Including Transitioning and Transitioned Athletes in Sport: Issues, Facts and Perspectives

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Promising Practices: Working with Transitioning/Transitioned Athletes in Sport Project

Acknowledgements

The project entitled: *Promising Practices: Working with Transitioning/Transitioned Athletes in Sport* has been conducted by a working group comprised of representatives from AthletesCAN, the Canadian Centre for Ethics in Sport (CCES) and the Canadian Association for the Advancement of Women and Sport and Physical Activity (CAAWS). The project is examining issues surrounding the inclusion and integration of transitioning/transitioned athletes in Canadian sport.

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Table of Contents

Preface

The *Promising Practices: Working with Transitioning/Transitioned Athletes in Sport* project has been initiated by AthletesCAN, the Canadian Centre for Ethics in Sport (CCES) and the Canadian Association for the Advancement of Women and Sport and Physical Activity (CAAWS) to identify and help address barriers that inhibit participation of transitioning and transitioned athletes in sport. It is anticipated that the project will lead to the creation of fair and equitable policies and practices that ensure ethical, safe and educational approaches to integrating transitioning and transitioned women and men into all levels of sport, and that these outcomes may benefit sport bodies in Canada and in other countries.

As part of the *Promising Practices* project, two reviews were commissioned to examine existing social science literature and existing biological science literature relevant to transitioned athletes in sport. The reviews were authored separately to examine a particular body of literature and each provides an important part of the current knowledge in this area. The reader is cautioned about drawing any conclusions on the basis of either literature review alone.

This discussion paper synthesizes the findings from the two literature reviews, examines related information and proposes steps forward for achieving the project's goals.

1.0 Purpose and Outline

The purpose of this discussion paper is to promote respectful dialogue, consultation and action concerning the participation of transitioning and transitioned athletes in sport. As will become evident in the pages that follow, it is not possible or useful to view this complex topic through a lens that separates societal and sport expectations. Therefore the paper aims to create a shared understanding of human biological and psychological diversity by explaining the continuum between the traditional models of what defines male and female identity, a subject that has been shrouded by a profound lack of knowledge and invalid assumptions.

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The paper begins by explaining the terms and concepts that underpin the topics being considered. An outline of key issues and a summary of relevant facts from the available research follow to provide a frame for informed discussion. The focus then turns to what we can learn from past parallels in sport and society as recorded in the literature. The paper closes with recommendations for promoting dialogue, consultation and action within the Canadian sport community on how Canada can be exemplary in providing a fair, safe and inclusive sport environment.

The Appendices to the paper provide an alphabetical glossary of terms and acronyms (Appendix A), a list of prominent cases of sex and gender identity issues in sport (Appendix B), a list of world records by sporting events for men and women (Appendix C), the Statement on the Stockholm Consensus on sex reassignment in sports (Appendix D), and a list of social science publications for further reading (Appendix E).

The content of this paper is drawn primarily from the two literature reviews prepared for the *Promising Practices: Working with Transitioning/Transitioned Athletes in Sport* project:

- "Sport and Transitioning/Transitioned Athletes: A Review of the Social Science Literature" by Kevin B. Wamsley, Professor, Faculty of Health Sciences, The University of Western Ontario, February 2008
- "Do Transitioned Athletes Compete at an Advantage or Disadvantage as Compared to Physically Born Men and Women: A Review of the Scientific Literature" by Michaela C. Devries, PhD, McMaster University, May 18, 2008

Both literature reviews and this paper can be accessed on AthletesCAN's website at http://www.athletescan.com/Content/Publications.asp.

A person's sex is determined by the physical presence of particular external genitalia, chromosome structures and hormones…

…Gender identity is a person's own internal sense of being female or male, or in between, regardless of his or her physical sex characteristics.

2.0 Terms and Concepts

There can be considerable confusion about what is meant by the terms 'transitioning', 'transitioned' and 'transgender'. Some associated concepts that are used in defining those terms are also often misunderstood as their meanings change over time – examples are a person's 'sex' and 'gender'. Language is continually evolving, but perhaps more so in recent years with respect to human biology, physiology and behaviour. As human genetic and psychological diversity becomes more evident in science and less concealed in society, there has been gradual refining and expanding of how similarities and differences are described.

While definitions facilitate discussion and sharing information, terminology remains subject to both cultural context and individual interpretation. Personal, social and political implications inherent to describing some aspects of human diversity can lead to descriptors taking on harmful connotations, and eventually being replaced with more supportive wording. However, for sensitive topics there may be no universal choice of words that is inoffensive to all. The intent of this section is to provide a common language for respectful dialogue and consultation within those constraints.

Understanding the key terms used in this paper is important for understanding the paper overall and involves going beyond definitions to how the terms interconnect.

Sex and gender – these two words are often used interchangeably, but their meanings have become quite distinct.

A person's **sex** is determined by the physical presence of particular external genitalia, chromosome structures and hormones.[1] It is typical to think that being identified as a female means being born with a vagina and ovaries as a result of having an X sex chromosome from the mother and an X sex chromosome from the father. It is typical to think that being identified as a male means being born with a penis and testes as a result of having an X sex chromosome from the mother and a Y sex chromosome from the father. While many people's physical characteristics fit with this dual model of female and male sex identification, a significant number of people's physical characteristics do not.

Some people are born **intersexual** with ambiguous genitalia, for example one ovary and one testicle, or reproductive organs that contain a mix of both kinds of tissues.[2] The term intersexual has replaced **hermaphrodite** which was commonly used in the past.[3] With ambiguous

genitalia a part of human biological diversity, the dual male - female model extends to a continuum that is in between. The continuum includes people with **Androgen Insensitivity Syndrome** where hormonal anomalies result in various sex organ developments. In some cases sex organs appear to be 'female' early in life but develop into male genitalia during puberty. These individuals appear identical to females with XX chromosomes at birth but in fact have XY chromosomes.[4]

Gender is based on how a person's psychological make up conforms with social and cultural expectations of what characterizes male and female personalities, behaviours and interests.[5] **Gender identity** is a person's own internal sense of being female or male, or in between, regardless of his or her physical sex characteristics.[6]

The term **gender variance** is used when a person's behaviour and interests do not align with cultural norms for her or his assigned physical sex, or with either sex.[7] There is no consensus in the literature on causes of gender variance. While gender variance was once thought to be solely the result of upbringing and other social or psychological factors, there is more recent emphasis on biological factors.[8]

When gender variance causes a person to frequently or continually feel intensely uncomfortable, she or he is experiencing **gender dysphoria.**[9] The American Psychiatric Association has established the formal diagnosis of **Gender Identity Disorder** (GID) when gender dysphoria is causing persistent and significant distress or impairment.[10] However, 'disorder' is a confusing and perhaps misguided term in this context given that gender dysphoria can be understood as a normal response to intense internal conflict and external pressures.

People experiencing gender dysphoria can decide to modify their bodies in order to be physically aligned with their gender identity. A **transitioning female** is in the process of using hormone treatments and/ or surgery to change from being physically male to being physically female. A **transitioning male** is in the process of using hormone treatments and/or surgery to change from being physically female to being physically male. **Transitioned females and males** have completed the transitioning process.[11] The outdated term **transsexual** was used in the past to describe an individual who underwent a 'sex change' operation, but has become obsolete.[12]

Transgender is a broad term used to identify diversity in identities, behaviours, and beliefs among gender nonconforming people. The majority of transgender individuals choose not to modify their bodies.[13]

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…Gender dysphoria can be understood as a normal response to intense internal conflict and external pressures.

It is consistent with our Canadian Sport Policy that decisions made concerning participation of transitioning and transitioned athletes in sport should be inclusive whenever possible, and attitudes and behaviours of teammates, competitors, coaches, referees, judges, administrators, other sport personnel and spectators should be welcoming always.

Sexual orientation refers to a person's attraction to a sexual partner of the opposite physical sex (heterosexual) or same physical sex (homosexual) or both sexes (bisexual). Sexual orientation is a separate concept from gender identity. For example, transitioned individuals may be heterosexual, homosexual or bisexual, and their sexual orientation may have remained the same through the transitioning process or may have changed.[14]

These terms are included in the alphabetical glossary provided in Appendix A.

3.0 What are the Issues?

As a social construct, the sport environment is linked to barriers transitioning and transitioned individuals encounter in everyday life – discrimination, revulsion, ridicule – revealing transphobia, "the irrational fear or hatred of the gendered subject in transition".[15] However, sport also has very specific considerations that influence perspectives on the inclusion of transitioning and transitioned athletes as outlined in this section and addressed in the remainder of the paper.

