Submission to Senate Inquiry into the practice of sports science in Australia

Queensland Academy of Sport - Sport Science Group

Written by:

Daniel Greenwood (Biomechanics/Skill Acquisition)

Dr Mark Osborne (Physiology)

Dr Trish King (Physiology)

Dr Megan Shephard (Physiology)

Hedda Brooks (Physiology/Biomechanics)

Daniel Chalkley (Skill Acquisition)

Shaun D'Auria (Physiology)

Clare Jones (Biomechanics)

Chris McCosker (Biomechanics)

The opinions contained within the following submission represent the members of the Sport Science unit at the Queensland Academy of Sport and is written based on reflections from the State Academy and State Institute system. The document represents the personal opinions and views of the authors of the paper and do not reflect those of the Queensland Academy of Sport or the Queensland Government.

In line with what is expected of other professional practitioners the following document proposes standards, including ethical, moral and accountability expectations for application across the sport science industry of Australia. Within these expectations it is proposed that education, knowledge and experiential standards are included to better define and classify a sport scientist.

(a) The current scope of practice, accreditation and regulation arrangements for the profession;

Within the broader umbrella of sport science in Australia no scope of practice, accreditation or regulation exists within which scientists operate. However, within larger collections of sport scientists staff expectation documents are often developed internally. These act as a mission statement and present guidelines within which collective groups operate. For example, at the Queensland Academy of Sport, sport science guidelines encompass the following:

- Definition of Sport Science
- Definition of a Sport Scientist
- Sport Science Framework
- Philosophy and Expectations

The entire document is attached to the submission in the document titled '2013 Queensland Academy of Sport Science Guidelines and Staff Expectations' found in Appendix A (P.12).

Within the State Academy and State Institute system the National Sport Science Quality Assurance (NSSQA) program has provided guidance and regulation to physiology specific staff and laboratories since 1989. Through annual reporting and an on-site assessment every 4 years laboratories are accredited for testing of athletes following successful equipment validation and confirmation of staff competences. This system is comprehensive for physiology testing and more recently NSSQA has begun to implement processes for other fields of sport science including biomechanics, performance analysis and sports medicine. While the NSSQA mechanisms are not currently sufficient to regulate across all sport science disciplines, it is appropriate to consider the contribution of NSSQA in any plan that looks to establish accreditation and regulation systems within the sport science industry.

The collective referred to as sport science includes professionals who possess discipline specific expertise. Understanding of the sport science disciplines involved is important to understand the broad scope of work which is undertaken within the field. The three main disciplines which are evident at major state institutes and academies are:

- Physiology

    - Study of acute responses and chronic adaptations to athletic training
- Biomechanics
    - Optimising sports technique for performance benefits and injury prevention
- Skill Acquisition
    - Study and application of learning principles to increase skill development

Additional disciplines exist which are under the broader title of sport science and are present at some State institutes and academies including:

- Performance Analysis
    - Objective measurement of performance and qualitative feedback
- Sport Nutrition
    - Plan athlete diets during training, competition and recovery. Provide advice on nutritional supplements.
- Strength and Conditioning
    - All-round physical preparation to complement the athlete's sport-specific skills development
- Sport Psychology
    - Study of psychological factors which contribute to human behaviour in sport

Also working within the boundaries of sport science are various allied health professionals from a variety of backgrounds and disciplines. Examples include sports medicine, engineering, technical support, physiotherapy, and massage therapy. While some of these groups have their own professional bodies which represent their interests (e.g. Australian Physiotherapy Association, Australian Association of Massage Therapists), it is important that they are included under the same code of conduct and ethical bounds as sport science practitioners due to the close affiliation and cooperative work environment in which they operate. The broad range of discipline specific knowledge should highlight that supplementation represents only a small component of sport science, especially considering the current reporting of ‘sport science’ in the media.

When considering sport scientists as a collective national organisations do exist which present opportunities for professional membership. Examples include Sports Medicine Australia and Exercise and Sport Science Australia. In their current form these organisations fail to adequately represent the needs and requirements of applied sport scientists or acknowledge the variety of disciplines which contribute to the sport science collective. The focus on clinical, rather than applied, sport science presents limitations to the understanding of the role of a sport scientist in athlete focussed sport environments and restricts their relevance to the industry as a whole.

(b) The role of boards and management in the oversight of sports scientists inside sporting organisations;

Within State Institute and Academy set-ups scientists are overseen by management and boards at Institute and Academy level as well as at the sport specific level by National Sporting Organisations.

Effective management processes and oversight are important within sporting organisations to ensure staff expectations are set and specification of roles (and boundaries) exist. Arguably poor management processes have contributed to the catalyst which triggered the current review of sport science practices in Australia. The communication between sport scientists and management has often not been consultative enough from both parties suggesting improvement from both groups is required.

While ultimately responsible for all decisions made, management in sport science settings can be complex due to the multi-disciplinary nature of the professionals and information involved. Therefore, in order for management to make informed decisions consultative processes with sport scientists are required. It is the discipline specific knowledge which sport scientists possess which can effectively contribute to educated approaches which satisfy scientific rigour as well as the sports needs for performance outcomes. However, the need for this approach to remain as a collaborative process which benefits from open communication channels between manager and scientists cannot be emphasised enough.

Within the context of decision making a significant limitation within the current structure is the lack responsibility to respond to complaints and issues from external and internal staff, or the existence of an official complaint process. For example, if a sport scientist finds a directive or practice from their manager against their professional judgement there is no channel to officially note their concern, and alternatively if management disagrees with a scientific approach they are unable to argue on a scientific level due to discipline and research specific nature of the knowledge involved. An informal board made up of senior scientists and management could exist as a facilitator within sporting organisations for concerns to be aired, presenting a mediation style setting to allow the group to move forward with the best interests of the athlete and group as their primary concern.

(c) The duty of care of sports scientists to athletes, and the ethical obligations of sports scientists in relation to protecting and promoting the spirit of sport;

As professionals this is certainly an important issue and any association that looks to accredit and regulate sport science should include a compulsory code of ethics and expectations for professional conduct. It is acceptable for responsible professionals to be subject to consequences for breaches of ethical or conduct rules, especially as similar practices have existed for many years in similar professional disciplines such as medicine. This is especially relevant due to the influence which sport scientists can have over coaches and athletes, especially younger more vulnerable athletes.

Staff of the Queensland Academy of Sport are subject to an official code of conduct from both the Queensland Government, which covers broad behaviour requirements, and the Queensland Academy of Sport, which details conduct requirements. The staff expectations document alluded to earlier in the submission and attached below details more specific expectations of appropriate behaviour expected from a sport scientist.

