Doping in Sport: A review of medical practitioners' knowledge, attitudes and beliefs

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Abstract

Background: Central to the work of many medical practitioners is the provision of pharmaceutical support for patients. Patients can include athletes who are subject to anti-doping rules and regulations which prohibit the use of certain substances in and out of competition. This paper examines the evidence on medical practitioners' knowledge, attitudes and beliefs towards doping in sport. **Methods:** A systematic search strategy was followed. Research questions and relevance criteria were developed a priori. Potentially relevant studies were located through electronic and hand searches limited to English language articles published between 1990 and 2010. Articles were assessed for relevance by two independent assessors and the results of selected studies were abstracted and synthesised. Outcomes of interest were knowledge, attitudes and beliefs in relation to doping in sport. **Results:** Six studies met the inclusion criteria and were examined in detail. Samples reflected a range of medical practitioners drawn from the UK, France (2), Greece, Italy and Ireland. The investigations varied with respect to outcome focus and quality of evidence presented. **Conclusion:** While the extant empirical research posits a negative attitude towards illegal performance enhancement combined with a positive inclination towards doping prevention, it also exposes a limited knowledge of anti-doping rules and regulations. Insufficient education, leading to a lack of awareness and understanding, could render this professional group at risk of doping offences considering Article 2.8 of the World Anti-Doping Agency Code (WADC). Moreover, in light of the incongruence between professional medical codes and WADC Article 2.8, medical professionals may face doping dilemmas and therefore further discourse is required. At present, the current evidence-base makes it difficult to plan developmentally appropriate education to span the exposure spectrum. Addressing this situation appears warranted.

Key words: Doping in Sports; Performance enhancing substances; Health; Sports Medicine; Medical Professionals

Introduction

Providing pharmaceutical support for patients is central to the work of many medical practitioners from general practitioners to pharmacists. Indeed, the exact style of prescription, together with the intensity of the recommendation to take such treatment, not only characterises the professional identity of the practitioner (Friedson, 1970) but also influences patient responsiveness and adherence (Armstrong, 2002). In this context, and notwithstanding the need to meet conventions for prescribing, professional variability is a strong indicator of professional autonomy (Armstrong, Reyburn, & Jones, 1996). It is also important to recognise that the variability in medical practitioner's decision-making is often based on a lack of 'gold standard' evidence (Baiardini, Braido, Bonini, Compalati, & Canonica, 2009). Further, individual practitioners' may be motivated to resist the unwanted influence that guidelines may have on the practitioner-patient relationship (Martin, 2003).

The status of practitioners' involvement in prescribing and administering performance enhancing drugs is at least contentious. On the one hand, the goal of sports medicine includes human performance enhancement above normal functioning (Edwards & McNamee, 2006). However, this act alone challenges sporting ethics but is further problematic when these same substances also bring potentially harmful side-effects[1]. Indeed, drug-supportive practitioners can point to recent criticisms of doping prevention programmes for their lack of focus on the safety of participants (Savulescu, Foddy, & Clayton, 2004; Waddington, 2001). In contrast, doctors might wrongly imagine that drugs users uniformly place great trust in them to provide accurate up-to-date information and to provide reliable supplies of quality-assured drugs (Pope, Kanayama, Ionescu-Pioggia, & Hudson, 2004). Moreover, Kanayama and colleagues (2010) assert that the failure of the scientific and medical communities to

[1] We also recognise that medical practitioners may deal with medications that contain active ingredients with greater harm potential than those found in banned performance enhancing substances.

recognise the efficacy of anabolic steroid use could explain the reluctance of steroid users to engage with medical practitioners in relation to such use (Dawson, 2001). Therefore, it is realistic to assume that an athlete might consult with a medical practitioner to monitor markers of health, rather than to validate the use of the drug *per se*. Collectively, these issues have been summarised in the phrase; 'a counsel of perfection thwarted by reality' (Collier, 1988).

