The role of the sports medicine physician has changed significantly over the last 2 decades. In some sporting organisations, the sports medicine physician served as a necessary, governance requirement – someone who could sign the scan request form, dispense analgesia and inject anaesthetic or other medication when required or desired. This approach was from an era when sports medicine doctors did not have the necessary skills, background or contractual relationship to critically evaluate or manage musculoskeletal health.

Sport and Exercise Medicine is now an official medical specialty in many countries. This has engaged governments and institutions to develop, publish and implement the criteria for the training of sports medicine physicians; it has improved the standards of care for participants in sport and exercise who have access to these specialists. However, the role of the specialist sports medicine physician is not always well-understood by medical colleagues, team management or politicians.

A ROLE FOR SPORTS MEDICINE PHYSICIANS IN POPULATION HEALTH

In the realm of population health, the increasing personal and economic health burden of non-communicable diseases has escalated to such an extent that it cannot be sustained indefinitely by government health department budgets. There has been a significant global emphasis on sport and exercise as key elements to address this pandemic by organisations such as the International Olympic Committee (IOC), FIFA and the UK Faculty of Sport and Exercise Medicine promoting physical activity programmes in the community. The sports medicine physician should have a key role in the promotion, integration and facilitation of exercise as medicine within primary and secondary healthcare. However,
changing existing, disease-based paradigms where the pharmaceutical industry has substantial financial and political influence is challenging. It will require sustained and co-ordinated effort from the wider medical community, aligned with bold political vision to change healthcare systems and societal culture to promote and support physical activity.

In addition to ‘the promotion and implementation of regular physical activity in the prevention, treatment and rehabilitation of chronic diseases of lifestyle’, Sport and Exercise Medicine has been defined as that scope of medical practice which focuses on:

- The prevention, diagnosis, treatment and rehabilitation of injuries that occur during physical activity.
- The prevention, diagnosis and management of medical conditions that occur during or after physical activity.

The words protect, prevent and promote often feature prominently in defining the roles and scope of practice of sports medicine physicians.

Competitive sport and major events are increasingly being played in front of millions of living room spectators from around the globe. The recent London Olympic and Paralympic Games were a huge commercial and media success with the extensive coverage of the Paralympics raising the profile of disability sport. A number of athletes and coaches commented on injuries and illnesses and also the care provided by hundreds of employed and volunteer doctors, therapists and sport scientists.

But the cameras don’t only focus on the players; the medical teams and sports medicine physicians providing the healthcare to these athletes often find themselves at the centre of media attention. Every weekend the actions and decisions of medical teams in professional sport are observed and analysed on television and social media platforms. The recent scrutiny on concussion in sport has challenged medical teams and sporting organisations regarding their governance, decision-making processes and the protection role of the sports medicine physician. The appropriately qualified sports medicine physician has much to offer the elite medical support team and the balance of roles and responsibilities will depend on each particular organisation’s structure.

‘PROTECT AND PREVENT’

There are many conflicting opinions and direction as to the role of the sports medicine physician in elite sport. Is it, as the IOC campaign would suggest, to protect against and prevent injury and illness? Is it to screen athletes, to ensure quality injury surveillance or to assist in optimising performance? Is it to diagnose and manage the rehabilitation of injuries or to prescribe pharmaceuticals where there is some clinical indication to do so? Is it to request imaging tests and provide injection therapies, like platelet rich plasma (PRP), that traditional healthcare systems may not provide?

Sports medicine physicians have an important role in protecting, especially vulnerable athletes like children, against unnecessary sporting risk. The correct answer when approached before a rugby game by an overenthusiastic parent requesting an ‘urgent’ local anaesthetic injection to numb the pain of a recent ankle ligament injury in a ‘talented beyond imagination’ 12-year old is clear. However is it our role to protect the elite competitive athlete? And if so, protect from what?
Competitive sport at an elite level is not conducive to the pursuit of optimal health. Kelly Holmes, the first British woman to become a double Olympic champion when she won the 800 m and 1500 m races at the 2004 Athens Olympic Games, was public about the sacrifices necessary to compete at the highest level of sport. Aged 34, she achieved this remarkable double at the end of a career plagued by injury and health issues. She wrote: ‘I have lost count of the amount of physio treatments, stomach injections, X-rays, blood tests, bone scans and MRI scans I have had over the years for my legs, back, Achilles tendons and feet, but without them I wouldn’t have been able to keep on running’.