When considering the details which would comprise an ethical and code of conduct document 'Exercise and Sport Science Australia' have already created a 'Code of Professional Conduct and Ethical Practice' (included as Appendix B - P.23) for their members which has an appropriate framework that could be applied to the broader sport science

industry with minor edits. A specific addition would be requiring practitioners to abide by the ASADA rules and regulations with reference to supplementation and training practices. A similar document has also been created by Sports Medicine Australia for its members which is less detailed than Exercise and Sport Science Australia code of ethics but could also be considered appropriate.

(d) Avenues for reform or enhanced regulation of the profession;

We believe that the sport science industry requires a body which represents and regulates sport science, overseeing practitioners and practices. That body would have the following roles:

- Advocate on behalf of its members
    - Present a voice for the sport science collective
    - Work with governments and related organisations to ensure provision of resources and knowledge to develop and maintain world class practices
    - Provide informed and authoritative expert sport science commentary on relevant issues
    - Present policy and advice including position statements on best practice
    - Lead the sport science debate, promoting policies based on empirical research over those developed through unquantified or 'fad based' foundations.
- Support the profession
    - Ensure minimum qualification and knowledge standards to protect the profession
    - Preserve and protect the political, legal and industrial interests of sport science practitioners
- Provide a code of conduct which represents core fundamental principles, and a code of ethics to which practitioners are bound.
    - Hold sport scientists to account
    - Provide consequences for behaviour
    - Failure to adhere to standards could result in dismissal from the regulatory body

The set-up of the body could be similar to that of any major regulatory body which already exists in similar professions. Examples include the Australian Medical Association, Sports Dieticians of Australia, or the Australian Physiotherapy Association.

To classify a sport scientist recognition of education, knowledge and experiential history are important. When considering accreditation, a tiered system which denotes this understanding would provide industry standards and aid definition. Importantly this offers potential employers with confirmation of individuals skills and discrimination of credentials between individuals for quality control in the appointment of scientific staff. Presented below are 2 potential regulatory set-ups, the first which considers all sports scientists under the same umbrella and the second acknowledging the discipline specific nature of sport science.

The first proposed regulatory set-up assembles sport science disciplines together and discriminates between levels of accreditation based on years of experience and university qualifications. This simplicity standardises expectations and potentially reduces the workload required for accreditation processes. While the definition and amount of categories can be specified following rigorous debate, a provisional 6 tier set-up (Student, Associate, Provisionally Accredited, Accredited, Senior Accredited, Fellow) is proposed below:

Student membership is open to students in the process of completing a three or four year degree or equivalent in the field of sports science.

Associate is available to persons in other professional fields whose qualifications would not meet the criteria for Sport Science Accreditation, but whose degree may contribute to the field of sports science in Australia. For example, a member of another accreditation body such as an engineer or strength and conditioning professional. This would also encompass academic professionals, who while not directly interacting with athletes, use their research to provide important contributions to the area.

Provisionally Accredited Sport Scientist is available to new graduates of an undergraduate program in sport science or related discipline who have less than one year's experience in full-time employment. Provisional accreditation is also available for those who have completed an undergraduate degree in a relevant field and are currently completing post-graduate qualifications in sport science or related discipline.

Accredited Sport Scientist is available to graduates who have completed an undergraduate degree and honours degree in the field of sports science plus a minimum of 1 year full time experience.

Accredited Senior Sport Scientist is available to graduates who have completed a post-graduate degree (Masters or PhD) in the field of sports science plus a minimum 2 years full time practical experience, OR a minimum of 8 years practical experience. Senior practitioners may choose to specify their discipline specific interests in their post-nominal details (i.e. Physiology, Biomechanics, or Skill Acquisition).

Fellow is available to members of the governing body. It recognises those who have achieved a high level of professional accomplishment, responsibility and service to the association.

An alternative structure could better represent the discipline specific nature of sport science. Under this proposed model 'sport science' accreditation can be organised by a larger organisation which encompasses general skills and minimum standards. This could be based purely on qualifications and documented experience. This provides minimum standards for everyone wanting to call themselves a sport scientist in clubs, schools, and the private sector and importantly encompasses a code of conduct and ethical accountability.

Once a member of the overseeing body, scientists could achieve discipline specific accreditation which highlights their specialisation. Within the discipline specific recognition a tiered system should exist which could be similar to the previously alluded to tiered set-

up. Competency and accreditation of the individual could be recognised by discipline specific national groups which already exist, for example:

- Physiology – NSSQA and the State and Academy applied physiology network
- Biomechanics - Australian and New Zealand Society of Biomechanics
- Skill Acquisition – Australasian Skill Acquisition Research Group

A diagram of a potential discipline specific model of sport science accreditation is shown below in Figure 1.

Due to the speed at which technology and research can evolve within the scientific community ongoing professional development should be required for maintenance of professional accreditation. Due to the broad knowledge base which encompasses sport science, especially when sports specific knowledge is considered, the role of workshops, conferences, and discussion meetings between colleagues should be highlighted as keys to professional development. This is especially relevant as many accreditation systems focus on study based systems to dominate their professional development programs.