3.1 Equality, Human Rights and Dignity

Whether gender variance has harmful impacts in terms of discrimination, loss of identity, low self esteem, and even violence rests with how our society responds to this facet of human diversity – from our laws and policies to social expectations and interactions.

Our sport system aspires to model our national laws and established standards for ensuring equality, human rights and dignity. Our current Canadian Sport Policy, representing the shared vision and goals of 14 governmental jurisdictions for sport for the period 2002 to 2012, upholds the principle that "Sport is welcoming and inclusive, offering an opportunity to participate without regard to age, gender, race, language, sexual orientation, disability, geography, or economic circumstances."[16] It is consistent with this principle that decisions made concerning participation of transitioning and transitioned athletes in sport should be inclusive whenever possible, and attitudes and behaviours of teammates, competitors, coaches, referees, judges, administrators, other sport personnel and spectators should be welcoming always.

Similarly, the International Olympic Committee (IOC)'s Consensus Statement on Sexual Harassment and Abuse in Sport, adopted by the IOC in February 2007, includes "prejudice and discrimination ranging from passive resentment to active victimization" of transgender people, and states that: "Everyone in sport shares the responsibility to

identify and prevent sexual harassment and abuse and to develop a culture of dignity, respect and safety in sport. Sport organizations, in particular, are gatekeepers to safety and should demonstrate strong leadership in identifying and eradicating these practices." The Consensus Statement asks all sport organizations to develop, monitor and evaluate policies and procedures for the prevention of sexual harassment and abuse, to provide related education and training in their sports, and to exemplify equitable, respectful and ethical leadership.[17]

The issue that arises is how to ensure the equality, human rights and dignity of transitioning and transitioned athletes within the quest for a level playing field for all athletes and in a domain where criteria for participation have always included clearly identifying athletes as physically male or physically female.

3.2 Inclusion and Exclusion in Competitive Sport

The concept of fair sport draws in many factors – the rules and regulations that define how different sports are to be played, who is eligible to participate, who is selected for competitions, and how winners of competitions are determined. The concept of fair sport also calls for particular attributes – impartiality, honesty, respect, transparency and accountability. However, like many grand notions, what is meant by fair sport is imprecise and without collective consensus on when it has or has not been achieved. The common ground where all seem to agree is the goal of having a level playing field and upholding the principles of fair play in demonstrating athletic skills.

Within this mix there is the imperative to be both inclusive and exclusive in order to have authentic competition. Inclusion of all interested athletes is the starting point for meeting a fundamental objective in sport – to have the person or team demonstrating the highest level of skill on a particular day win the competition. But without requiring some exclusions, victories would be hollow. Whether in the form of weight classes, age categories, qualifying trials, equipment specifications, or disqualifications – exclusion criteria are integral to an equitable system for judging ability in the realm of sport.

The question then becomes what exclusion criteria are needed to allow for an inclusive sport environment within the bounds of a level playing field? When a mere fraction of a second can be the difference between first and second place, the answer to this question has major consequences for both athletes and nations. When there is increasing loss of confidence in the legitimacy of competition outcomes, the answer has far reaching implications for the future of sport. When you may be the one who is excluded, your athletic aspirations can rest with the answer.

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…The question becomes what exclusion criteria are needed to allow for an inclusive sport environment within the bounds of a level playing field?

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…It is likely that close to 2 out of every 100 people do not fit exactly or at all in the traditional concepts of being male or female.

3.3 Concerns about Possible Performance Advantages

Inclusion/exclusion issues for transitioning and transitioned athletes typically centre on concerns about possible unfair performance advantages. These concerns can include:

- For different types of sports, are there performance advantages inherent to having been born physically male or physically female that equate to unfair advantages for transitioning and transitioned athletes?
- Might an athlete's training regimen in the years prior to transitioning create a performance advantage once the athlete has transitioned?
- Do the hormone treatments and surgery for transitioning from male to female or from female to male inadvertently create unfair performance advantages?
- Should hormone treatments necessary for transitioning that involve banned or restricted substances under the World Anti-Doping Code be allowed or disallowed?
- Would an athlete transition for the purpose of hoping to gain performance advantages in competitive sport?

The sections that follow consider what facts are known about these issues and questions, and whether there are lessons from the past that may be useful in guiding a dependable course towards answers.

4.0 What do Reviews of the Literature Say?

Both biological science research and social science research are substantiating that the narrowly defined binary model of male and female identity, so deeply engrained in our western culture and collective psyche, actually represents just the end points of a continuum of sex and gender diversity. In fact, it is likely that close to 2 out of every 100 people do not fit exactly or at all in the traditional concepts of being male or female.[18] There still is unwavering societal pressure, however, for all people to be seen as conforming to one of these two categories, to the extent that the sex of children with ambiguous genitalia has often been decided by doctors and parents at the time of birth through medical intervention followed by stereotyped upbringing.[19]

This degree of variance and the measures taken to somehow 'undo' variance challenge some widely-held assumptions that are immediately relevant to sport. There has been the immutable assumption that we can accurately differentiate between who is physically male and who is physically female, and therefore have a clear division on that basis within sport. The social science literature makes evident that "sport was

one of the fundamental and prevalent social institutions of the 19th and 20th centuries which endorsed the binary model. Sport leaders and athletes went to great pains to ensure that sport sustained gender polarities."[20] The Olympic Games, as the world's premier sport events, have been a major purveyor of this model. "Since their inception, the Olympic Games have reproduced a gender order and have sustained polarities between women and men based on performance, appearance, and social decorum."[21]

The impact of the IOC and the Olympic Games on the issues affecting inclusion of transitioning and transitioned athletes in sport cannot be overstated, and their influence is paramount in how sports assess eligibility criteria related to sex and gender.

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4.1 Sex Verification Testing

With the myriad of physical differences amongst physically born females and amongst physically born males, and an ever-present cloud of suspicion generally hanging over athletes in the upper echelons of competitive sport, sex verification testing eventually made its way onto the playing field in the mid 1960s. The focus was on female sports reflecting beliefs that athletic advantage only went in one direction – there could only be an athletic advantage for males competing as females, and not the reverse.[22]

At first sex verification in the form of a humiliating visual examination of female athletes' genitals was used at track and field championships and some major games, and then was given more stature when the IOC introduced chromosome testing at the 1968 Olympic Games.[23] This approach, called the Barr body test, consisted of taking a swab from the athlete's mouth. If the test result was not considered conclusive, the athlete then had to undergo blood tests and a physical examination in order to officially be deemed female.[24]

Beginning with the 1992 Olympic Games, the IOC Medical Commission replaced the Barr test with DNA-based testing.[25] At the 1996 Olympics, sex testing revealed that seven athletes had partial or complete androgen insensitivity. All of these athletes were permitted to compete.[26] The IOC did not use sex testing at the 2000 Olympics or at subsequent Olympics to date, but has reserved the right to reintroduce such testing in the future if considered necessary.[27] Another highly influential sport body, the International Association of Athletics Federations (IAAF), continues to have a discretionary policy in place for sex verification that includes: "If there is any 'suspicion' or if there is a 'challenge' then the athlete concerned can be asked to attend a medical evaluation before a panel comprising [of a] gynecologist, endocrinologist,

Review of the social science literature reveals "it is clearly evident that sex testing from its outset has been a harmful, damaging, humiliating process fuelled by inaccurate scientific assumptions...

...There is no evidence that men or women want to have sex change operations, to transition, in order to better compete in sport. There is no evidence that transitioning athletes use this complex, difficult personal journey to gain competitive advantages."

psychologist, internal medicine specialist, [and an] expert on gender/ transgender issues. The medical delegate can do an initial check."[28]

In January 1997, the Canadian Academy of Sport Medicine (CASM) issued a position statement on sex verification testing in sport that remains in effect today. Their position that "gender verification be eliminated from all sport competition" has been based on considering the historical background of the issues, examining scientific, socio-cultural and ethical criticisms, and the development of alternative approaches. Amongst the recommendations in the position paper are: "Women athletes who have developed greater than average muscle mass, whether due to extreme training programs or to genetic abnormalities…should be accepted as part of the normal range of variation, similar to individuals who have grown to extreme heights…Individuals who have undergone genital sexual reassignment should be eligible to participate in sport competition with their phenotype sex. Only women who have cheated by using steroids or other performance enhancing drugs to increase their muscle strength should be disqualified."[29]

In fact, a review of the social science literature reveals "it is clearly evident that sex testing from its outset has been a harmful, damaging, humiliating process fuelled by inaccurate scientific assumptions and tests which do not accommodate the continuum that exists between maleness and femaleness. These tests have demonstrated that the gender binary, as historically constructed, does not exist for all human beings. Unfortunately, many athletes suffered great harm, both personally and professionally, from these testing procedures, from the blatantly inaccurate cultural labelling process that accompanied the procedures and outcomes, to the deep levels of ostracization by peers and the public. In short, sex testing proved to be an exercise in human rights violations, inspired by a culture of suspicion[30]…In spite of any gains that we have made with respect to intersex individuals and their participation in athletic competition, there are still deep-seated suspicions and a fear of deception in sport. This remains the social context faced by transitioning and transitioned athletes in sport."[31]

Appendix B lists prominent cases of sex and gender identity issues in sport.