None of the track and field medal-winners at the 2012 London Olympic Games did so without at some point overcoming their own struggles with injury and illness. Greg Rutherford suffered a number of significant hamstring injuries before his Olympic long jump gold medal in London and London heptathlon gold medalist Jessica Ennis-Hill missed the 2008 Beijing Olympic Games due to a navicular stress fracture. The injury rate in professional football is estimated to be approximately 1000 times higher than the overall rate for high-risk industrial occupations. If our role as sports medicine physicians was truly to protect athletes from harm we could never advocate for or recommend the pursuit of an Olympic medal or a Football World Cup title. The journey to an Olympic medal is not compatible with protecting optimal health. As an elite sports medicine physician, protecting the health of the athlete is perhaps not sustainable as a primary role.

**Should our focus then be on prevention?**

There is good evidence that simple measures are effective in preventing injuries and illness and it would be negligent for any medical team looking after elite athletes not to promote these. Measures, such as hand washing and probiotic use when travelling, allergy and blood screening programmes or targeted conditioning programmes can all help to prevent injury and illness.

However, the physician must always be mindful as to the goals of the athlete or sports team. The easiest way to prevent a hamstring injury is to ask the athlete not to run fast or to work with a group of athletes who cannot run fast. However, these are clearly inappropriate preventative strategies for an elite sprinter aspiring to Olympic medals. The focus of the sports medicine physician and medical team must be to mitigate risk for when the athlete is running fast, as he or she is required to do by the demands of the sport.

**WHAT IS THE PRIMARY ROLE THEN OF THE SPORTS MEDICINE PHYSICIAN IN ELITE SPORT?**

In British Athletics, the support team physiotherapists, therapists and doctors developed a clear understanding of each other’s role and responsibility regarding musculoskeletal injury. The sports medicine physician is responsible for the diagnosis and early management of every injury presentation. The therapist is responsible for the rehabilitation and exercise prescription and liaison with the coach to return the athlete to full sporting activity. However, the role of the sports medicine physician is much broader than acute injury management.

The primary role of the sports medicine physician in competitive sport is the comprehensive health management of the elite athlete to facilitate optimal performance – the diagnosis and treatment of injuries and illnesses associated with exercise to improve athlete performance. Sports medicine physicians should focus on developing and maintaining excellence in structuring and providing continuous clinical services to the elite athlete. In conjunction with the coach and other members of the sports medicine and science team (physiotherapists, physiologists etc.) the sports medicine physician is involved in the rehabilitation of acute and chronic injuries as well as developing measures to reduce the risk of injury and illness occurrence or severity.

‘As physicians we spend years of formal training and decades of practice in order to achieve optimal competence in the care of our patients. Although our education never ends, we always fall short of perfection, and we remain forever fallible, we do achieve a vast array of high-level skills that benefit our patients, their families, our staff and team members and as well as ourselves and our families. We learn to diagnose, treat, and prevent illness, to promote health and well-being, and to communicate.’

To provide this primary role of comprehensive health management and optimising performance the sports medicine physician must wholly understand the demands and requirements of the athlete’s sport. A thorough knowledge of the technical and physiological requisites
for training and performance in that sport is necessary to provide integrated care, in the context of optimising performance. It is difficult to succeed and thrive as a generalist sports medicine physician in elite sport, as attaining this detailed knowledge, developing relationships within the sport and delivering medical services is a huge challenge within every sport. The combination of excellence in clinical skills, sport specific knowledge, a thorough understanding of the athlete’s goal combined with enthusiasm and compassion will make the sports medicine physician a trusted and respected member of the athlete support team.