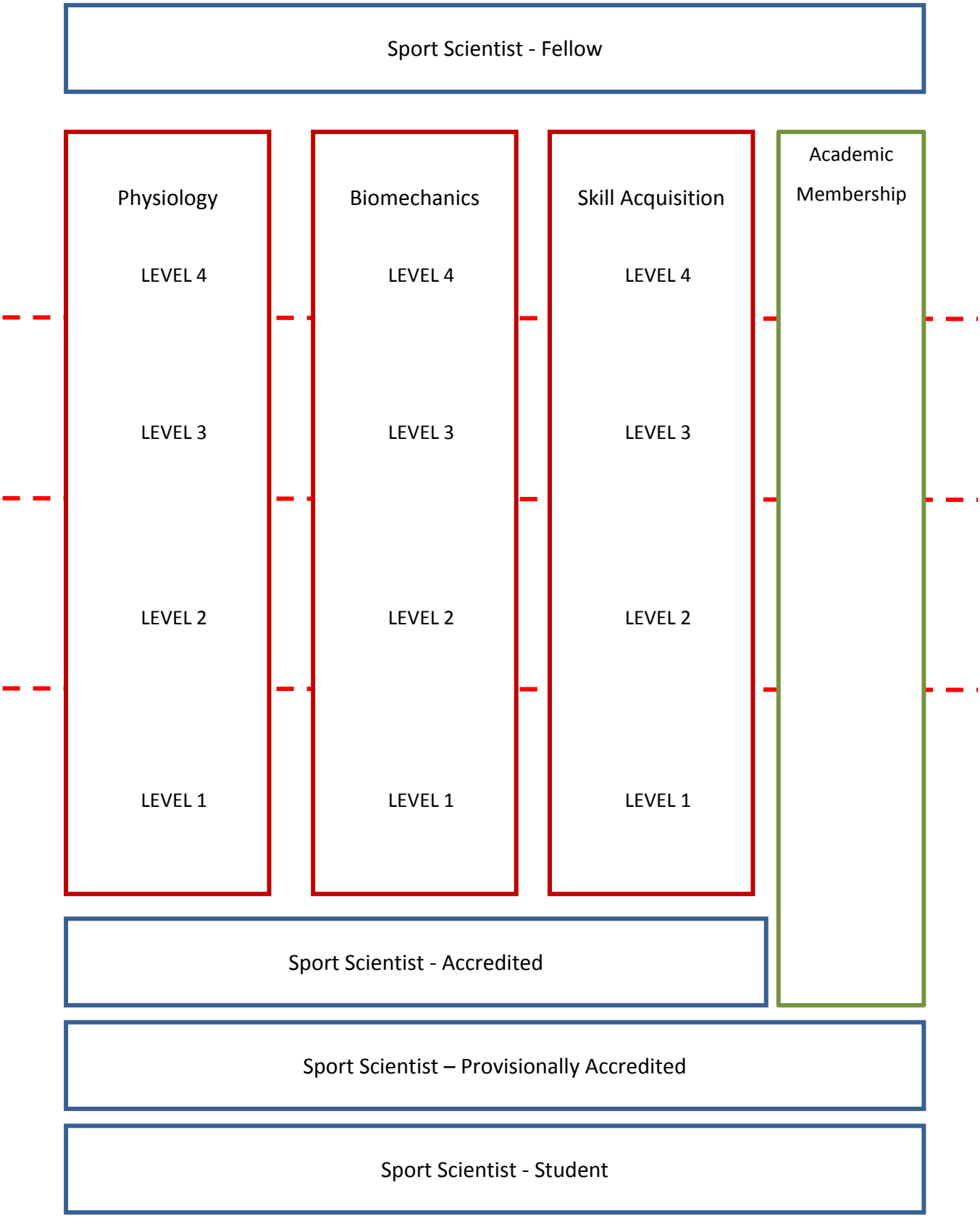

Figure 1: Example development chart for sport science accreditation which encompasses discipline specific knowledge

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(e) any other related matter

We believe a regulatory body is necessary to provide oversight and apply personal and professional expectations across the sport science industry. As major employers within the elite sport industry the creation of this regulatory body should involve consultation with major state institutes, academies and related stakeholders to ensure their needs are met. This is especially relevant as the current accreditation organisations fail to represent the needs of applied sport scientists in elite sport settings.

Based on the applied nature of our organisation and the athlete focussed role of our work we respectfully suggest that the current framework and requirements of a sport scientist as defined by Exercise and Sport Science Australia is inadequate due to its focus on clinical rather than applied sport science. From a knowledge and experience perspective we believe the university qualifications and the amount of practical experience are both insufficient. Instead, as alluded to above, an undergraduate and honours degree should be considered a minimum for university qualifications and a minimum of 1 years full time experience under a senior practitioner should be required for experience.

Finally we appreciate the opportunity to contribute to the important debate regarding accreditation of sport science within Australia. We would like to offer our help in any other way that we can contribute to the discussion as this has important ramifications to the professionalism of the industry in the future.

Appendix A

Queensland Academy of Sport
Sport Science
Guidelines and Staff Expectations

Definition of Sport Science

Sport Science is the study and application of scientific principles and techniques with the aim of understanding, and providing information that can be used to improve sports performance.

Service provision without a conceptual framework or purpose is not science, although it often forms a legitimate part of the work of an applied sports scientist. Sport science is not just the application of existing knowledge and procedures to sport. Sport science also involves the development of new technology and knowledge of 'real-world' sporting environments.

The focus should be on *applying the scientific method* to address specific issues that have an influence on an athlete's performance.

The ***scientific method*** refers to the techniques for the investigation of phenomena and the acquisition of new knowledge, as well as the correction and integration of previous knowledge, based on observable, empirical, measurable evidence, and subject to laws of reasoning. There are identifiable features that distinguish scientific inquiry from other methods of developing knowledge. Scientists propose specific hypotheses as explanations of events or phenomena. These hypotheses have as logical consequences the prediction of additional, observable phenomena. Scientists design studies that test these predictions for accuracy. These steps are repeatedly reviewed, refined or rejected in order to make increasingly dependable predictions of future results. Once a hypothesis is repeatedly verified through experiment, it is considered to be a theory and new predictions are based upon it. Erroneous predictions, internal inconsistencies, or unexplained phenomena initiate the generation and consideration of corrections or alternative hypotheses, which are themselves tested, and so on.

The scientific method involves the following basic facets:

- **Description** [information must be reliable, i.e., replicable (repeatable) as well as valid (relevant to the inquiry)].
- **Prediction** (information must be valid for observations past, present, and future of given phenomena, i.e., purported "one shot" phenomena do not give rise to the capability to predict, nor to the ability to repeat an experiment)
- **Control** (gaining the ability to manipulate a variable, if possible and appropriate).
- **Understanding** (identification of the cause or causes of a particular phenomenon to the best achievable extent – this is applicable for traditional fields of sport science such as physiology and biomechanics but causality is difficult to establish in many fields of science such as psychology or

sociology). Before a factor that is the object of research can be said to be understood, the following conditions must be met:

- **Covariation of events** (hypothesized cause must correlate with observed effect)
- **Time-order relationship** (hypothesized cause must occur before observed effect)
- **Elimination of plausible alternatives** (this is a gradual process which requires repeated experiments by multiple researchers who must be able to replicate the results to validate them).

Definition of a Sport Scientist

Sport scientists are tertiary-trained professionals who provide advice on the technical and practical aspects of training and competition, talent identification and talent development, injury prevention, pre-event preparation, technique, nutrition and recovery practices, to optimize performance outcomes in sport. They work in partnership with coaches, medical staff, and other members of the high-performance team to enhance the performance of individuals and teams. Sport scientists should be viewed as expert partners for coaches, capable of providing specialist applied knowledge and perspective integral to the process, rather than just service providers.