Even though drug provision to athletes may be contrary to sporting, medical or even national legislation, it persists. Further this behaviour persists in spite of the risks associated with taking some of these performance-enhancing drugs (Garnier, 2006). This highlights the complexity of practitioner decision-making, which also involves managing the risks associated with more conventional drug-based treatments in the same athlete. However, the scale and nature of medical practitioner involvement in doping in sport remains unclear. Moreover, McNamee and Phillips (2010) clearly articulate the tensions that arise from the incongruence between the World Anti-Doping Agency Code (WADC) and medical professional codes, particularly in relation to confidentiality and disclosure. Until these issues are clarified the exact nature of the prescribing 'problem' and any associated 'solution' will also remain elusive.

While numerous studies have attempted to quantify the extent of doping in sport (Waddington, Malcolm, Roderick, & Naik, 2005), or considered athletes doping social-cognitions (Petroczi, 2007), literature regarding the attitudes, beliefs and knowledge of medical practitioners and support staff is limited. Under the WADC, support staff may be charged with a doping offence if they are deemed to administer or attempt to administer any prohibited substance or method to any athlete in competition or out-of-competition or "assist, encourage, aid, abet, cover up or engage in any other type of complicity involving an anti-doping rule violation" (WADA, 2009 p 25). Thus, it is important to interrogate the social

science doping literature that focuses on these support staff and on the sports anti-doping landscape. Therefore, this paper aims to amalgamate current literature and provide indications for the future direction of this area of research.

Methods

A comprehensive search was carried out and a set of relevance criteria developed a priori. To be included a paper needed to focus on medical practitioners and contain one or more of the following outcome measures: a) knowledge of doping and/or doping controls in sport, and b) attitudes and beliefs towards doping in sport. Studies that only reported prevalence rates or that made no specific reference to doping in sport were excluded.

An electronic search strategy was developed using a series of doping related keywords to extract potentially relevant articles from a number of electronic databases: Medline (and Pubmed), PsycINFO, CINAHL, SPORTdiscus, Ingenta, Web of Science and ZETOC. Since each database has its own indexing terms bespoke search strategies were developed. The primary search terms included variations on the nomenclature of "doping", "sport", "medical practitioner", "attitudes", "beliefs" and "knowledge". Only full papers published in peer reviewed journals in the English Language since 1990 were included.

Papers were reviewed first by title, then by abstract, to determine inclusion. One member of the research team screened each citation in the master list, including the abstract (when available) to assess whether it examined medical practitioners, attitudes, knowledge and/or beliefs towards doping in sport. Articles that met these broad criteria were obtained for assessment by a second reviewer. Additional sources (e.g., reference lists of all articles deemed relevant) were also hand searched to identify studies not captured in the electronic searches.

Results

The electronic search identified 53 potentially relevant articles. Two additional articles were identified through hand searching. Of these 55 articles, only six met the relevance criteria (Table 1). Of these six articles, the average response rate was 59% and study sample sizes ranged from 102 (Scarpino, et al., 1990) to 771 (Woods & Moynihan, 2009). Two studies originated in France (2003) (Laure & Kriebitzsch-Lejeune, 2000) and the remaining studies emerged from the UK (Greenway & Greenway, 1997), Italy (Scarpino, et al., 1990), Greece (Panagiotis, Ourania, Christos, & Jannis, 2006) and Ireland (Woods & Moynihan, 2009). In terms of samples, general practitioners (GPs) were the focus of most surveys (Greenway & Greenway, 1997; Laure, et al., 2003; Panagiotis, et al., 2006; Woods & Moynihan, 2009), males represented an average of 68% of respondents and the mean age of the participants across the studies was 41 years.

The role of medical practitioners in anti-doping

Self-reports showed a consensus among medical practitioners that they have a role to play in doping preventions. Specifically, 92% and 89% (Laure, et al., 2003; Woods & Moynihan, 2009) of GPs and 91% of retail pharmacists (Laure & Kriebitzsch-Lejeune, 2000) agreed with this proposition. A monitoring function was also highlighted; 10% of Irish GPs, declared a willingness to monitor the athlete during prohibited substance use (Woods & Moynihan, 2009). Furthermore, 27% declared they would refer the athlete to another practitioner for a prescription or for monitoring.

Table 1. Articles included in this review.