5 KEY ELEMENTS AND TRENDS IN ELITE ATHLETE HEALTH MANAGEMENT AND PERFORMANCE OPTIMISATION

1. Focus on clinical competencies: the effective clinical management of injuries and illnesses

Injuries and illness will continue to occur in athletes and influence performance despite our best efforts to protect and prevent. In football, the injury rate of ligament injuries has decreased since the start of the UEFA Champions League injury study 11 years ago, but overall training and match injury rates and the rates of muscle injury and severe injury remain high. Warren Buffet has used the phrase ‘circle of competence’ in the business context. In the context of sports medicine, this can be creatively applied and modified into a competency model to facilitate personal reflective thinking, development and peer appraisal (Figure 1a). Physicians need to focus on optimising their appropriate circles of clinical competencies to deal with the health and performance challenges of individual elite athletes, including rapid diagnosis and appropriate intervention. It is paramount that the best medical evidence is combined with the athlete’s preference when formulating effective and individualised management plans. We illustrate this model using sports injuries in general (Figure 1b) but this can be applied in more detail to specific injuries, in specific sports and personal circumstances.

The Periodic Health Evaluation (PHE) of elite athletes is an important part of health management. In some organisations this might be called ‘health screening’ with the purpose of diagnosing, managing and preventing injuries and illnesses. If the PHE is an occasional event largely devoid of ongoing contact or health management it is likely to have minimal impact on these aims (Figure 2). The follow-up and health management plan following a screening assessment is usually more important in optimising athlete performance than the collection of data for surveillance. The sports physician is well-placed to co-ordinate, monitor and manage a comprehensive illness and injury prevention strategy for elite athletes following a PHE. The findings of the PHE should be well-documented, ideally using an Electronic Medical Record keeping system accessible by all the key members of the medical team.

2. Invest in professional clinical environments including data management systems

The working environment of the sports medicine team in elite sport vary from the clinic in a private hospital, sports medicine institute or at the training venue to track side and hotel rooms (Figure 3 UK Athletics training camp in Stellenbosch, South Africa). It is therefore important to develop appropriate clinical communication and record-keeping strategies to facilitate these situations. Integrated personalised healthcare and communication involving the athlete, coach and members of the healthcare team is a key element to athlete health management. The Athlete Electronic Medical Record (AEMR) is increasingly used by teams and organisations not only to document health events but also to do surveillance of injuries and illnesses and clinical audits. These systems give rapid and
remote access to the comprehensive health file and are updated with real-time health information (injury and illness events, blood tests, imaging etc). The Medicine and Science Profiler EMR system implemented by UK Athletics prior to the London Olympic Games is such a system. The personalised EMR is continuously updated with a traffic light system for each health event on the file informing real-time training risk and readiness to compete. The medical team also use this system for clinical audits. It is reasonable to argue that organisations and clubs failing to implement state of the art EMR and health data systems in the near future will significantly compromise their ability to effectively manage athlete health.

3. Develop a clear risk decision-making strategy
There are some situations in adult elite sport where the doctor must make the decision to withdraw the player from sport. These are usually related to head trauma, when the athlete does not have the capacity to make an informed decision and the coach does not have the expertise to assess capacity or risk. The recent debates regarding concussed players continuing to play in soccer and rugby reinforce the essential requirements for doctors, cognizant of the current best practice, to determine fitness to return to play in this situation. The important message is that only the doctor or a trained and experienced healthcare worker (physiotherapist or nurse) should be allowed to make a return to play decision on a concussed player. Other on field decisions are usually made by the doctor or physiotherapist in communication with the coach and player.

However, most management decisions regarding modification of training or fitness to return to training or competition are taken in a different context. In this environment, the British Athletics experience is that the role of the sports medicine physician is to present the information to the coach and athlete regarding the nature of the injury, proposed interventions, the rehabilitation course and the expected timeframe to return. The risk

Figure 2: Regular health assessments and the integration of a risk communication, risk reduction and continuous monitoring approach. HA=health assessment.
and consequences of continuing to train or compete while injured are presented but the decision to continue to train or compete is for the athlete and coach. The doctor may be willing and able to support this course of action, even if it does not support optimal health, if they are satisfied that the athlete is making an informed decision. There may be some situations in which the doctor feels unable to actively support the more risky course of action, due to the severity of the potential outcomes or effects on other players. The decision-making process in both these circumstances should be thorough and carefully documented. With good relationships, understanding of the sport and integration within the team, the sports medicine physician can steer an appropriate path in these challenging circumstances.