The primary role of the sport scientist is to systematically obtain relevant information in order to address specific practical issues in an objective manner. Their primary aim is not to gain knowledge for their own sake but to improve the application. The process must be objective so that the scientist does not bias the interpretation of the results or change the results outright. The process must adhere to relevant scientific conventions so as to ensure meaningful results and to protect integrity of the data.

The applied sport scientist sits between the pure scientist and the pure engineer on a continuous spectrum. Where exactly they sit will depend on their personal interests, i.e. whether they have a research or applied focus. Their position along the spectrum may also depend on the specific or potential application at the time and the environment they are working in. For example, S&C coaches and dieticians tend to attempt to engineer a result or a specific adaptation rather than simply understand the how and why something occurs.

QAS Sport Science Vision

- The QAS Sport Science unit is regarded as the best and most effective small to medium applied sport science unit in the world
- The QAS Sport Science unit continues to attract exceptionally qualified, passionate and experienced staff because of our culture and structure
- There is enough critical mass in terms of staff numbers to undertake outstanding work yet the staff numbers remain small enough that enables a true multi-disciplinary approach to problem solving and service provision
- That QAS staff are widely recognised for their ability to develop a rapport with coaches and athletes and impact on their programs
- QAS staff are innovative and continue to challenge convention and are recognised for their applied research
- The number of employed/contracted staff will always outnumber the number of integrated students to ensure the focus remains on application rather than a student or academic mentality

QAS Sport Science Framework

Role

The QAS Sport Science unit was established in 1992 to perform the following roles:

- Provide evidence-based sports science support to QAS Programs with laboratory and field-based testing and scientific activities across several sport science disciplines
- Conduct applied research which directly enhances sports performance
- Where necessary develop technology and specific equipment to assist with applied servicing and research
- Provide high-level advice and consultation to QAS programs to impact on elite-level athletes
- Educate coaches, athletes and talented young scientists

The Sport Science staff are actively involved in identifying and quantifying the various characteristics that contribute to performance among the QAS athletes, and the most effective ways to manipulate these characteristics to enhance the likelihood of future success. The unifying theme across the staff of the Sport Science unit is continuous improvement with a philosophy of servicing objective-based outcomes.

The QAS Sport Science unit encompasses three different disciplines who work together to provide specialised services to QAS athletes and coaches as well as numerous National Sporting Organisations, professional teams, and Queensland-based AIS programs. These include:

- **Physiology**
- **Biomechanics**
- **Skill Acquisition**

A key function of the Sport Science Unit is to undertake assessment in both the competition and training environment to enable an accurate assessment of an athlete's performance or their readiness to perform. This often involves the qualitative and quantitative measurement of a number of variables across the sport science disciplines.

QAS Sport Scientists also work with coaches, athletes, other scientists from other SIS/SAS as well as Universities, and other QAS sports medicine network personnel/scientists (physicians, dietitians, psychologists, physiotherapists etc) across a range of areas to regularly assess and monitor performance in both the training and competition setting.

Sport Science staff are expected to help with developing a profile of each athlete based on identifying their strengths and weaknesses as indicated by any testing or competition results, other existing benchmark data, national program directives, as well as any specific QAS program goals and objectives. As a result, staff are expected to work with the coach/program manager to develop a service plan by identifying the key areas for assistance and what services are to be provided or what projects are to be undertaken. As a group, the coach and service provider/s are to identify how the services are to be organised (i.e. individually or by groups with similar capabilities, geographically, by squad or coach, depending on service mode such as camps based or special projects, or any combination of the above factors). They are to prioritize the services where necessary or appropriate, identify who will be responsible for the service provision, when are services required, and if any additional budget is required. They are also expected to document how these services are going to be evaluated. The agreed services and resources can then be endorsed by QAS Management.

Unit Philosophy and Expectations

QAS Sport Science management encourages diversity and lateral thinking, the exploration of new possibilities, and a minimalist approach to management. This requires QAS management to

relinquish control and have confidence that people are capable of self-regulation. This is deemed essential for true innovation.

The QAS Sport Science unit operates with a philosophy of continuous improvement. Staff are encouraged and expected to be always looking at improving the services they are delivering as well as the efficiency of their delivery. Staff are expected to ensure systems and processes are as streamlined as possible and as simple and effective as possible. Sport Science staff must be continually looking outside their normal "field of view". This includes looking outside their sport, outside of Australia, and outside their industry for ideas that can adapted to their programs. They must be continually questioning what they are doing and looking to improve and refine what is being done. Sport science staff seek to utilize the most suitable and advanced equipment for the purposes of athlete assessment and, where necessary, designs and develops its own hardware and software. Everything we do as Sport Scientists must have a purpose. If a coach requests a service, they must be able to justify why and what they are expecting to gain from this service. If Sport Science staff approach a coach with an idea, likewise, they must be able to demonstrate clearly what it is, exactly what is involved and why it might be useful to them. Spending time to educate and up skill a coach and develop a rapport is also a valid service. Coaches also need to understand the skill sets of its service team members to ensure they are asking the right questions to the right service providers. They must also be aware of how Sport Science may assist their program through a more quantitative approach. However, sport scientists must be aware of the status and nuances of the relationship in order to have an impact on a program, and also to be able to identify when it is time to move on from more general tasks to more specific and effective service provision. This is a skill which develops only with experience.

There is a considerable amount of knowledge and experience within the QAS Sport Science unit. Staff are expected to make use of their access to this knowledge expertise and also use other staff as a resource. It is important to learn from what has been tried and tested in the past in order to reduce the risk of potentially making similar errors again. In addition, all staff are capable of coming up with a fresh approach or a new idea, or an alternative solution to troubleshooting etc. This alternative perspective can provide a fresh stimulus to problem solving and ultimately improve a research project or an area of service delivery. As a result, regular sharing and questioning among colleagues is viewed as essential.

QAS Sport Science staff within each discipline are expected to meet regularly to discuss their own work i.e. fortnightly at a minimum. This is to ensure they can verbalise what they do. This helps with the process of clarification before mistakes can be made (or worse – repeated!). Staff are expected to, and be open to receive constructive criticism and comment on their work from their peers. This review process assists staff in their understanding so they can justify scientifically what they are doing, why they are doing it, and what they (and the coaches) are gaining from it. This will result in a more effective service and this process will help reinforce their understanding of the fundamental scientific principles and assist with ensuring their work is scientifically sound. If staff are lacking in the knowledge of fundamental areas or skills, they should rectify this ASAP by seeking guidance and assistance from other Sport Science staff as well as seeking external formal educational opportunities if necessary or appropriate. Staff should also meet regularly with scientists from other disciplines to expand their broader sport science knowledge and to increase their awareness of other nuances specific to this field – such as developing rapport with coaches of various styles and backgrounds and different styles of feedback.