Authors	Country	Sample	Design & methods	Study results
Scarpino et al., (1990)	Italy	102 doctors (part of a larger study with a total n=1231, including 1015 athletes and 92 coaches & managers). 67% male-	*Cross-sectional *Questionnaire and interview *Bespoke self-report design	• 21% of doctors believed that doping practices can enhance athletic performance. • 20% of technicians (which included the doctor sample) believed that anabolic steroids were frequently used by top level athletes.
Greenway and Greenway (1997)	UK	157 GPs Response Rate=39%	*Cross-sectional *Questionnaire *Bespoke self-report design	• Only 35% of respondents were aware that guidelines on prohibited substance use could be found in the BNF. • 18% had either prescribed or been asked to prescribe anabolic steroids for performance enhancement or body image purposes.
Laure et al., (2000)	France	198 Retail Pharmacists. 52% male Mean age=43 years Response Rate= 66%	*Cross-sectional *Telephone interview *Bespoke self-report design	• 25% had been asked for doping information in the previous 12 months. • 88% considered doping as a public health problem and 69% that doping is a form of drug addiction. • 91% of pharmacists believed that they have a role to play in doping prevention, but 74% considered themselves poorly trained to do so.
Laure et al., (2003)	France	202 GPs 76% male Mean age=45 years Response Rate= 51%	*Cross-sectional *Telephone interview *Bespoke self-report design	• 37% had been asked for information and 11% for a doping prescription in the last 12 months. • 89% of GPs believed that they had a role to play in preventing doping, but 77% considered themselves poorly informed on this matter.
Panagiotis et al., (2006)	Greece	123 trainee GPs 83% male Mean age=28 years Response Rate=100%	*Cross-sectional questionnaire *Bespoke self-report design	• Only 25% of respondents knew of the WADA/IOC banned list. Only 5.7% correctly answered questions on laboratory control procedures. • 99% cited newspapers as their main source of doping knowledge.
Woods and Moynihan (2009)	Ireland	771 GPs 63% male Mean age = 46 years. 37% response rate.	*Cross-sectional questionnaire *Bespoke self-report design	• 24% were connected with a specific sport as a team doctor/advisor and 28% had been consulted for advice on doping in sport. 12% indicated they had received a request for AAS from a coach or an athlete without medical indications. • 92% believed that GPs had a role to play in doping prevention; only 9% felt adequately trained for this role.

Contact with doping

The studies indicate that it is not uncommon for medical practitioners to receive enquiries about, or consult with known users of, doping agents. Laure et al. (2003) reported that 37% of respondents had been confronted with doping and Woods and Moynihan (2009) stated that 28% of GPs in their Irish study confirmed having been consulted for advice on

doping in sport. Moreover, 12% indicated they had received a request for anabolic androgenic steroids from coaches or athletes without medical indications. A further 6% of the overall sample had received requests for other performance enhancing substances without medical indications. Exposure rates were lower for retail pharmacists - 25% had been contacted for information in the previous 12 months (Laure & Kriebitzsch-Lejeune, 2000). However, it is not clear from the research who initiated these 'contacts'. Pharmacists (6%) also reported being offered financial or other incentives to supply doping agents to athletes in the last 12 months (Laure & Kriebitzsch-Lejeune, 2000).

Training and knowledge of doping

Medical practitioners have limited doping agent knowledge and this may influence their actions when solicited for such advice. In the studies reviewed, knowledge was assessed by variously identifying substances on the Prohibited List, estimating substance efficacy, and identifying either health effects and/or sanctions. Assessment of the classes of prohibited substances was the only knowledge constituent to unite all these studies. Even then, there were inconsistencies in whether actual or perceived knowledge of the Prohibited List was examined.

Regarding specific knowledge about prohibited substances, Panagiotis et al. (2006) reported that only 25% of Greek trainee GPs had heard of the current List of Prohibited Substances. This finding is broadly consistent with an earlier study by Greenway and Greenway (1997) who noted only one third of UK GPs were aware of the prohibited substances in sport list readily available in the British National Formulary (BNF). Most recently, Woods and Moynihan found that knowledge of drug-testing procedures was reported by 25% of their Irish sample (24% of this sample of 771 was formally connected with a specific sport as a team doctor/advisor); Panagiotis and colleagues (2006) found that

fewer than 6% of the trainees had knowledge of correct laboratory procedures for doping tests. Greenway and Greenway (1997) found that 12% of UK GPs thought that doctors were permitted to prescribe anabolic steroids for non-medical purposes and 17% did not know; in the United Kingdom this non-medical prescription is not permitted (Greenway & Greenway, 1997).