4.2 Intent to Cheat

There is no corroboration or convincing logic that an athlete's decision to transition would relate in any way to athletic aspirations. The review of the social science literature concludes: "Women who want to be strong, fast, muscular, and powerful are women, not women trying to be men. There is no evidence demonstrating that men wish to masquerade

as women in sport competition. There is no evidence that men or women want to have sex change operations, to transition, in order to better compete in sport. There is no evidence that transitioning athletes use this complex, difficult personal journey to gain competitive advantages."[32]

Concerns about the possibility of a physically born male athlete or physically born female athlete intentionally cheating by competing as the opposite sex are also outdated for practical reasons. In today's sport system, athletes at the national and international levels are subject to doping control tests that involve a witness having an unobstructed view of the provision of urine samples, making such impersonations virtually impossible. As well, it is mandatory for all athletes winning medals at Olympic Games to provide a witnessed sample following their events, as is the case for other reputable major games.

4.3 Possible Performance Advantages

It is widely perceived that transitioned athletes could have possible advantages in terms of anatomy and/or physiological/metabolic differences due to hormonal differences. However, review of the available scientific literature finds that "to date, no study has examined the effects of cross-sex hormones on any objective measures of athletic performance…Additionally, no trial has been conducted with transitioned athletes as compared with physically born men and women athletes. As such, there is no concrete evidence to support or refute the position that transitioned athletes compete at an advantage or disadvantage as compared with physically born men and women athletes."[33] The only study addressing performance measures in a transitioned population used a retrospective design looking at data from the past in a non-athletic population.[34]

In view of the lack of research conducted to date, substantial new research would need to be undertaken to come to any reliable conclusions and would face the methodology requirement of being able to involve a sufficient number of transitioned athletes – possibly a formidable challenge given the low prevalence of transitioned individuals in the population.[35] To move forward with informed discussion on fair perspectives and policies for including transitioned athletes in competitive sport, it is still very helpful, however, to understand physical and performance differences between physically born men and women, and the implications of these facts for transitioned athletes.

To be concise, 'men' will denote physically born men and 'women' will denote physically born women in the paragraphs that follow. Some medical terminology is needed to present this information and those terms have been included in the glossary in Appendix A.

Review of the available scientific literature finds: "to date, no study has examined the effects of cross-sex hormones on any objective measures of athletic performance… no trial has been conducted with transitioned athletes as compared with physically born men and women athletes."

Generally, physically-born men can outperform physically-born women by 11 - 18% depending on the type of activity. Specifically for sport, men's world records in a number of events vary by approximately 5 - 37% over women's world records.

Sex differences in performance, body measurements and metabolism: Generally, men can outperform women by 11- 18% depending on the type of activity.[36] Specifically for sport, men's world records in a number of events vary by approximately 5 - 37% over women's world records[37] as summarized in Appendix C. These differences between men and women likely are attributable to a variety of factors including:

- Men generally have a higher maximal aerobic capacity relative to body weight.[38] They have higher haemoglobin levels, which means higher oxygen delivery to the active muscles during exercise, and there is a positive correlation between blood testosterone levels and haemoglobin levels.[39]

- Men generally have greater muscle mass and less body fat[40] which can mean greater overall strength.[41] Greater muscle mass also can mean a higher anaerobic capacity, though this difference is not evident in trained men and women relative to lean body mass.[42] More anaerobic capacity would allow athletes to perform at a higher intensity for a longer period of time.[43]

- Men typically have a larger proportion of fast twitch (type II) muscle fibres and this may account for men's greater leg muscle strength. Compared to slow twitch (type 1) muscles fibres, type II muscle fibres are larger allowing for greater contraction strength and power. However, type I muscle fibres can provide greater muscle endurance.[44]

- Men generally have greater lung capacity in terms of lung volume and larger airways compared with women of similar height. As a result, women can experience quicker fatigue of the respiratory muscles during heavy exercise but this effect may be mitigated by needing less oxygen due to lower body weight.[45]

- Men generally have greater bone thickness and greater bone mineral density which results in larger and stronger bones, and may mean increased stability and less risk of injury.[46]

- Differences in fat distribution in men and women mean men typically have a higher centre of gravity which can be a performance advantage.[47]

- Men generally are 12 -15 centimetres taller than women.[48]

- Due to having a wider pelvis, women typically have a greater angle of the quadriceps to the knee (the Q angle) which can increase the risk of knee injury and may affect running

performance. However, high level women runners tend to have narrower pelvises than similarly-aged women in the general population, and recently the importance of sex difference in the Q angle has been questioned.[49]

Some physiological factors may favour women's performance or are neutral including:

- Women generally rely to a greater extent on fat stores in the body to fuel moderate intensity exercise. During this type of exercise it has been shown consistently that women use less carbohydrate stores and have a higher rate of fat breakdown.[50]

- Women have more fat stores within the fibres of skeletal muscle, called intramyocellular lipids (IMCL). While there is no difference between women and men in utilizing IMCL during exercise, having more IMCL may influence exercise performance as a readily available energy source within the muscle.[51]

- In contrast to IMCL, there is no difference between women and men in muscle glycogen stores, the carbohydrate stores in the muscle. However it has been consistently shown that women use less liver glycogen and, depending on the type of exercise and the menstrual cycle phase that exercise is performed in, less muscle glycogen during moderate intensity exercise. Slower carbohydrate depletion would allow exercise at a higher intensity for a longer period of time.[52]

- Cardiac output, a function of heart rate and stroke volume, is similar for men and women.[53]

Surrounding all of these comparisons is the fact that there is a vast range of anatomical and physiological variation within each physically born sex. This raises some fundamental questions: Should any of those differences within each sex (for example hand size or height) be seen as causing an uneven playing field for particular sports? Where should the line be drawn? And where do transitioning and transitioned athletes fit in the broad variance that already exists within their new sex?

Effects of testosterone and estrogen:[54] The transition process typically includes using testosterone or estrogen supplementation on an ongoing basis in order to develop and maintain male or female sex characteristics. As testosterone and estrogen can impact performance in sport, the effects of these hormones are particularly relevant to the focus of this paper.

There is a vast range of anatomical and physiological variation within each physically born sex. Should any of those differences be seen as causing an uneven playing field for particular sports? Where do transitioning and transitioned athletes fit in the broad variance that already exists within their new sex?

Testosterone and estrogen can impact performance in sport…

…When comparing physically born women and transitioned women, there are similar concentrations of both testosterone and estrogen…

…Transitioned men can have higher testosterone and estrogen concentrations compared with physically born men but a long-acting dosing regime that is now available resulted in testosterone levels within the normal range.

Testosterone affects muscle mass and strength. While the effects depend on the dose that is used, testosterone supplementation within normal levels does not change muscle strength even though muscle mass may increase. While testosterone is thought to also play a role in reducing fatigue and helping muscles to recover from exercise, research indicates that a wide range of testosterone doses in humans did not have this effect.[55]

Review of the scientific literature further finds that: "During puberty in boys, the effects of testosterone increase the total quantity of bone and increase calcium retention within the bone, resulting in larger, stronger bones. Testosterone also influences the shape of the pelvis…as well as increasing the strength of the pelvis for load-bearing… Testosterone also stimulates red blood cell production, which contains haemoglobin, which carries oxygen to the working muscles."[56]

Metabolism differences observed between men and women during exercise are not influenced by differences in testosterone levels,[57] but are influenced by differences in estrogen levels.[58] Depending on the dose, estrogen supplementation can cause an overall whole body shift towards greater utilization of fat during exercise, but there is no scientific evidence to date that this improves exercise performance in humans.[59] However, estrogen acts as an anti-oxidant and therefore estrogen supplementation may affect performance in terms of decreasing muscle soreness and muscle fatigue.[60]

Cross-sex hormone administration: As both testosterone and estrogen can influence performance, can transitioned athletes' sex hormone levels fall within the normal range for their new sex?

