Profiling the Australian High Performance & Sports Science Workforce

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PROFILING THE AUSTRALIAN HIGH PERFORMANCE AND SPORTS SCIENCE WORKFORCE

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Australia is viewed as leader in the field of sports science, with Australian sports scientists highly sought after and respected worldwide (1). However, despite the important contribution of sports scientists to the development of professional sport in Australia (1-3), we know little about these sport professionals who play an important role in the development and success of athletes, teams and sport organisations.

This report provides a more formal understanding of the high performance and sports science workforce with the purpose of informing the policy development of Australia’s sport governing bodies and education providers to inform sport management practices that will enhance the support and development of current and future high performance managers and sports scientists. The data presented in this report provides valuable insight about the scope of the profession to enable further development of strategic plans for the industry.

Aims of this study
The research team of the present study set out to better understand the Australian High Performance and Sports Science workforce by examining: 1) the size and capacity of the high performance and sport science workforce; 2) what roles high performance managers and sport scientists perform; 3) their salary and conditions of employment; 4) their work environment; 5) their training and professional development; 6) their career pathways and future intentions; and 7) their opinions about their profession. We also wanted to know about the human resource management practices of sport organisations that employ members of the high performance and sport science workforce.

Method
This research project was a cross-sectional, predominantly quantitative study to collect population data of the Australian High Performance and Sports Science workforce, and the Sport Administrators that employ them. Two independent online survey instruments were employed to collect data from these two participant groups. Participants in this research project were Australian High Performance and Sports Science employees (n = 210) and Sports Administrators (n = 32).

Results and Recommendations

Characteristics of the Workforce
The high performance/sports science workforce is predominantly young, male and relatively inexperienced. However, they are also highly qualified, many possessing or currently completing, tertiary qualifications beyond what was required for their current position. A large proportion of the workforce are not associated with any professional organisation such as ESSA. This presents a problem for the industry as much of the high performance/sport science work is performed without either direct or indirect quality assurance by way of regulation or at least professional accreditation. Nevertheless, the majority view of the workforce and their administrators is that accreditation is
Executive Summary

Career Pathways and Future Career Intentions
From a career development perspective, participants were highly motivated to work in elite and professional sport with the pathway into their career mostly through internships or strength and conditioning coaching. A large proportion are looking to advance their career with a different employer citing dissatisfaction with their current employer (mostly state institute-based employees) due to high job strain/stress and the negative impact the long hours has on work/life balance and family/relationships.

Views on the High Performance and Sports Science Profession
A large proportion of the workforce are not associated with any professional organisation such as ESSA. The majority of high performance/sports science professionals believed that ESSA membership was not required for their position and is not of value to them. Many believe ESSA, in its current form, is not best placed to take on this role. This presents a problem for the industry as much of the high performance/sport science work is performed without either direct or indirect quality assurance by way of regulation or at least professional accreditation. Despite this, the high performance/sports science workforce and the administrators that employ them agree that accreditation and registration should become an industry standard and that regulation of the profession will improve professional standards.

Employment Conditions and Roles
When considering the characteristics of the work performed by high performance/sports science professionals, work outside of normal office hours and/or overtime (mostly unpaid) is common, tasks performed often require people management skills (which is not part of their undergraduate or post graduate training) and they are required to behave ethically. A high rate of unpaid overtime could cause a variety of problems for the workforce such as burnout. A third of the workforce are actively seeking other employment and the most popular reasons for this include “the heavy workload” and perceptions of “insufficient support”.

Professional Development Activities
High performance/sports science professionals are required to behave ethically and yet only half receive ethics training in their workplace, while the requirement for ethics training in formal education programs are not well defined. A lack of training in professional ethics across the entire workforce misses an important opportunity to reduce the risk of unethical behaviour by providing behavioural guidelines and disincentives.

High performance/sport science staff indicated that their highest professional development needs were not being met by either the industry or their employer with over half having to fund their own development. Key barriers for continued professional development were a lack of time due to high rates of unpaid overtime work, a lack of opportunities from industry and poor support from employers in terms of funding. The activities that participants nominated as having the greatest impact on their professional development were formal qualification upgrades, networking and mentoring.

Sports Administrator Survey
The recruitment processes experienced by the workforce highlight that many positions are not advertised, many organisations do not follow “best practice” induction procedures, staff possess tertiary qualifications beyond what was required for their position and many are pursuing higher degrees. The human resource management of the high performance/sports science workforce is compromised by a lack of funding and resources to support and develop staff. Administrators and the high performance/sports science

desirable and should become a requirement for employment.
workforce value professional development (PD), however, opportunities for this is limited by a lack of PD resources within organisations and by the expectation of staff to work longer (than contracted) hours.

Sports administrators and managers believe high performance/sports science professionals are a valuable asset to their organisation and indicate that they would employ more (and provide better support if they had the funding to do so.

**Key Recommendations**

1. **Definition and scope of practice**
   As a precursor to future development and regulation of the sport science profession, a definition of a sport scientist and their scope of practice needs to be agreed. The definition drafted below, and the data provided in this report, should serve as a starting point for ESSA to lead this process.