In terms of anti-doping education, Laure et al. (2003) found 77% of French GPs considered they were poorly trained in this area. In the most recent study (Woods & Moynihan, 2009) only 9% of Irish GPs surveyed felt adequately trained in the prevention of doping in sport and 86% felt that further training in relation to doping issues was required. A discrepancy emerged between the 24% of respondents who reported being connected with a sport as a team doctor or advisor and the 12% of GPs who had completed specific training on doping in sport. Having said this, 12% of Irish GPs stated they did not feel further training was necessary and qualified that the investment of their time in training on this issue would be disproportionate to their exposure to this issue.

Attitudes towards doping

Cross-sectional designs and bespoke survey instruments characterised the survey studies included in this review. Idiosyncratic survey design is problematic when assessing attitudes towards doping because of the need for psychometric rigour in designing such questionnaires. This challenge may help to understand the general lack of available research on attitudes towards doping in medical practitioners. However, Laure et al. (2000) noted 88% of French pharmacists considered doping to be a public health problem, with the majority regarding it as a form of addiction. Woods and Moynihan (2009) also reported that in the event of an athlete insisting on taking a prohibited substance, 90% of GPs would discourage the use of the substances in all circumstances.

Current prevention methods

There was general agreement that more frequent and efficacious doping control is required. However, prevention appears to be at the heart of the intervention approaches. Laure et al. (2003) found that 81% of French GPs believed that doping prevention was important because of the health risks associated with such practices and 12% endorsed prevention to support sporting ethics. In an earlier study, 73% of pharmacists considered current prevention methods to be ineffective (Laure & Kriebitzsch-Lejeune, 2000). More recently (Panagiotis, et al., 2006) 48% of trainee GPs considered that contemporary prevention methods were ineffective. Deeper investigations into prevention showed that the majority of French GPs (55%) (Laure, et al., 2003) believed that prevention efforts should be aimed primarily at children and adolescents, with less priority afforded to professional and amateur athletes (Laure, et al., 2003).

Discussion

This review examined the scale, range and consensus in the extant literature of a diffuse range of medical practitioners' knowledge of, attitudes towards and beliefs regarding doping in sport. A fragmented landscape has emerged, based on studies across 20 years. This shows only few studies, all of European origin, and all featuring bespoke assessment tools developed to answer a wide variety of isolated research questions. What was common to the studies was a focus on PEDs within sport, rather than recreational use by athletes. In sum, this literature may be best regarded as providing practice-based evidence of anti-doping for sport enhancement, reflecting different contexts of legislation, speed of change and policy development.

Owing to this narrow evidence base, caution must be taken when attempting to generalise the findings of the individual papers to the wider medical professional community.

These limitations notwithstanding, a negative attitude towards doping in sport prevails but this is combined with a lack of doping knowledge, a feeling of insufficient anti-doping training and a limited confidence in current prevention efforts.

Taken together, the broad sweep of the evidence suggests a need to review medical professionals' education and professional development in relation to doping in sport. Speed and Jaques (2010) refer to the Sports Physician as a 'medical guardian' and they specifically highlight that they 'work hard to ensure that the athlete understands and adheres to anti-doping codes' (p. 2). However, a lack of knowledge and understanding of anti-doping governance on the part of the medical guardian could lead to misinformed practice. Ultimately, this presents the possibility of a sanction under the 2009 World Anti-Doping Agency Code (WADC) for both the athlete and medical practitioner. However, WADA has no jurisdiction to punish medical practitioners. Therefore, sanctioning practitioners in breach of the WADC remains with the relevant sports bodies (McNamee & Phillips, 2010). WADA recommends that offending practitioners are banned from working with athletes within that sporting body (McNamee & Phillips, 2010).