When comparing physically born women and transitioned women, there are similar concentrations of both testosterone and estrogen. Transitioned men, however, can have higher testosterone and estrogen concentrations compared with physically born men.[61] While these findings suggest that transitioned men may experience performance benefits from higher levels of testosterone (muscle strength and mass) and possibly from higher levels of estrogen (increased reliance on fat stores during exercise), their testosterone levels can be kept in the normal range for physically born men by using a new long-acting dosing regime.[62]

Transitioned men typically have been administered testosterone once every 14 days which causes above normal levels that last for at least five to nine days and then drop to subnormal levels for the remaining days prior to the next injection. However, the scientific literature review found that a long-acting dosing regime that is now available not only

resulted in testosterone levels within the normal range of physically born men immediately after the injection and between doses, but additionally resulted in the mid-range of normal levels at the end of one year.[63]

It is important to stress that research to date on the effects of cross-sex hormone administration has not been conducted in an athlete population and no studies to date have specifically looked at performance variables in transitioned versus physically born men and women.[64] Given this lack of research, inferences for transitioned athletes from the following research findings in general populations are speculative and would require further study.

For testosterone supplementation to transitioned men in the general population, the research found:[65]

Oxygen delivery:

- a possible increase in oxygen delivery to the muscles during exercise due to increased haemoglobin levels within the first year of hormone supplementation, but no additional increase beyond one year. Importantly, no difference was found in haemoglobin levels between transitioned men and physically born men.[66]

Muscle mass:

- increased muscle mass but still smaller than the average for physically born men, noting that there is a large range within both groups of men. At the high end of the range, muscle mass is similar for both groups suggesting that this would be the case in an athletic population.[67]

Fat content and distribution:

- despite an increase in body weight, an overall decrease in subcutaneous fat (fat just under the skin), but still greater than in physically born men.[68]

- an increase in fat in the abdominal area within one year of treatment, and with further increase at three years of supplementation.[69]

- an increase in the body's natural activity of breaking down fat in the abdominal area, but not in the buttock area, after one year of supplementation.[70]

Height:

- no study to date has recorded whether height has changed for transitioned men in response to cross-sex hormone administration.[71]

Inferences for transitioned athletes from research findings in general populations are speculative and would require further study…

…Substantial new research would need to be undertaken to come to any reliable conclusions and would face the challenging methodology requirement of being able to involve a sufficient number of transitioned athletes.

Review of the scientific literature finds that the lack of relevant research to date means "there is no concrete evidence to support or refute the position that transitioned athletes compete at an advantage or disadvantage as compared with physically born men and women athletes."

Transitioned women receive estrogen supplementation to block or inhibit the biological effects of the hormones responsible for male sex characteristics. For transitioned women in the general population receiving this supplementation, the research found:[72]

Oxygen delivery:

- a possible decrease in oxygen delivery to the muscles during exercise due to decreased haemoglobin levels within one year of supplementation, and no further change after three years. These levels were comparable to physically born women.[73]

Muscle mass:

- decreased muscle mass within one year with only a slight further decrease after three years, but still on average greater than for physically born women. However, there is a dramatic range within both groups of women, and at the high end of the range, muscle mass is similar for both groups suggesting this may be the case in an athletic population.[74]

Fat content and distribution:

- an overall increase in percent body fat. However, total subcutaneous fat, the fat just under the skin, still appeared to be lower in transitioned women compared to physically born women after one year of supplementation.[75]

- a decrease in the body's natural activity of breaking down fat in the abdominal and buttock areas.[76]

Weight:

- an increase in total body weight despite a decrease in muscle mass.[77]

Height:

- no study to date has recorded whether height has changed for transitioned women in response to cross-sex hormone administration.[78]

As noted above, in considering all of these findings, the review of the scientific literature finds that the lack of relevant research to date means "there is no concrete evidence to support or refute the position that transitioned athletes compete at an advantage or disadvantage as compared with physically born men and women athletes."[79]

4.4 Implications for Transitioning and Transitioned Athletes

Transitioning and transitioned athletes want to participate in competitive sport, including the Olympic Games,[80] but face formidable challenges. In addition to having to deal with an extremely personal issue in a very public forum, and coping with the intimidation of suspicion, contempt and/or rejection by team mates, competitors and spectators, transitioning and transitioned athletes face specific eligibility policies and rules.

The conditions imposed by the Stockholm Consensus are clearly expensive as well as extremely onerous or an outright barrier for transitioned athletes. The policy does not address the full range of choices possible for transitioning and transitioned athletes. Nothing in the policy addresses or protects intersex individuals from scrutiny and suspicion or ensures their privacy.

The Stockholm Consensus on sex reassignment in sports was recommended by the IOC Medical Commission in 2003 and approved by the IOC in 2004 to be applied as of the 2004 Olympic Games. The Consensus sets out specific criteria for transitioned men and women to be eligible to compete against members of their new sex.[81] The athlete either must have undergone sex reassignment prior to puberty or must meet the following specific conditions through a confidential case-by-case evaluation:

- It is at least two years after the athlete's sex reassignment surgery has been completed.
- The athlete is legally recognized by the appropriate authorities as a member of their new sex.
- Cross-sex hormones have been administered in a verifiable manner and for a sufficient length of time to minimize any associated advantages in sport competitions.

It can be inferred from this policy that the IOC has not identified the athlete's training regimen in the years prior to transition as a concern in terms of creating a possible unfair performance advantage.

Notably, this policy does not address all situations. Eligibility requirements need to address the full range of choices possible for transitioning and transitioned athletes. An example is the choice to have hormone supplementation but not sex reassignment surgery which has additional considerations outside the scope of the literature reviews. Also, included in this policy is the authority for the medical delegate (or equivalent) of the relevant sporting body "to take all appropriate measures for the determination of the gender of a competitor" if the gender of a competing athlete is "questioned" – which is alarmingly vague and in effect restates the IOC's right to authorize sex verification testing if thought to be necessary. The full text of the IOC Stockholm Consensus is given in Appendix D.

As described in the previous sections, from the perspective of the scientific literature the Consensus' underlying premise of needing to

Meeting the Stockholm Consensus criteria does not mean transitioned athletes automatically meet the rules set out in the World Anti-Doping Code.

safeguard against transitioned athletes having possible unfair advantages has not been substantiated given the lack of relevant research conducted to date.[82] As well, the mandatory waiting period of two years may be able to be reduced given that the research on the effects of testosterone and estrogen supplementation suggests a one year waiting period may be sufficient.[83] From the perspective of the social science literature, there are strongly opposing views on whether the Consensus' eligibility requirements are fair and equitable.[84] Some studies support the requirements while other studies emphatically contend that the policy's focus on the binary model of sex identity to ensure fair competition is seriously flawed. Furthermore they point out that the conditions imposed by the Stockholm Consensus are clearly expensive as well as extremely onerous or an outright barrier for transitioned athletes who must rely on the cooperation of physicians, judicial systems and government officials to meet the verification requirements. They also note that nothing in the policy addresses or protects intersex individuals from scrutiny and suspicion or ensures their privacy.[85]

While the Stockholm Consensus sets out the IOC's current eligibility criteria for transitioned athletes to compete at the Olympic level and is seen as a guideline for all sport competitions, meeting those criteria does not mean transitioned athletes automatically meet the rules set out in the World Anti-Doping Code.

The World Anti-Doping Code is a very detailed set of rules, procedures and standards applied to all participants at certain levels of sport, including athletes competing at the national and international levels. There are particular aspects of the Code that have direct implications for transitioning and transitioned athletes. The following synthesis and summary of the relevant aspects of the Code should not be taken as a complete or binding review, but rather a simplified restatement of the Code's implications for athletes.

The World Anti-Doping Code includes mandatory sections that must be adhered to by all signatories to the Code, primarily international sport organizations, national Olympic and Paralympic committees, and national anti-doping organizations including the Canadian Centre for Ethics in Sport. Under the Code (and Code compliant programs such as the Canadian Anti-doping Program), an anti-doping rule violation should result from the valid detection of a prohibited substance in an athlete's sample – and prohibited substances include testosterone or estrogen originating from a source outside of the body. However, in such situations, if a pre-existing and medically valid reason exists for the use of a prohibited substance and a valid therapeutic use exemption (TUE) has been granted in advance, the anti-doping rule violation will be avoided. This process would require transitioning and transitioned

athletes to submit a confidential application for a TUE to use testosterone or estrogen supplementation prior to participation in any sport activity subject to doping control.