All staff are expected to contribute to the various activities and discussion groups within the Sport Science unit. Lack of preparation time or contribution for certain activities such as staff discussions or not sharing the workload of supervising work experience students is not acceptable. The more discussion that exists among staff reduces the potential duplication of effort and equipment and time spent problem solving. Sport Scientists always need to continue to develop their skills and gain confidence in putting their work out there in front of their peers as it is a proven way to further develop and refine their skills. This includes people management and this skill starts with the supervision of students.

QAS Sport Scientists are viewed as experts and specialists. Not generalists. QAS Sport Scientists are expected to have a multi-disciplinary approach to servicing. While staff have a specialist background as a result of their training and education, sport scientists are expected to develop their understanding of other disciplines to ensure they are part of an effective delivery program and not working in isolation which can result in poor assumptions and errors in assessment. This can lead to poor advice and a lack of credibility. No-one staff member can provide significant expertise across **all** scientific disciplines to a particular program (physiology, biomechanics, skill acquisition, nutrition, S&C, psychology etc). Staff should ensure they know their limits and are not moving out of their areas of expertise when talking to clients (coaches and athletes).

Applied sport science is not just the application of existing scientific knowledge and procedures to sport. It also involves the development and practical use of new knowledge in “real-world” sports environments. There is no division between the concepts of research and servicing within the QAS Sport Science unit. Basic scientific testing can be undertaken in accordance with the scientific method and is the first point in a continuum between service delivery aimed at answering specific questions through cross-sectional and longitudinal research designs (e.g. evaluating the effectiveness of a training program), then onto projects involving repeated, careful observation in the training and/or competition environment, and further along the continuum onto studies involving specially derived experimental protocols. The scientific method may be applied to a number of problem solving areas. It may involve an individual athlete using a case-study approach, an investigation with a specific group of athletes, or evaluation across entire sports. Research is therefore part of the service required by a coach. An integrated approach to research and routine support is vital as each is important in guiding the other. Routine servicing can provide a stimulus for more controlled research including studies involving hypothesis testing, the results of which then feeds back into improved servicing. A continuity of approach is essential to long-term progress.

Sport scientists may be best placed to identify suitable areas of research as a result of their knowledge and experience before gaining the support of other members of the high-performance community however this is not the only approach. Scientists, coaches and administrators are encouraged to work together to develop programs and conceive and conduct research. Scientists should not just see themselves as research or service providers for coaches and others but as expert partners useful in determining productive program direction.

Decisions will often need to be made as to which level of focus is likely to be most productive. In some cases, higher-level and longer-term focus may be necessary in order to address the most critical issues associated with providing real assistance to sports. This may involve the introduction of a PhD student working under a Senior Scientist on a more long-term project. This will require the support of the relevant QAS coaches and QAS management. It is expected that projects will be designed to ensure frequent feedback to coaches and athletes will occur. This approach enables a greater level of servicing than would normally occur because of the time constraints of a single individual staff member. A project may also simply require the collation of data which has been collected systematically over a period of time to determine relevant trends and athlete benchmarks. This may be done by staff and/or students.

Individual Staff Expectations

1. Staff should come to work with the attitude of how am I going to help the coach and athletes – and my workmates. This is a place for teamwork not for prima donnas.
2. Staff should come to work with the attitude of how am I going to make my athletes faster, stronger, or more skilful today than what we were doing yesterday.
3. Scientists should be pro-active in wanting to learn more about their sport, their discipline, and themselves. Scientists should always be looking for continuous improvement both in their work and in themselves.
4. Staff are expected to develop a multi-disciplinary approach to servicing. While staff may have a specialist background as a result of their training and education, sport scientists are expected to develop their understanding of other disciplines to ensure they are part of an effective delivery program. Staff should however, ensure they know their limits and are not moving out of their areas of expertise when talking to clients (coaches and athletes). Staff must refer clients or questions to others where appropriate, or at least seek information to pass back on their behalf when access and availability of other experts is limited. Failure to do so can lead to poor advice and a lack of credibility.
5. Staff should be looking to develop a rapport with their immediate colleagues and peers as there is much to learn and be aware of. There is always something to be gained from a different perspective and experience.
6. Staff must be continually reviewing and questioning what they are doing and the services they are providing – both in terms of quality and quantity, to ensure they effective and having an impact on performance. If coaches are not using the information provided or it does not make a difference to a program or an athlete's performance, then the future of this service should be reviewed and possibly terminated.
7. Staff should be efficient with their time and always be considering ways to streamline their tasks. Staff should consider what tasks can be passed onto others to free up time in order to undertake other activities which may have a greater impact.
8. As staff gain experience within a particular sport, they should become familiar with various benchmark criteria and expected performance ranges where possible. This will help with early troubleshooting as well as understanding what you are doing and why you are doing it. These benchmark criteria and ranges should be documented and shared among staff.

9. Staff are expected to understand the limitations of testing individual athletes in individual trials on any given day, especially in the laboratory or in artificial settings. A broader understanding of the importance of ecological validity is developed longitudinally.
10. Sport Science services should be regular and targeted. Everything we do as scientists must have a purpose.
11. Sport Scientists should employ the scientific method in everything they do. They should critically evaluate all results rather than accept a number blindly, particularly when coming from black box technology. They should base their interpretations on sound scientific principles rather than hearsay.
12. All staff are expected to have a thorough understanding of how their equipment works from a first principles perspective. This will help ensure equipment is used appropriately and data is accurate and reliable. This will also improve their understanding of the limitations of their equipment and potential troubleshooting.
13. Staff should be able to adapt to new technology and be open to new ideas but the emphasis remains on athlete improvements, not the technology itself. Sport Scientists need to ensure they (and the programs they work with) continue to do the basics well and these fundamentals are not neglected by any focus on toys, gadgets or black box technology.
14. Staff should seek to be innovative and management should be supportive and assist in building a culture that allows staff to create new methods, knowledge and technology. Sport science staff seek to utilize the most appropriate and advanced equipment for the purposes of athlete assessment and, where necessary, may design and develop its own hardware and software. Staff are expected to share information about various technologies or processes as it may assist others in problem solving or open up new ideas and opportunities and impact in other programs.
15. Staff must be continually looking outside their normal “field of view”. This includes looking outside their sport, outside of Australia, and outside of the sporting industry for ideas that can adapted to their programs. They must be continually questioning what they are doing and looking to improve and refine what is currently being done.
16. Staff are expected to, and be open to receive constructive criticism and comment on their work from fellow scientists, coaches, managers, and athletes This peer review process will assist in providing a better service.
17. Staff are encouraged to publish their research although time spent undertaking more structured research is not at the expense of improving athlete performance. Staff should be aiming for involvement in at least one publication per year. This process encourages staff to maintain high

scientific standards by ensuring greater attention to detail in their research design, data collection, higher level statistical analysis and also improves their writing skills. It also ensures a more detailed and higher level of thinking about the data collected and its potential application. This process also helps develop the profile of the individual and the QAS.