Supporting the findings of doping attitude surveys of elite athletes (Alaranta, et al., 2006; Anshel, 1991) the studies reviewed here suggests a widespread anti-doping attitude stance. Indeed, the most recent investigation found that an overwhelming majority of GPs would discourage an athlete's use of a prohibited substance even if the athlete insisted on continued use (Woods & Moynihan, 2009). Having said this, professional variability was highlighted by the minority of GPs who confirmed that they would prescribe or supply the requested agent. Moreover, a number of respondents chose not to answer the question (8%) and almost one in four respondents was ready to refer the athlete to another doctor for prescription and monitoring. Whilst no explanations were sought or offered for such decision

making, the inter-individual variability observed is akin to prescribing in the wider medical literature.

Medical practitioners differ from one another in their communicative behaviour; some have a more patient-centred style and others less so (Zandbelt, Smets, Oort, Godfried, & de Haes, 2006). Such inter-individual variability suggests that while some medical practitioners may be bastions of doping prevention, others may be prepared to consider providing illegal performance enhancing substances as part of their patient care regime. In the case of the BALCO scandal, practitioners facilitated doping practices (Fainaru-Wada & Williams, 2006). In stark contrast, the East German doping programme involved doping athletes without their consent (Werner & Berendonk, 1997). Thus, the medical practitioners' rationale for providing this context is worthy of closer inspection. However, the complexity of the situation should not be discounted when considering the interaction of this professional body, who often offer their time freely, with the anti-doping landscape. On the one hand medical practitioners are expected to stay abreast of evidence and apply the latest technologies in the pursuit of performance enhancement and on the other hand they are expected to be sensitive caregivers and remain within the realms of prescribing regulations. Therefore, we must recognise and explore the tensions which can emerge from a pressure to fulfil such multiple roles (Cassell, 1991); neither can the concepts of confidentiality and disclosure be overlooked (McNamee & Phillips, 2010). Furthermore, recognition must be made of the dual obligations in this group; these may arise due to professional obligations to patients alongside obligations to sports clubs or associations to which they are contracted.

The literature suggests that a low level of doping knowledge exists in the practitioner groups surveyed and this resonated as cause for concern across a number of studies. Yet, none of the studies linked knowledge to engagement within sport (as a medical practitioner) which could extend from the local GP who receives a visit from a young athlete with a cold

to the salaried sports medic who resides with the athlete or team. The depth of knowledge required for these two medical professionals is arguably different and therefore presents a challenge for anti-doping education bodies. Woods and Moynihan (2009) reported that 24% of their Irish GP sample were employed by a sport on a permanent or ad-hoc basis, yet, only half of that group reported receiving appropriate training in anti-doping. This is a concerning statistic given the potential for an accidental breach of doping regulations as it is not uncommon for athletes to be unknowingly prescribed banned medical agents (Webborn, 1997).

Current anti-doping legislation may be seen as playing out against medical practitioners' strong sense of personal autonomy and it may be argued that it contravenes the ethos of patient-centeredness. Paradoxically, where an athlete presents a desire to use a prohibited substance (for whatever reason), it may be patient-advantageous to display less patient-centred behaviours given the implications for both parties of a positive dope test in international sport. However, the importance of respecting patient autonomy is underscored in the general medical literature (Quill & Brody, 1996) and this aligns with the argument that the non-medical experimentation of illegal performance enhancing substances is a matter of individual choice (Kennedy & Kennedy, 1999). Yet, these perspectives are at odds with current anti-doping regulations and the GMC Standards Committee holds a very clear view that doctors will contravene the guidance by prescribing or colluding in the provision of drugs or treatment with the intention of improperly enhancing an individual's performance in sport. The GMC state that such actions would usually raise a question of a doctor's continued registration (BMA, 2001). Whilst the study by Woods and Moynihan (2009) has highlighted some of the different approaches taken by GPs when faced with a doping athlete, the intricacies of the decision making process, involving such a doping dilemma, is worthy of further consideration.