The decision whether or not to grant a TUE is made by a panel of independent physicians who have been appointed to a Therapeutic Use Exemption Committee (TUEC) by the athlete's international federation if the athlete is competing at the international level, and for all other athletes by their country's national anti-doping agency (in Canada, the Canadian Centre for Ethics in Sport). All TUEs that are granted for athletes competing at the national and international levels must be reported to the World Anti-Doping Agency.

The criteria at this time for granting a TUE are:[86]

- The athlete would experience significant health problems without using the prohibited substance or method; and
- The therapeutic use of the substance would produce no additional enhancement of performance other than that which might be anticipated by a return to a state of normal health following the treatment of a legitimate medical condition; and
- There is no reasonable therapeutic alternative to the use of the otherwise prohibited substance or method.

For transitioning and transitioned athletes, one focus of the TUEC's review of an application for a TUE would be whether the sex hormone supplementation would result in testosterone and estrogen levels within the normal range for their new sex. However, throughout the TUE application process, decisions made by the TUEC are discretionary and entirely fact dependent. There are no mandatory International Standards in the World Anti-Doping Code that address the use of hormone supplementation for transition purposes.

All TUEs must be granted in compliance with the Code's International Standards. In rendering their decision, TUECs must use the International Standard for Therapeutic Use Exemptions in its entirety – not merely judge aspects of an application in isolation. When the requirements of this Standard are applied, TUECs are generally not permitted to exempt an athlete (regardless of gender or sex) for the use of any prohibited substance or prohibited method to increase 'low-normal' levels of any hormone produced naturally by the body – this is generally not considered an allowable therapeutic intervention.[87,88] It therefore would be critical for the applicable TUEC to be provided with all relevant information during the TUE application process, including all relevant information about substances being used for transition purposes.

The World Anti-Doping Code does not include mandatory standards that address the use of hormone supplementation for transition purposes. This could result in discretionary decisions that might be inconsistent from one case to the next.

The argument is made in the social science literature that the World Anti-Doping Code should not be invoked to stop transitioned athletes from competing because none of the Code's 'spirit of sport' values, including fair competition, are being contravened.

Full disclosure is also important because the World Anti-Doping Code requires any jurisdiction that issues a TUE to notify the World Anti-Doping Agency and the relevant international federation of its issuance. Since testosterone and other hormones are subject to abuse as doping agents, TUE applications for their use are very closely scrutinized.

There is an appeal process available to athletes who disagree with the decisions made by the relevant TUEC. It is also noteworthy that the World Anti-Doping Agency, on its own initiative or upon request, can review and can reverse the granting or denial of any TUE. The World Anti-Doping Agency's decisions regarding a TUE can be appealed to the Court of Arbitration for Sport for a final ruling.[89]

If a TUE had not been granted for testosterone or estrogen supplementation, and a doping control test resulted in the detection of testosterone or estrogen supplementation in the athlete's sample, the athlete would have the opportunity for a hearing before an impartial panel to have his or her situation considered. Nonetheless, under the current anti-doping rules, by being proactive in applying for and receiving a TUE in advance of sport participation, transitioning and transitioned athletes would be in the best position to establish that their use of hormone supplementation was for valid therapeutic purposes and not with the intent to enhance performance.

The argument is made in the social science literature that the World Anti-Doping Code should not be invoked to stop transitioned athletes from competing because none of the Code's 'spirit of sport' values, including fair competition, are being contravened. The perspective taken is that hormone supplementation for transitioning and transitioned athletes is a completely separate issue from illegal doping.[90] In fact, the same may also be said about other legitimate medical matters which are subject to the TUE process. From asthmatics to cancer patients to diabetics – the TUE system has evolved to address high requirements and challenging circumstances faced by athletes with medical needs. It is acknowledged that the current process is accompanied with certain limitations (for example, male athletes facing fertility problems caused by low levels of testosterone will likely not have any ability for treatment until after they retire from sport – fertility treatment is not easily recognized as valid for a TUE). Medical treatment with testosterone and other hormones is a very restricted area for being granted a TUE.

The overall TUE system – for all athletes – is intended to have a rigorous process for approvals to be granted. It may have limitations, but it is a necessary process to enable athletes with medical conditions to continue to participate in sport while not opening a 'back-door' to those

that would deliberately cheat by using prohibited substances under the guise of a medical condition. However, even if this perspective is valid and widely held, all athletes, including those who are transitioned or transitioning, must still apply for a TUE in a timely manner if they intend to use substances that are otherwise prohibited.

4.5 Key Findings

In summary, key findings and conclusions from the reviews of the social science literature and biological scientific literature include:

1. Sex verification testing of athletes should be considered a human rights violation and eliminated from all levels of sport.

2. Doping control procedures make it virtually impossible for physically born male or female athletes competing at the national level or international level to intentionally cheat by masquerading as the opposite sex.

3. There is no evidence or convincing logic that athletes would transition in order to gain competitive advantages.

4. While generally there are numerous anatomical and physiological differences between men and women, there also is a vast range of anatomical and physiological variation within each sex. The implication is to ask whether transitioned athletes, in fact, fit in the broad variance that already exists within their new sex.

5. Both testosterone and estrogen can influence performance, and therefore transitioning and transitioned athletes participating in competitive sport should try to consistently have sex hormone levels within the normal range for their new sex.

6. Physically born women and transitioned women have similar concentrations of both testosterone and estrogen. Estrogen supplementation to transitioned women resulted in haemoglobin levels similar to those found in physically born women, and similar muscle mass at the upper range of development. Subcutaneous fat content remained lower while total body weight was higher in transitioned women.

7. Transitioned men can have higher estrogen and testosterone concentrations compared with physically born men but the difference in testosterone levels can be eliminated by using a new long-lasting testosterone dosing regime. However, for all approved dosing regimes, testosterone supplementation to

Doping control procedures make it virtually impossible for physically born male or female athletes competing at the national level or international level to intentionally cheat by masquerading as the opposite sex.

The broad historical context that remains relevant for transitioning and transitioned athletes today is aptly summarized in the review of the social science literature: "Society did not offer any social or biological territory for those who found themselves between sexes and genders."

transitioned men resulted in haemoglobin levels similar to those in physically born men, and similar muscle mass at the upper range of development even when concentrations were higher. The only difference that continued following one year of supplementation was a higher amount of subcutaneous fat in transitioned men which could diminish performance in competitions with physically born men.

8. To date, there is no available research or other reliable scientific evidence to either support or refute the position that transitioned athletes compete at an advantage or disadvantage compared with physically born men and women athletes. In view of the lack of available research and the methodology requirements for credible new research, the answer to that question may never be known with certainty given the low prevalence of transitioned individuals in the population.

9. The IOC and World Anti-Doping Agency play influential leadership roles in how the sport community views sex and gender issues, and how the sport community sets policies establishing related eligibility and participation criteria.

10. The eligibility requirements in the IOC's Stockholm Consensus on sex reassignment in sports should be reviewed considering that few metabolic changes were found beyond one year of cross-sex hormone supplementation. The conditions that are imposed should not be vague or onerous to the point of being barriers. Eligibility requirements also need to address the full range of choices possible for transitioning and transitioned athletes. This includes the choice to have hormone supplementation but not sex reassignment surgery which has additional considerations outside the scope of the literature reviews.

11. The World Anti-Doping Code does not include mandatory standards that address the use of hormone supplementation for transition purposes. This could result in discretionary decisions that might be inconsistent from one case to the next.

5.0 What can We Learn from the Past?

The broad historical context that remains relevant for transitioning and transitioned athletes today is aptly summarized in the review of the social science literature: "In very general and simplified terms, western social, political, religious, and economic institutions were built on the fundamental notion that men and women were clearly discernable entities. Societies established and celebrated a paradigm of opposites for

male and female attributes, which people generally accepted as biological facts...In these general terms, the doctrines of science and medicine supported the creation and maintenance of separate spheres…Physical differences that did not align with normalized appearances were categorized as abnormal and behaviours that did not align were pathologized as mental disorders – undesirable and treatable. A lack of openness to difference and a general disgust for gender variance placed additional pressures upon individuals. Society did not offer any social or biological territory for those who found themselves between sexes and genders. The sheer pressure of the binary model of personhood, buttressed by science, medicine, and innumerable cultural institutions, rendered any alternatives unthinkable. Physical and behaviour modification, then, became the solution to sustain congruency between sex and gender."[91]

The social science literature review notes: "There has always been a continuum of physical capacities not restricted to the categories of male and female; but sport has been strategically used to identify and legitimize a gender binary – a 'bio-logic.'"