18. Staff/students are often in the public eye and are representing the QAS/University and should act and dress appropriately. There is an appropriate time and place to debate protocols and data interpretation. This is not in the presence of the athletes/coaches.
19. Staff should have excellent communication skills and be able to relate to a wide variety of relevant groups from academics to colleagues to coaches and athletes of any age. Sport scientists are in a privileged position working closely with high performance coaches and athletes and need to ensure confidentiality and eliminate bias from their observations and comments.
20. Staff should be able to present results or resources to coaches and athletes in a timely, clear and concise manner. Results or resources should be applied to athlete or program development rather than simply overwhelming coaches and athletes with irrelevant information. Individual reports for all athletes should be tailored specifically to the needs of the individual, whether the specific client is the coach or athlete. This includes the areas of development needed and the learning styles used etc.
21. Sport Scientists are expected to manage their time and workloads so as not to accumulate excessive amounts of overtime.
22. Sport Scientists are expected to be organised ahead of time and dedicated to their job. This often means being the first ones at any testing, training or competition, and the last to leave.
23. Staff are expected to present and maintain a suitable working environment and be considerate of others in terms of taking equipment or leaving equipment setup permanently.

Appendix B

Exercise and Sports Science Australia
Code of Professional Conduct and Ethical Practice
Version 1.1.1 August 2011

Preface

The Code of Professional Conduct and Ethical Practice has three main purposes, to unify the practices of Exercise and Sports Science Australia (ESSA) members, to provide guidelines for ESSA members, and to formalise a set of guidelines, which inform the Australian public of the professional standards of ESSA members.

Membership of ESSA requires acceptance of the ESSA Code of Professional Conduct and Ethical Practice. This code establishes a standard against which professional behaviour of ESSA members may be evaluated. Behaviour contrary to the advice of the Code amounts to behaviour against the best advice of ESSA.

The Code will be used by the Ethics Committee and Review Panel of ESSA and by the Executive itself in establishing ESSA work protocols, and in making decisions and in determining appropriate courses of action regarding complaints concerning the professional conduct and ethical behaviour of ESSA members.

The Code is comprised of a series of principles which are applicable to the involvement of ESSA members with the public, subjects, supervisees, students, employees, research participants, colleagues or other professionals.

The Code does not apply to disputes between members arising from commercial and contractual obligations, such as employment relationships or principal/contractor relationships.

Each section of the Code comprises an initial statement of the general principle followed by specific examples of applications of the principle.

Exercise & Sports Science Australia

The Australian Association for Exercise and Sports Science Pty Ltd (AAESS) was officially founded in 1991 to meet the professional needs of exercise and sports scientists in Australia. It changed it's trading name to Exercise and Sports Science Australia in January 2010. It is directed by an Executive Board comprised of leading academics and practitioners in these fields and is supported by a growing number of state chapters throughout Australia.

ESSA is an incorporated body and its constitution (currently termed the memorandum articles of the association) has been registered with the Australian Securities Commission (ASIC). The Association is an Australian Public Company, Limited by Guarantee.

Definition

Association A formal organisation of practitioners or groups of practitioners of the Exercise and Sports Science profession. The Association is the public face and voice of the profession; it stands for the advancement of the profession and benefits to the clients; it ensures that technical and ethical standards are maintained and improved; and it maintains a watch on continuing educational needs not just for the benefit of its members but for the greater good and best interest of the society it serves.

Constitution The system of fundamental laws and principles that prescribes the nature, functions, and limits of the Association.

By-Law A subordinate law adopted by the Association to regulate the rights and duties of its officers and members. In the absence of law to the contrary, under the common law, the power to make by-laws resides in the constituent body of members.

Profession An occupation that requires specialised tertiary training, knowledge and skills, and which intrinsically carries with them implied obligations to community, society and individuals with a set of standards or ethics by which these duties will be discharged.

Practitioner The professional who provides Exercise and Sports Science services.

Member An elected and financial member of the Exercise and Sports Science Australia whether admitted as a Student Member, Full Member, Accredited Member, Fellow, Associate Member or Honorary Member.

Practice Any activity considered to be within the accepted scope of an Exercise Scientist's work, and/or the accepted scope of the area of the individual's current accreditation (e.g. exercise physiology).

Client A direct recipient of exercise and sports science services. There may be multiple recipients in cases where the services have been contracted, paid for, or given consent for, by a person or organisation other than the person being assessed, evaluated, or prescribed (treated) by the member. The term may subsume students, research participants, supervisees, other direct recipients, other professionals, referral agencies or organisations. Other parties, such as third party payers, facilitators or sponsors, may also be involved in this service arrangement.

Research The empirical data collection in the pursuit of scientific endeavour usually in the form of an experiment, survey, or evaluation, and which may be qualitative or quantitative in nature.

1. Best practice

Members should maintain high professional standards of client service and professional relations:

(a) services should be based upon the best scientific information and professional practice currently available;

(b) members should be committed to, and involved in furthering their knowledge, skills and competencies through continuing education;

(c) members should be committed to ensure appropriate relations are maintained all health care professionals;

(d) members should respect the collaborative nature of comprehensive health care with recognition and respect for the perspective and expertise of other health care professionals.

2. Responsibility

Members are expected to maintain professional objectivity and integrity; to apply professional knowledge and skills to all work undertaken; to actively seek the objective of advancement of knowledge; and to respect the cultural environment in which work.

2.1 ESSA members engaged in research conduct unbiased investigations, through the selection and development of appropriate research techniques, and through the timely and adequate disclosure of research findings to the professional and scientific community as well as the community at large.

2.2 ESSA members engaged in teaching help students to acquire knowledge and skill, to achieve high standards of scholarship, and to develop independent thought.

2.3 While taking account of their obligations under the law, ESSA members who are practitioners hold the interests and welfare of their subjects to be of primary importance.