The six reviewed studies examined medical practitioners from across Europe using cross-sectional designs. Notwithstanding their similar research designs, the survey instruments utilised are defined by their disparate style making cross-study comparisons difficult. While definitive conclusions cannot be drawn, the outcomes from this review remain important for developing a more robust and coherent future for research in this field. Firstly, the span and scale of the evidence base needs to be developed to generate a solid foundation from which to inform policy and practice. Given the potential complexity in this field, it would be wise to follow the guidance of Rutter and colleagues (2001) and adopt a systematic approach that generates knowledge from converging evidence, delivering it through multiple research strategies and methods. Taking into consideration the infancy of this research, it is to be expected that cross-sectional designs will continue to be favoured albeit with refinements that make the outcomes more informative. At the same time, researchers are encouraged to supplement this mode of data acquisition with qualitative methods and experimental approaches to generate data convergence. This offers a chance of ensuring relevance and contribution of research in this domain to daily routines and practice.

This review flags the inherent challenges facing medical practitioners who operate in a complex anti-doping landscape. Looking forward, a specific focus on those who specialise in Sport and Exercise Medicine appears justified as they may regularly (if not frequently) encounter doping issues. Alongside this target audience for the research, the issue of source credibility is worthy of closer inspection given that existing literature questions their credibility among some 'patient' groups. For example, anabolic androgenic steroid users have been reluctant to engage with medical professionals in relation to their AAS use (Dawson, 2001). Kanayama et al. (2010) suggests this may be due to the historical reluctance of the science and medicine community to recognise the efficacy of AAS use.

This current review has also exposed dissatisfaction with contemporary prevention methods' effectiveness. This, together with the common conviction that medical practitioners have a role to play in future initiatives, suggests that professional bodies should be more fully engaged in this complex issue. The importance of examining continued professional development is also underscored by the fact that the WADC is dynamic, meaning that those affected by Code compliance must keep abreast of the field. Having said this, it would be timely to establish the position of the medical body in relation to the comparative importance of receiving education on this issue relative to other training needs and practitioner pressures. This question could even be part of the annual review process for general practitioners.

Acknowledgement

The research team would like to thank Dr Andrew Atkins for his assistance with the literature search. The early stages of this project were supported by funding from the World Anti-Doping Agency.

References

Alaranta, A., Alaranta, H., Holmila, J., Palmu, P., Pietila, K., & Helenius, I. (2006). Self-reported attitudes of elite athletes towards doping: differences between type of sport. *International Journal of Sports Medicine, 27*(10), 842-846.

Anshel, M. H. (1991). A survey of elite athletes on the perceived causes of using banned drugs in sport. *Journal of Sports Behaviour, 14*(4), 283-307.

Armstrong, D. (2002). Clinical autonomy, individual and collective: the problem of changing doctors' behaviour. *Social Science and Medicine, 55*, 1771-1777.

Armstrong, D., Reyburn, H., & Jones, R. (1996). A study of general practitioners' reasons for changing their prescribing behaviour. *British Medical Journal, 312*, 949-952.

Baiardini, I., Braido, F., Bonini, M., Compalati, E., & Canonica, G. W. (2009). Why do doctors and patients not follow guidelines? *Current Opinion in Allergy and Clinical Immunology, 9*(3), 228-233.

BMA (2001). Doctors' assistance to sports clubs and sporting events. London, UK: Board of Science and Education, British Medical Association.

Cassell, E. (1991). *The nature of suffering and the goals of medicine.* New York: Oxford University Press.

Collier, J. (1988). Drugs in sport: a counsel of perfection thwarted by reality. *British Medical Journal, 296*(20), 520.

Dawson, R. T. (2001). Drugs in sport - the role of the physician. *Journal of Endocrinology, 170*(1), 55-61.

Edwards, S. D., & McNamee, M. (2006). Why sports medicine is not medicine. *Health Care Analysis, 14*(2), 103-109.

Fainaru-Wada, M., & Williams, L. (2006). *Game of Shadows: Barry Bonds, BALCO, and the Steroids Scandal that Rocked Professional Sports* New York: Gotham Books.

Friedson, E. (1970). *Profession of Medicine*. New York.: Dodd Meads.

Garnier, A. (2006). Letter to the Editor: An Open Letter to Those Promoting Medical Supervision of Doping *Medscape Orthopaedics & Sports Medicine, 10*(2).

Greenway, P., & Greenway, M. (1997). General practitioner knowledge of prohibited substances in sport. *British Journal of Sports Medicine, 31*, 129-131.