Sport, and particularly the Olympic Games, not only reflected but fortified this overarching context in uniquely important ways as a highly visible beacon for human excellence and national glory.

5.1 The Olympic Games[92]

The founder of the Olympic Games, Pierre de Coubertin, was against women's participation throughout his term as president of the IOC from 1896 to 1925, seeing sport competition as physical dominance over opponents and therefore inappropriate behaviour for women – men were seen as the only serious athletes.[93] In the early years of the Olympics, the media began to implicitly reinforce this view by focusing on the quantifiable aspects of athletic performance, such as racing records and length or height of jumps, and predicting athletic prowess based on size and strength or speed. In parallel with enduring social biases, female athletes were judged first on their appearance, second on their behaviour and third on their performance while the reverse order applied to male athletes.[94]

The social science literature review notes that "the binary model made little sense, even in the 1920s. Indeed, female athletes had more in common physically with male athletes than with other women and the same applied to men. All men were not faster and stronger than all women…This had been evident in farm fields and other venues of labour and life for centuries. There has always been a continuum of physical capacities not restricted to the categories of male and female; but sport has been strategically used to identify and legitimize a gender binary – a 'bio-logic.' Olympic leaders, sports administrators, athletes, the media, all of us have found ways to distinguish between men and women, in spite of a significant body of evidence that suggests that physical capacity operates on a continuum."[95]

Systematic doping during the Cold War era served to reinforce the idea of 'unfeminine' women being more successful in sport and contributed to the legacy of an inequitable sport environment that transgressed the rights and dignity of athletes who did not fit the binary male - female sex and gender models.

Despite the disdain for women participating in sport persisting into the 1930s and 1940s, changes were underway as it became increasingly evident that excluding women athletes from the Olympic Games was no longer a viable approach. The social science literature review concludes: "If the IOC was to maintain control over sport and to apply an international consistency in world competition, then marginalized groups that threatened this sovereignty had to be assimilated or incorporated into an acceptable model."[96]

The IOC and IAAF agreed to include five women's athletics events at the 1928 Olympic Games on the basis of having control over all aspects including eligibility to participate.[97] Subsequently, with the permanent acceptance of female athletes in the athletics program at the 1932 Olympics, the IOC leadership ensured a clear divide between 'feminine' and 'masculine' sports. Fencing, swimming, tennis, figure skating, and gymnastics were seen by sport leaders and the media as appropriate sports for women to demonstrate athletic skills with elegance and artistic style. Appearance and deportment were under scrutiny, and any departure from femininity was met with suspicion which could escalate into rumours of homosexuality and accusations of cheating.[98] In the 1930s, while president of the United States Olympic Committee, Avery Brundage once appealed to the IOC to have an American female athlete barred from competition because he thought that her voice was too deep and her feet were too big.[99] Brundage brought his concerns of possible sex or gender variance to his post as president of the IOC from 1952 to 1972,[100] and it was part way through his tenure that the IOC first introduced sex verification testing at the Olympic Games.

5.2 The Cold War Era[101]

War – whether a state of severe political tension between countries or actual physical combat – has proven to be a powerful catalyst of change throughout history. This was certainly the case for the Cold War that began in 1945 between the United States and the former Soviet Union. Amidst the threat of nuclear obliteration lurking in the background, sport was included in a bloodless battleground where every form of competition became symbolic of national superiority. The review of the social science literature examined the impact for women athletes: "The arrival of the Soviet Union with a full team of male and female athletes in the Games of 1952 forced western nations to field full teams of women across the spectrum of sport…at the same time, the sporting culture that developed during this period chastised women who did not look or act like women – the pressures to achieve competitive success between east and west were at direct odds with the gender binary that sporting culture had promoted and secured for decades. Consequently, many athletes suffered severe criticism and outright

suspicion for their appearances and physical performances…the historical assumption that sport was fair, the competitive ground was equal, and that rules ensured fair play made sport highly susceptible to distrust between competitors and competing nations."[102]

Pursuit of suspicions led to sex verification testing of female athletes, revealing a continuum between female and male biological sex characteristics and raising issues of gender variance – complex facts that the sport community was ill-prepared and ill-equipped to properly address.

In the acutely competitive environment of the Cold War era and with so much at stake, it was essential for the IOC, international and national sport federations, and national Olympic committees to do their utmost to reach for the ideals of a fair and level playing field at an administrative level through rules, codes, monitoring and investigations.[103] The discovery of synthetic testosterone and its ability to enhance athletic performance by artificially increasing size, strength and speed eventually brought illegal doping to the forefront of the mission to achieve fair sport. Suspicions about doping and other forms of cheating were prevalent during the Cold War period and accompanied athletes to the top of the podium.

As noted in the social science literature review, sport administrators were caught up in a heightened dilemma: "Cold War suspicions raised two challenges, linked ideologically, to the 'purity' of sport that administrators had so long fought to preserve: athletes were taking drugs to improve performance; 'unfeminine women' from east bloc nations were outperforming western women."[104] This dilemma spread to include growing concern amongst the public: "Developments in training and training science and a far more extensive commitment by athletes to full-time competitive preparation resulted in new athletic bodies which challenged the gender binary. To the increasing television audiences, athletes looked bigger and stronger, and the appearance of big, strong, women directly confronted long-standing common beliefs about feminine bodies."[105]

As we now know, systematic doping during the Cold War era served to reinforce the idea of 'unfeminine' women being more successful in sport and contributed to the legacy of an inequitable sport environment that transgressed the rights and dignity of athletes who did not fit the binary male - female sex and gender models.

5.3 From Past to Future Tense

Reflecting upon the past illuminates the reality transitioning and transitioned athletes face today. As described above, for many years competitive sport was considered to be unsuitable and improper for women, and men were seen as the true athletic contenders. Yet, women slowly edged into high level competitive sport as unwelcome participants until the Cold War increased their value – women could add to the medal

The social science literature review concludes that "of all institutions to deal with gender variance, including law and the workplace, sport is not conducive to gender blending – to considering maleness and femaleness on a continuum or to preventing discrimination and harassment towards transitioning and transitioned athletes."

count and the highest medal count symbolized a visible aspect of national superiority on the world stage.

Some of the female athletes who were winning gold and silver and bronze on the world stage were conspicuously muscular and also consummate competitors. Suspicions grew about whether female athletes with features or behaviour veering from a narrowly defined concept of femininity might be men competing as women in order to win. Pursuit of those suspicions led to sex verification testing of female athletes, revealing a continuum between female and male biological sex characteristics and raising issues of gender variance – complex facts that the sport community was ill-prepared and ill-equipped to properly address.

When transitioning from being male to female or female to male became a choice to resolve gender dysphoria, an additional concern came sharply into focus in sport. Suspicions about cheating by both male and female athletes had been fuelled to an unprecedented level by the possibility of undetected use of performance enhancing substances including the synthetic hormones used for the transitioning process. With the eventual introduction of the Stockholm Consensus as an IOC policy in 2004, transitioned athletes meeting the specified criteria have been formally recognized by the IOC as legitimate and fair competitors against members of their new sex, and a guideline for their inclusion has been established for other sport administrating bodies. However, the literature reviews raise important questions about the policy's limitations and onerous criteria,[106,107] and to date the World Anti-Doping Agency has not followed suit by providing standardized requirements for allowing the use of synthetic hormones as an ongoing part of the transition process.

Other aspects of the continuum of sex identity and gender identity remain unaddressed in any official, universal way by the leading sport administration bodies. In fact, the social science literature review concludes that "of all institutions to deal with gender variance, including law and the workplace, sport is not conducive to gender blending – to considering maleness and femaleness on a continuum or to preventing discrimination and harassment towards transitioning and transitioned athletes."[108] Leadership is emerging in other sectors, such as business and education, with the implementation of anti-discrimination policies and, in some cases, educational sessions for staff.[109]

The past holds prophetic lessons for the future – a future that, to an important extent, will be determined by what we do today. In responding to the fact that there is a continuum in sex and gender identity, sport institutions need to look at past parallels of discrimination and limited vision amongst their ranks, evolving best practices and relevant standards in all sectors, and the full scope of available scientific research.