2.4 The welfare of research subjects takes precedence over the self-interest of researchers and over the interests of colleagues and other agencies.

2.5 ESSA members are sensitive to cultural and social diversity. They recognise that there are differences among people, such as those that may be related to age, sex, or socioeconomic and ethnic backgrounds and, when necessary, they obtain training, experience or advice to ensure competent service or research relating to such persons.

2.6 ESSA members present opinions of their own in a fair and honest fashion.

2.7 Where ESSA members become aware of possible misconduct by a professional colleague that cannot be resolved by discussion with the colleague concerned, they take steps to bring the matter to the attention of those charged with the responsibility to investigate it, doing so without malice and with no breaches of confidentiality other than those necessary to the proper investigatory processes.

2.8 ESSA members co-operate with duly constituted committees of the Board, particularly those charged with the duty of investigating any complaints against members of the Board. Co-operation implies responding to

any inquiries promptly and completely and adhering fully to any procedures established by the Board for such investigations.

2.9 ESSA members ensure that they have current knowledge of scientific, technical and professional information relevant to the services that they offer.

3. Competency and accountability

ESSA members, and those under their supervision, should develop, maintain and encourage a high standard of professional training and competence. They accept that they should be accountable for their professional actions.

3.1 ESSA members recognise the boundaries of their own competence and provide only services for which they are qualified by training and experience. They refer matters outside their areas of competence to appropriately qualified persons.

3.2 ESSA members keep sufficient records of their professional activities:

a) for their own reference;

b) to ensure that at some future date the subject, or other ESSA member who has become responsible for that subject, can be informed of the action taken;

c) to allow the information to be presented clearly if necessary.

3.3 ESSA members act in such a way that they are able to justify their professional decisions and activities in the light of current knowledge and standards of practice.

4. Client care

Clients should not be subjected to undue risk prior to; during and following testing procedures or exercise prescribed by members.

4.1 Members should ensure that clients are aware of the risks associated with exercise through the process of informed consent, and aware of their clients rights to withdraw from such interaction without penalty (at any time);

4.2 Members should provide instruction and education which minimises the risk of injury, and maximises the benefits from their interaction;

4.3 Members should ensure that, in the case of injury, treatment and appropriate care are available to clients;

4.4 Members should ensure that in the conduct of experimentation, procedures conform to principles enunciated by:

(i) the NH & MRC

and

(ii) those of the administering institution.

5. Description of services

ESSA members provide information on professional qualifications and descriptions of services to help the public to make informed choices of the quality and type of service provided by both individuals and laboratories.

5.1 ESSA members do not misrepresent their qualifications, experience or services.

5.2 Announcement of ESSA and ESSA members' services should conform to this Code of Professional Conduct and Ethical Practice and contain only a statement of name, degrees, status, address, telephone number, hours, a brief factual statement of the services provided and any additional relevant or important consumer information.

Announcements through agencies should conform to these standards. Members advertising their services should submit proposed advertising material to the Executive Officer if in any doubt about its appropriateness.

5.3 ESSA members associated with the promotion of professional devices, books, recorded material or other products offered for commercial sale ensure that any promotional claims can be supported by evidence of a standard acceptable to the profession.

6. Confidentiality

ESSA members do not disclose information obtained professionally to any third party without the informed consent of the subject or research participant. There are certain exceptions to, and limitations of, that principle.

6.1 The major exceptions/limitations are:

(a) Incapacity: Where subjects are judged incapable of giving consent to disclosure, consent must be sought from those authorised to represent their interests.

(b) Emergency: Situations may arise when it is impossible or impracticable to seek consent to disclosure in time to prevent harm or injury to the subject or some other person. In this event it is expected that ESSA members should normally report to the subject or persons authorised to represent his/her interests, as soon as practicable, any information disclosed to a third party.

(c) Law: Acts of Parliament and Courts of Law may compel disclosure of information given by a subject. ESSA members inform the subject, in advance, of such limitations of confidentiality.

(d) Public safety: An ESSA member who believes that nondisclosure may endanger a subject or another person but is denied permission to disclose, exercises professional judgment, if necessary after consultation with senior colleagues, in deciding whether to breach confidentiality or not.

6.2 In disclosing of information, ESSA members provide only that, which in their opinion, would enable the recipient to assist their subject, and not in contravention of 4. Should such information become obsolete, ESSA members inform the recipient accordingly.

6.3 The use of subjects' names in presentation (either verbal, visual or written) or in publications, shall only be used when informed consent has been obtained, and by doing so shall not directly or by implication reveal the names of other subjects.

6.4 Where information is gathered by an ESSA member for use by a third party, the informed consent of those to whom the information refers is obtained and the recipient is informed by the ESSA member of the need to protect confidentiality.

6.5 ESSA members make provision for protecting subject confidentiality in the storage and disposal of research and case records.

7. Professional Relations

ESSA members do not exploit their professional relationships with subjects, supervisees, students, employees, research participants, colleagues or other professionals. They ensure that subjects are fully informed of all aspects of the study and obtain their informed consent to participate and remain in interventions.

7.1 ESSA members do not condone or engage in sexual harassment, which is defined as comments, gestures, or physical contacts of a sexual nature that are unwanted by the recipient. Sexual relations with subjects are unethical.

7.2 ESSA members have a responsibility to obtain the informed consent of their subjects with respect to all aspects of interventions. Informed consent means obtaining the agreement of the subject or, where the subject is judged incapable of giving informed consent, of those authorised to represent the interests of the subject. ESSA members must follow ESSA Code of Professional Conduct and Ethical Practice and this policy statement on informed consent. Informed consent includes determining appropriate levels of understanding by the subject with ESSA members making every effort to ensure that understanding.

7.3 ESSA members will ensure they do not exploit relationships with clients, colleagues or other health professionals for emotional, sexual or financial gain

7.4 ESSA members will not use inaccurate or misleading ways to promote their services or products, or accept undisclosed private financial benefits

7.5 ESSA members will treat their colleagues with fairness, honesty, courtesy, respect and good faith.

8. Client assessments

ESSA members have the prime responsibility for client assessment, including interviews, observations, standardised tests, questionnaires and psycho-physiological measures, and they ensure that these are used and interpreted only by competent persons.

8.1 ESSA members adequately protect the physical security of assessment instruments, the data they generate and the reports based on them.