Kanayama, G., Hudson, J. I., & Pope, H. G., Jr. (2010). Illicit anabolic-androgenic steroid use. *Hormones and Behavior, 58*(1), 111-121.

Kennedy, M. C., & Kennedy, J. R. (1999). Ethics of prescribing drugs to enhance sporting performance. *The Medical Journal of Australia, 171*, 204-205.

Laure, P., Binsinger, C., & Lecerf, T. (2003). General practitioners and doping in sport: Attitudes and experience. *British Journal of Sports Medicine, 37*, 335-338.

Laure, P., & Kriebitzsch-Lejeune, A. (2000). Retail pharmacists and doping in sports: Knowledge and attitudes. A national survey in France. *Science and Sports, 15*(3), 141-146.

Martin, J. F. (2003). The physician/care provider and politics. *European Journal of Public Health, 13*, 182-184.

McNamee, M., & Phillips, N. (2010). Confidentiality, disclosure and doping in sports medicine. British Journal of Sports Medicine. doi: 10.1136/bjsm.2009.064253 [published Online First 29 May 2009].

Panagiotis, G., Ourania, D., Christos, F., & Jannis, P. S. (2006). Knowledge on and attitudes of doping in sport, of young trainees in internal and general-familial medicine. *Pharmacologyonline, 2*, 1-5.

Petroczi, A. (2007). Attitudes and doping: a structural equation analysis of the relationship between athletes' attitudes, sport orientation and doping behaviour. *Substance Abuse*

Treatment and Prevention Policy, 2, 34.
Pope, H. G., Kanayama, G., Ionescu-Pioggia, M., & Hudson, J. I. (2004). Anabolic steroid users' attitudes towards physicians. *Addiction, 99*(9), 1189-1194.
Quill, T. E., & Brody, H. (1996). Physician recommendations and patient autonomy: Finding a balance between physician power and patient choice. *Annals of Internal Medicine, 122*, 766-771.
Rutter, M., Pickles, A., Murray, R., & Eaves, L. (2001). Testing hypotheses on specific environmental causal effects on behavior. *Psychological Bulletin, 127*(3), 291-324.
Savulescu, J., Foddy, B., & Clayton, M. (2004). Why we should allow performance enhancing drugs in sport. *British Journal of Sports Medicine, 38*, 666-670.
Scarpino, V., Arrigo, A., Benzi, G., Garattini, S., La Vecchia, C., Bernardi, L. R., et al. (1990). Evaluation of prevalence of "doping" among Italian athletes. *Lancet, 336*(8722), 1048-1050.
Speed, C., & Jaques, R. (2010). High-performance sports medicine: an ancient but evolving field. British Journal of Sports Medicine. doi: 10.1136/bjsm.2010.075325 [published Online First 24 Sept 2010].
WADA. (2009). World anti-doping code. Available Online http://www.wadaama.org/Documents/World_Anti-Doping_Program/WADP-The-Code/WADA_Anti-Doping_CODE_2009_EN.pdf Accessed 1st October 2010.
Waddington, I. (2001). *Doping in sport: some issues for medical practitioners.* Paper presented at the Leiden International Medical Students Congress.
Waddington, I., Malcolm, D., Roderick, M., & Naik, R. (2005). Drug use in English professional football. *British Journal of Sports Medicine, 39*(4), e18.
Webborn, A. D. (1997). General practitioner knowledge of prohibited substances in sport. *British Journal of Sports Medicine,, 31*(3), 259.
Werner, F., & Berendonk, B. (1997). Hormonal doping and androgenization of athletes: a secret program of the German Democratic Republic government. *Clinical Chemistry, 43*, 1262-1279.
Woods, C. B., & Moynihan, A. (2009). General practitioners knowledge, practice and training requirements in relation to doping in sport. *Irish Medical Journal, 102*(1), 8-10.
Zandbelt, L. C., Smets, E. M., Oort, F. J., Godfried, M. H., & de Haes, H. C. (2006). Determinants of physicians' patient-centred behaviour in the medical specialist encounter. *Social Science and Medicine, 63*(4), 899-910.