6.0 Conclusion

Sport is about human endeavour and human excellence. From a soccer tournament in a small town to the Olympic Games, sport has a unique opportunity to contribute to who we are as individuals, as communities, as nations and connected together as humanity. In its sphere of influence, sport plays a role in shaping our values, how we relate, and how we react to challenge. High performance sport has always meant being on the leading edge of talent, training and fortitude, and has come to mean also being on the leading edge in preventing doping and other forms of cheating. Those two edges interface in a shifting frontier where exemplary leadership by sport institutions is required to ensure fair, safe and inclusive sport for all participants. This frontier is about finding the best answers to the complex inclusion - exclusion questions that remain fundamental to the essence of sport, and calls for the highest level of commitment, progressive thinking and accountability.

The challenge ahead lies in the defining obligation of sport to be fair and ethical without arbitrarily excluding athletes. Current approaches to 'gender verification' do not meet that test. Given that the binary model of sex and gender identity is entrenched in sport rules, responsibility for determining how to fairly and ethically include sex and gender variance within the rules rests with sport organizations and relevant government ministries. The major issues to address are eligibility criteria involving categorization by sex and anti-doping rules that are open to interpretation and could have significantly different outcomes for transitioning and transitioned athletes.

It is time for the sport community to undertake this challenge worldwide, and for Canada to be on the forefront and join with other countries in modelling the leadership required. The *Promising Practices: Working with Transitioning/Transitioned Athletes in Sport* project endeavours to provide a sound framework and to be a catalyst for the Canadian sport community to take up this role. This discussion paper, along with the two literature reviews, is intended to promote dialogue and serve as a basis for consultations, including broad consultations within the sport community and focused consultations with athletes who are transitioning or have transitioned, key sport organizations and senior sport administrators. Concurrently, the project plans to compile an inventory of relevant policies, promising practices, available resources and selected case studies. Together, these actions will support the goal of having a standardized Canadian policy with attendant protocols and practices for the inclusion of transitioning and transitioned athletes in sport.

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…It is time for the sport community to undertake this challenge worldwide, and for Canada to be on the forefront and join with other countries in modelling the leadership required.

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Appendix A

Glossary of Terms and Acronyms

Aerobic Capacity – the capacity of the body to transport and utilize oxygen during exercise. This is a reflection of the physical fitness of the individual.

Anabolic – pertaining to the metabolic process that promotes tissue growth.

Anabolic Steroids – synthetic hormones that are derivates of testosterone and that are used to promote tissue growth, especially of muscles.

Anaerobic Capacity – the capacity of the body to generate energy without oxygen during intense exercise.

Androgen – a hormone or substance that promotes and maintains male sex characteristics.

Androgen Insensitivity Syndrome – a condition where hormonal anomalies result in various sex organ developments – in some cases an individual's organs appear to be 'female' at birth and during childhood but develop into male genitalia during puberty. These individuals appear identical to females with XX chromosomes at birth but in fact have XY chromosomes.*

Anti-oxidant – a molecule that is capable of slowing or preventing the oxidation of other molecules.

Bone Mineral Density – a measure of bone density reflecting the strength of bones as represented by calcium content.

CASM – Canadian Academy of Sport Medicine.

Estrogen – hormones that primarily influence the female reproductive system's development, maturation, and function. The three major estrogens — estradiol, estrone, and estriol — are produced mainly by the ovaries and placenta while the adrenal glands and the testes secrete smaller amounts. Estrogens affect the ovaries, vagina, fallopian tubes, uterus, and mammary glands and play crucial roles in puberty, menstruation, and pregnancy. They also influence the structural differences between female and male bodies.

Fast Twitch (Type II) Muscle Fibres – muscle fibre that contracts quickly especially during brief high-intensity physical activity requiring strength such as jumping or running at full speed for a short distance.

Gender – traditionally defined as socially, culturally, and psychologically determined aspects of femaleness and maleness.*

Gender Dysphoria – persons uncomfortable in their anatomical and assigned sex.*

Gender Identity – the internal experience of one's gender.*

Gender Identity Disorder (GID) – a formal diagnosis established by the American Psychiatric Association in its *Diagnostic and Statistical Manual of Mental Disorders* to replace 'transsexualism'.*

Gender Variance – interests and behaviours that are not consistent with cultural norms typical for one's assigned sex or do not align completely with either assigned sex.*

Genotype – the genetic makeup of an organism.

Glycogen – the form of carbohydrate stored by humans in the liver and muscles. Glycogen is used as a fuel during exercise.

Gonads – the testes and ovaries.

Haemoglobin – a protein-iron compound in red blood cells that carries oxygen from the lungs to the tissues in the body.

Hermaphrodite – older term used to describe infants born with one ovary and one testis or with organs that contain a mix of both kinds of tissues.*

IAAF – International Association of Athletics Federations.

IMCL – intramyocellular lipid.

Intersexual – person born with ambiguous genitalia (replacing the term 'hermaphrodite').*

Intramyocellular Lipid – lipids stored within the muscle fibres of skeletal muscle.

IOC – International Olympic Committee.

Lean Body Mass – the weight of the body minus the fat content.

Lipid Metabolism – conversion of the fat molecule from fat to energy and other by-products.

Lipids – fats and fatlike substances, such as fatty acids, which are not soluble in water. Lipids are easily stored in the body, serve as a source of fuel, are an important constituent of cell structure, and serve other biological functions.

Metabolism – all the physical and chemical processes in the body that create and use energy, such as digesting food and nutrients, eliminating waste, breathing, circulating blood, controlling body temperature, contracting muscles, and functioning of the brain and nerves.

Phenotype – the appearance of an individual resulting from an interaction of genetic and environmental influences.

Q Angle – angle of the quadriceps to the knee.

Quadriceps – the large four-part muscle at the front of the thigh that extends the leg.

Sex – traditionally defined biologically by the presence of particular external genitalia, chromosomes, and hormones.*

Sexual Orientation – refers to a person's attraction to a sexual partner of the same physical sex or opposite physical sex or both sexes.

Skeletal Muscle – muscle that is connected to bone. Skeletal muscle is used to move the skeleton in walking, lifting, etc.

Slow Twitch (Type I) Muscle Fibres – muscle fibre that contracts slowly especially during sustained physical activity requiring endurance such as running marathons.

Subcutaneous Fat – fatty tissue just under the skin.

Testosterone – a hormone that is produced primarily by the testes or made synthetically. Testosterone is necessary in the fetus for the development of male external genitalia. Increased levels of testosterone at puberty are responsible for further growth of male genitalia and for the development and maintenance of male secondary sex characteristics such as facial hair and voice changes. Testosterone is an anabolic agent for muscular development.

Transgender – a broad term identifying diversity in identities, practices, and beliefs among gender nonconforming people. The majority of transgender individuals choose not to modify their bodies.*

Transitioning/Transitioned – individuals who experience gender dysphoria and choose to modify their bodies through surgery and hormone treatments. A transitioned female is male-bodied and transitions to female; a transitioned male is female-bodied and transitions to male.*

Transphobia – the irrational fear or hatred of the gendered subject in transition.*

Transsexual – an older term, at one time used to describe an individual who has undergone a 'sex-change' operation.*

TUE – Therapeutic Use Exemption.

TUEC – Therapeutic Use Exemption Committee.

Visceral Fat – fat surrounding the internal organs in the abdominal area.

*Kevin B. Wamsley, "Sport and Transitioning/Transitioned Athletes: A Review of the Social Science Literature" (February, 2008), 3-4,17. http://www.athletescan.com/Content/Publications.asp.

Appendix B

*Prominent Cases of Sex and Gender Identity Issues in Sport**

Stanislawa Walasiewicz – (a.k.a. Stella Walsh) – gold medal winner, 100m, Los Angeles 1932. Killed during a robbery in 1980 and the autopsy revealed ambiguous genitalia, and possibly androgen insensitivity syndrome. The 1980s press accused her of being a man reinvigorating debates over the issue of men competing as women in international sport.

Hermann Ratjen – (a.k.a. Dora Ratjen) The only reported case of a man competing as a woman at the Olympic Games. Ratjen claimed that the Nazis forced him to compete as a woman in the high jump competition. He competed for three years.

Zdenka Koubkova – 800m runner, competed in the 1930s, who underwent surgery to become a man.

Mary Edith Louise Weston – shot put and javelin, became Mark Weston in 1937.

Claire Bresolles and Lea Caurla – members of the French 4 x 100m relay team that won silver medals at the 1946 European championships in Oslo. Later, they both lived as men: Pierre Bresolles and Leon Caurla.

Eva Klobukowska – the first athlete to 'fail' the chromosome test – disqualified in 1967, stripped of her 1964 Olympic medal and publicly humiliated.