8.2 ESSA members guard against any misuse or bias in selection, administration, scoring and interpretation of assessment procedures. They are prepared to justify, in terms of current scientific literature, their use and interpretation of any assessment procedure. They avoid using procedures which are obsolete or of dubious scientific status

8.3 ESSA members obtain the informed consent of subjects when undertaking client assessments. Informed consent means obtaining the consent of the subject or, where the subject is judged incapable of giving informed consent, the consent of those authorised to represent the interests of the subject. Informed consent includes that the subject is informed of:

(a) the nature and purpose of an assessment;

(b) the procedures to be employed in the assessment process (e.g., type and general format of tests or questionnaires, psycho-physiological procedures, etc.);

(c) the uses to which the data from assessments will be put and the persons,organisations and/or agencies to whom the data and/or reports will be made available;

(d) the right to know the content of client assessment reports concerning them.

8.4 In reporting assessment findings to subjects or participants and to other professionals, ESSA members endeavour to ensure that appropriate explanations of the findings and their interpretations are provided and that they are not misused. Any reservations concerning the validity or reliability of an assessment procedure, should be made explicit in the report. ESSA members strive to prevent misuse of outdated assessment results.

8.5 ESSA members do not normally release uninterpreted data from assessments to persons who are not specifically trained in the use and interpretation of the procedures concerned.

8.6 ESSA members are responsible for ensuring adequate supervision of assessment procedures administered, scored or interpreted by others under their direction unless such persons are themselves properly trained in their use.

8.7 ESSA members abide by such guidelines for the standard of training required for accreditation of a testing centre as may be adopted from time to time by the Executive.

9. Studies involving human subjects

ESSA members ensure that research investigations meet general scientific standards of competency and are sensitive to the welfare and dignity of the participants.

9.1 ESSA members submit their research proposals to ethical committees for review. Where no local ethical review committee exists, ESSA members should seek review by the Executive or its nominees.

9.2 ESSA members obtain the informed consent of participants except where its exclusion can be justified by the research methodology. Subjects should be informed of any research procedures that might have harmful effects on them.

9.3 ESSA members take all possible steps to protect participants from physical an mental discomfort, harm or danger. If the risk of such consequences exists and the participants give their informed consent to their involvement in the research, all possible steps must be taken to minimise any such risks. ESSA members do not use research procedures if they are likely to cause serious or lasting harm to participants.

9.4 Where methodological requirements of a study involve the use of concealment or deception, an ESSA member has particular responsibilities. These include justifying this to the appropriate ethical committee, demonstrating that other non-deceptive procedures could not be used, obtaining the consent of participants to waive their right to prior information on the nature and purpose of the study, and ensuring that all participants are given full explanations as soon as possible.

9.5 ESSA members have a responsibility to ensure that research carried out by others under their supervision conforms to The Code.

10. Studies involving animal subjects

ESSA members using animals in teaching and research and in applied settings shall give every consideration to their welfare.

10.1 ESSA members submit their research proposals to ethical committees for review. Where no local ethical review committee exists, ESSA members seek review by the Executive or its nominees.

10.2 ESSA members must follow the current Australian Government National Health and Medical Research Council (NHMRC) Australian Code of Practice for the Care and Use of Animals for Scientific Purposes

10.3 ESSA members using procedures likely to subject animals to discomfort have particular responsibilities. These include justifying their use on scientific grounds to an appropriate ethical committee, demonstrating that other less discomforting procedures could not be used and taking all possible steps to minimise any discomfort.

10.4 ESSA members have a responsibility to ensure that research carried out by others under their supervision conforms to this code.

11. Teaching of exercise and sports science

ESSA members ensure that educational and training activities (teaching) meet general scientific standards of competency (knowledge and practice) for the subject area and are sensitive to the interests, welfare and dignity of the students.

11.1 ESSA members who are responsible for education and training programs must ensure that the programs are competently designed and delivered, and that they meet accreditation and/or updating (CEC) requirements for which claims are made by the program.

11.2 ESSA members must make every effort to ensure that published information concerning any educational program in which they have a teaching or organising role is accurate and not misleading, especially with respect to expectations of, and possible benefits to, participants.

11.3 When teaching, ESSA members must present information accurately and objectively.

11.4 ESSA members must recognise the power they hold over students or supervisees and avoid engaging in conduct that is personally demeaning to students or supervisees.

11.5 ESSA members must not establish fee charging or consultative relationships with students they teach or are likely to examine.

11.6 ESSA members must not require or otherwise coerce a student to participate in a classroom or other training demonstration if there is reason to suppose that the student is likely to suffer distress from the experience.

11.7 ESSA members must instruct students witnessing case demonstrations that they are required to preserve the anonymity of the participant and in every way to safeguard the participant's privacy.

12. Supervision and training

ESSA members ensure that the supervision and training of students and/or junior colleagues meet general scientific standards of competency (knowledge and practice) and are sensitive to the interests, welfare and dignity of the trainee.

12.1 ESSA members who supervise the work of students or junior colleagues have responsibility to promote awareness of and adherence to the provisions of this Code.

12.2 It is unethical for ESSA members who are providing supervision or training to require or coerce supervisees or trainees to disclose personal information either directly or in the context of any training procedure. Where self disclosure is a normal expectation of a given training procedure, informed consent must be obtained from participants prior to training.

13. Publication and Public Statements

ESSA members are accurate and objective in reporting data or information and do so in a manner that encourages responsible discussion. They restrict their public comments as ESSA members to areas of sport science in which they have satisfactory knowledge and to information derived from research findings and theory.

13.1 When presenting research data or information ESSA members include relevant details of research findings that may modify or cast doubt upon the interpretation of evidence presented.

13.2 Credit is attributed in a publication in proportion to the contribution made by individuals and organisations. Accurate acknowledgement is given to sources of ideas and information.

13.3 ESSA members avoid excessive and exaggerate claims about the utility of their research findings or professional activities in all publications and public statements made through the news media.

13.4 Where incorrect or misleading reports have been given in reference to the work of an ESSA member all reasonable steps are taken to correct the error.

13.5 ESSA members do not state or imply that personal statements are made on behalf of other ESSA members, the Board, or any other organisations, unless such authority has been granted in advance. Statements on behalf of the Board, for possible publication, can be made only by the Chairman or Vice Chairman or their nominees.

14. Decisions of the Board

ESSA members abide by rulings and decisions which are made by the Board concerning ethical behaviour and standards of professional conduct.

14.1 It is the responsibility of ESSA members to maintain their current knowledge of any rulings and decisions which are made by the Board concerning ethical behaviour and standards of professional conduct.

15. Acknowledgment

This Code of Ethics was drawn up after consultation with Sport and Exercise Science New Zealand and is based in part on their Code of Ethics.