Optimal risk decision-making can only be applied when the delivery of sports medicine and science services to athletes and players are appropriately structured and managed within clubs and organisations. It is ideal if both the Chief Medical Officer/Head of Sports Medicine and the Head Coach/Manager are line managed by the Performance Director/CEO who are accountable to a board of directors.

In some clubs and organisations sports medicine physicians have played the role of Head of Sports Medicine and Science (e.g. Peter Brukner at Liverpool FC and Peter Fricker at the Australian Institute of Sport). In these cases they often don’t serve as the team physician.

### 4. Prioritise athlete performance

Every member of the support team of an elite athlete must improve and support performance. The sports medicine physician in elite sport has an important role in optimising athletic performance through high quality illness and injury management. Optimising performance through the management of illness such as asthma, iron deficiency or allergy may mean that goals of treatment are somewhat different than they would be for another patient. In the rehabilitation of injury the medical team does not aim for adequate return of muscle strength, rather optimal strength for sporting excellence. Similarly in the management of asthma or allergy in an elite athlete the goal should be complete control of symptoms and correction of pathological physiology. The setting of an arbitrary cut off of a drop in FEV1 of greater than 10%, to make the diagnosis of asthma (and thus permit pharmacological treatment) in an elite athlete prior to the Beijing Olympic...
Games was an example of an inappropriate and frustrating restriction on illness management in athletes. The correction of vitamin and mineral deficiencies may have small effects on health and performance but may be appropriate to identify and treat in the pursuit of sporting excellence with very small margins between success and failure.

The role of sports medicine physicians in optimising health and performance must be clearly defined and set apart from the malevolent practice of doping in sport. All sports physicians in elite sport should be adherent to and advocates of the WADA code. Doping in sport should be relentlessly pursued and clearly further deterrents and punishments are required. In recent years, it seems evident that WADA is more specifically and aggressively targeting performance-enhancing drug use and this is to be welcomed.

5. Invest in communication and implementation – use social media

Social media platforms are increasingly being used by athletes, organisations and Sports Medicine clinicians, including physicians. This is a very powerful medium and when used correctly, impacts significantly on improved team communication and the delivery of important health messages.

Twitter isn’t only a powerful team communication tool but also increasingly used by sports medicine physicians (@PeterBrukner; @DrJohnOrchard; @RoaldBahr), Sports Scientists (@ScienceofSport; @SweatScience), medical journals (@BJSMBMJ; @CJSMonline), Universities (@HarvardHSPH; @HarvardHealth; @uclh), sporting organisations (@iocmedia; @FIFACom; @BritAthletics), Hospitals (@AspetarQatar), athletes (@Mo_Farah; @J_Ennis) and Sports Medicine Faculties (@FSEM_UK) to spread health messages to a huge follower base (Figure 5).

In a global village with instant access to information of social and scientific nature the norm, social media sceptics might soon be wandering in the jungle while huge sports stadia are being built in the desert!

In addition to social media, UK Athletics also used health posters (Figure 6) and a Health and Performance Passport (Figure 7) to complement pre-competition health strategies before the London Olympic Games.

SUMMARY

The primary role of the sports medicine physician in competitive sport is the comprehensive health management of the elite athlete to facilitate optimal performance. This can be achieved with an appropriate focus on the physician’s circles of clinical competencies and will include pre-participation health evaluations, integrated electronic medical records, health and performance-focused risk decision making, a focus on optimising performance and a thorough understanding of the integration of communication and implementation strategies within the particular sport.
Our evolving specialty is facing huge challenges but also exciting opportunities. We will be better positioned as sports medicine physicians to deal with these when we accept the fact that we ‘first need to cure ourselves of the doctor’s disease – the pathological compulsion to cure’15.

The role of the sports medicine physician can be an extraordinarily rewarding one. We can work with highly talented, interesting, varied and inspirational athletes and coaches (from the academic to the artisan); a rich tapestry of personalities that many other medical professionals could never collaborate with as colleagues in the traditional medical world. We should run close to the athlete and coach, managing health, optimising performance and leading the way in collaborative, balanced, evidence- and preference-based, individualised healthcare12.

References