereby be reduced. The data were presented at the 2002 meeting of the Infectious Disease Society of America, and suggest that early detection and treatment of viral URIs is cost effective under the circumstances of many individuals sharing close living quarters, as in the Olympic Village. According to the researchers' report,¹⁰ the prompt administration of antiviral medicines probably helped prevent at least one multiple-medal winning delegation from being ravaged by the flu. Other studies carried out at the polyclinic included a prospective epidemiological registration of injuries to athletes, a comparison of MRI and ultrasound imaging in the diagnosis of soft tissue injury, and a questionnaire-based study investigating the motivation of Olympic polyclinic volunteers. The results of these studies have yet to be published, although the Olympic volunteer motivation study was presented at

the 2003 meeting of the American College of Sports Medicine.

CONCLUSION

The last Winter Olympics to be celebrated in the United States were in Lake Placid in 1980. George G. Hart, MD, (the chair of medical arrangements for the Lake Placid Olympic Organizing Committee) said, shortly after the conclusion of those Games, that health care preparations may have been excessive, stating "We were equipped for World War III."¹¹ We suspect that Dr Hart would be astonished by the growth in services and technologies available to winter Olympians 22 years later. The data presented in Table 3 serve to underscore that growth.

As with other areas of medicine, technological advances and research keep stretching the sports medicine envelope, just as the athletes themselves continue to set new records. Feedback received from athletes and other delegation members regarding care received at the polyclinic was very positive. Many suggested that the polyclinic services were among the "best ever."

"There's never been, in my experience, a better appearing or functioning Polyclinic in any Games. Their leadership, the quality of the medicine being practiced and the warmth and generosity of their staff have been absolutely outstanding."

—Johann Koss, MD, IOC Athletes Commission delegate, reporting to the IOC Medical Commission, February 2002

This degree of success reflects both the planning that preceded the effort and the positive team spirit engendered by the enthusiasm of the volunteers. All who worked at the polyclinic truly felt they were making a positive contribution during a "once in a lifetime" experience. Lessons learned from the SLC experience will hopefully result in even more successful polyclinics in Athens, Turin, Beijing and beyond, and thereby contribute to the performance of the world's best athletes who constantly strive to uphold the Olympic motto of "citius, altius, fortius."

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