Tamara and Irina Press – Soviet track and field athletes who retired prior to sex testing at the 1966 European Cup – presented to the American public as the monstrosities of eastern bloc training and deception.

Maria Jose Martinez Patino – a hurdler who failed the sex test at the 1985 World University Games. Officials told her to fake an injury. She refused and was disqualified, publicly humiliated, and suffered intense international scrutiny. A battery of degrading tests eventually revealed androgen insensitivity syndrome. Her status was returned 2½ years later.

Renee Richards – transitioned athlete, male to female sex reassignment surgery. She challenged the US Tennis Association to enter competition.

Danielle Swope – intersexed athlete who underwent surgery and was eventually permitted to compete in golf as a woman.

Mianne Bagger – the first transitioned athlete to play in a Ladies Professional Golf Association (LPGA) event.

Santhi Soundarajan – stripped of her medal at the Asian Games after 'failing' a gender test.

*Kevin B. Wamsley, "Sport and Transitioning/Transitioned Athletes: A Review of the Social Science Literature" (February, 2008), 13-15. http://www.athletescan.com/Content/Publications.asp.

Michelle Dumaresq – transitioned Canadian cyclist. Many athletes protested her participation.

Kristen Worley – transitioned Canadian cyclist.

Eric Schineggar – an intersex athlete, Erika 'failed' the sex test before the 1968 Grenoble Olympics and was asked to withdraw. She voluntarily surrendered her 1966 World Cup ski medal and later underwent surgery.

Appendix C
*World Records by Sporting Event for Men and Women as at February 9, 2009**

Event	Men	Date of World Record	Women	Date of World Record	% Difference**
TRACK AND FIELD					
100 m	9.69 sec	August 16, 2008	10.49 sec	July 16, 1988	8.3
400 m	43.18 sec	August 26, 1999	47.60 sec	October 6, 1985	10.2
1000 m	2:11.96 min	September 5, 1999	2:28.98 min	August 23, 1996	12.9
10 km	27:02 min	December 11, 2002	30:21 min	February 23, 2003	12.3
42 km	2:03:59 hrs	September 28, 2008	2:15:25 hrs	April 13, 2003	9.2
100 km	6:13:33 hrs	June 21, 1998	6:33:11 hrs	June 25, 2000	5.3
High jump	2.45 m	July 27, 1993	2.09 m	August 30, 1987	17.2
Pole vault	6.14 m	July 31, 1994	5.05 m	August 18, 2008	21.6
Long jump	8.95 m	August 30, 1991	7.52 m	June 11, 1988	19.0
Javelin	98.48 m	May 25, 1996	72.28 m	September 13, 2008	36.2
SPEED SKATING—SHORT TRACK					
500 m	41.051 sec	February 10, 2008	42.609 sec	November 29, 2008	3.8
1000 m	1:23.815 min	October 14, 2007	1:29.495 min	March 15, 2008	6.8
1500 m	2:10.639 min	October 24, 2003	2:16.729 min	February 9, 2008	4.7
SPEED SKATING—LONG TRACK					
500 m	34.03 sec	November 9, 2007	37.02 sec	November 16, 2007	8.8
1000 m	1:07.00 min	November 10, 2007	1:13.11 min	March 25, 2006	9.1
1500 m	1:42.01 min	March 14, 2008	1:51.79 min	November 20, 2005	9.6
5000 m	6:03.32 min	November 17, 2007	6:45.61 min	March 11, 2007	11.6
SWIMMING					
50 m freestyle	21.28 sec	March 28, 2008	23.97 sec	March 29, 2008	12.6
100 m freestyle	47.05 sec	August 13, 2008	52.88 sec	March 27, 2008	12.4
200 m freestyle	1:42.96 min	August 12, 2008	1:54.82 min	August 13, 2008	11.5
400 m freestyle	3:40.08 min	July 30, 2002	4:01.53 min	March 24, 2008	9.7

*Michaela C. Devries, "Do Transitioned Athletes Compete at an Advantage or Disadvantage as Compared to Physically Born Men and Women: A Review of the Scientific Literature" (May 18, 2008), 4. http://www.athletescan.com/Content/Publications.asp. Updated from the Official Website of the Olympic Movement, "World Records," http://www.olympic.org/uk/sports/records/results_uk.asp (accessed February 9, 2009) and the International Association of Athletics Federations, "World Outdoor Records," http://www.iaaf.org/statistics/recbycat/location=O/recordtype=WR/event=0/age=N/area=0/sex=W/records.html (accessed February 9, 2009).

**% difference in distance for high jump, pole vault, long jump and javelin world records, and in speed for all other world records.

Appendix D

*Statement of the Stockholm Consensus on sex reassignment in sports**

On 28 October 2003, an ad-hoc committee convened by the IOC Medical Commission met in Stockholm to discuss and issue recommendations on the participation of individuals who have undergone sex reassignment (male to female and converse) in sport.

This group was composed of:
Prof. Arne Ljungqvist (SWE)
Prof. Odile Cohen-Haguenauer (FRA)
Prof. Myron Genel (USA)
Prof. Joe Leigh Simpson (USA)
Prof. Martin Ritzen (SWE)
Prof. Marc Fellous (FRA)
Dr Patrick Schamasch (FRA)

The group confirms the previous recommendation that any "individuals undergoing sex reassignment of male to female before puberty should be regarded as girls and women" (female). This applies as well for female to male reassignment, who should be regarded as boys and men (male).

The group recommends that individuals undergoing sex reassignment from male to female after puberty (and the converse) be eligible for participation in female or male competitions, respectively, under the following conditions:

- Surgical anatomical changes have been completed, including external genitalia changes and gonadectomy
- Legal recognition of their assigned sex has been conferred by the appropriate official authorities
- Hormonal therapy appropriate for the assigned sex has been administered in a verifiable manner and for a sufficient length of time to minimise gender-related advantages in sport competitions.

In the opinion of the group, eligibility should begin no sooner than two years after gonadectomy.

It is understood that a confidential case-by-case evaluation will occur. In the event that the gender of a competing athlete is questioned, the medical delegate (or equivalent) of the relevant sporting body shall have the authority to take all appropriate measures for the determination of the gender of a competitor.

*International Olympic Committee, "Statement of the Stockholm Consensus on sex reassignment in sports," The Official Website of the Olympic Movement, http://multimedia.olympic.org/pdf/en_report_905.pdf (accessed December 15, 2008).

Appendix E

Further Reading

The social science literature review and scientific literature review prepared for the *Promising Practices: Working with Transitioning/Transitioned Athletes in Sport* project can be accessed at http://www.athletescan.com/Content/Publications.asp. The "References" section in each review is a source for further reading.

The social science literature review specifically recommends the following publications as helpful further reading specific to athletes and transitioning:*

- S. Birrell and C.L. Cole, "Double fault: Renee Richards and the construction and naturalization of difference," *Sociology of Sport Journal* 7 (1990): 1-21.

- S.L. Cavanagh and H. Sykes, "Transsexual Bodies at the Olympics: The International Olympic Committee's Policy on Transsexual Athletes at the 2004 Athens Summer Games," *Body & Society* 12, no. 3 (2006): 75-102.

- C.L. Cole, "Testing for Sex or Drugs?," *Journal of Sport and Social Issues* 24, no. 4 (2000): 331-3.

- M.J. Kane, "Resistance/Transformation of the Oppositional Binary: Exposing Sport as a Continuum," *Journal of Sport and Social Issues* 19, no. 2 (1995): 191-218.

- J. Pilgrim, D. Martin and W. Binder, "Far from the finish line: Transsexualism and athletic competition," *Fordham Intellectual Property Media and Entertainment Law Journal* 13 (2002-2003): 495-550.

- I. Ritchie, "Sex Tested, Gender Verified: Modern Sport and the Construction of Sexual Difference" (Dissertation. Bowling Green State University, 1996).

- I. Ritchie, "Sex Tested, Gender Verified: Controlling Female Sexuality in the Age of Containment," *Sport History Review* 34, no. 1 (2003): 80-98.

- H. Sykes, "Transsexual and Transgender Policies in Sport," *Women in Sport and Physical Activity Journal* 15, no. 1 (2006): 3-13.

- S. Teetzel, "On Transgendered Athletes, Fairness and Doping: An International Challenge," in *Doping in Sport: Global Ethical Issues*, ed. A.J. Schneider and F. Hong (London and New York: Routledge, 2007), 51-75.

*Kevin B. Wamsley, "Sport and Transitioning/Transitioned Athletes: A Review of the Social Science Literature" (February, 2008), 21-22. http://www.athletescan.com/Content/Publications.asp.