   “An Australian sports scientist is a university trained and nationally accredited, skilled practitioner and/or researcher engaged in supporting, developing and enhancing sport performance of athletes and coaches engaged in individual and team sports. In providing those performance enhancement services, sports scientists use evidence-based methods that ensure the protection of the health and welfare of the people they serve. They do so in an ethical manner within their scope of practice and discipline training. Sports scientists work in a variety of settings and can work as consultants, permanent employees, be self-employed or volunteers. Sports scientists are able to specialise in sub-disciplines such as: biomechanics, exercise/sport physiology, performance analysis and skill acquisition.”

Other service providers within sport contribute to the work of sport scientists and therefore may be considered sport scientists in some sport settings. These include: dietitians, physiotherapists, strength and conditioning coaches and sport psychologists.

2. **Registration and accreditation**
   ESSA should foster the establishment of a national registration and accreditation scheme for the High Performance and Sport Science profession. The profession and those who manage these professionals, overwhelmingly support the need for a scheme, that accreditation should be based on qualifications and that employment should be dependent upon accreditation.

3. **Ethical practice**
   Almost all employment contracts highlighted the importance of ethical conduct and the workforce also rate it as the third most important requirement for employment, yet only half of the workforce receive training in professional ethics. ESSA should use its experience in the oversight of ethical practice and its likely involvement in accreditation and professional development, to increase the rate of training in ethical practice in the profession.

4. **Professional development**
   A majority of the workforce agree that continuing professional development should be compulsory. While many professionals feel that their employer would provide time to engage in professional development opportunities, nearly half of the profession do not complete any professional development. ESSA should consider its future potential role as a facilitator and or provider of professional development opportunities that are relevant to the High Performance and Sport Science workforce.

5. **Human resource management practices and workforce retention**
   Sport organisations need to develop human resource management practices that both support and develop sports scientists and high performance managers in their roles and in their
career development. The risk of inappropriate practice as well as worker stress, dissatisfaction, turnover and subsequent loss of corporate knowledge may be mitigated with improvements in organisational HRM practices. Sport organisations should be required to implement minimum human resource management standards and be supported in their capacity to do so.

6. Future research
A stronger evidence-base is required to underpin industry decision making related to the sport science profession. Future research should focus on investigating:

i. The views of other key stakeholders (e.g. policy makers, professional bodies, athletes, allied health professionals, university educators) related to sports science provision, professional training and regulation

ii. Best practice models in professional training and regulation, including international standards and practices

iii. Scope of practice for sport scientists, both collectively and within key sub-discipline areas

iv. Consequences of inadequate professional support to existing sport scientists and the outcomes of future interventions to develop the profession.

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ACRONYMNS AND ABBREVIATIONS

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<tr>
<td>ACSP</td>
<td>Australasian College of Sports Physicians</td>
</tr>
<tr>
<td>AFL</td>
<td>Australian Football League</td>
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<tr>
<td>AIS</td>
<td>Australian Institute of Sport</td>
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<tr>
<td>ASADA</td>
<td>Australian Sports Anti-Doing Authority</td>
</tr>
<tr>
<td>ASC</td>
<td>Australian Sports Commission</td>
</tr>
<tr>
<td>ASCA</td>
<td>Australian Strength and Conditioning Association</td>
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<tr>
<td>BASES</td>
<td>British Association of Sport and Exercise Sciences</td>
</tr>
<tr>
<td>CHESMS</td>
<td>Council of Heads of Exercise, Sport and Movement Sciences</td>
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<tr>
<td>COMPSS</td>
<td>Coalition of Major Professional &amp; Participation Sports</td>
</tr>
<tr>
<td>COSEP</td>
<td>College of Sport and Exercise Psychologists</td>
</tr>
<tr>
<td>ESSA</td>
<td>Exercise &amp; Sports Science Australia</td>
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<tr>
<td>HRM</td>
<td>Human Resource Management</td>
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<tr>
<td>NRL</td>
<td>National Rugby League</td>
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<tr>
<td>NSO</td>
<td>National Sporting Organisation</td>
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<tr>
<td>SDA</td>
<td>Sports Dietitians Australia</td>
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<td>SMA</td>
<td>Sports Medicine Australia</td>
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<tr>
<td>SSO</td>
<td>State Sporting Organisation</td>
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<td>WADA</td>
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Australia has a proud history of being a high performing sporting nation built on the international success of individual athlete and teams in a wide variety of sports (4). Australians also have a reputation for being a sport loving nation investing heavily to systematically build a strong and stable system of sport development that supports more than eight million weekly participants (5) from grass roots to elite and professional levels of competition. Supporting that development has been the growth in services that support athletes and teams to achieve their sporting potential (1). It is no surprise that Australia is viewed as an international leader in the field of sports science, with Australian sports scientists highly sought after and respected worldwide (4). Sports scientists have been influential in the development of elite non-professional and professional sport in Australia (1-3), with sports science playing a major role in the transformation of sport from an amateur-based leisure activity to a large scale professionalised economic and social enterprise (6).

Despite the important contribution of sports scientists to Australian sport. Little is known about the Australian sports science workforce. As such, it is imperative that a more formal understanding of the sports science workforce is developed, in order to augment the industry’s regulation and enable future governing bodies, education providers and sport an enhanced ability to support current and future sports scientists.

Although a number of workforce studies have been conducted in Australia in allied health professions (7-9), some of which are considered sub-discipline fields of sports science such as psychology (10-13), there has been no large-scale investigation in Australia, or internationally, of the high performance and sports science workforce. Exploratory research investigating the career experiences of Australian sports scientists (14) and Australian strength and conditioning coaches (15) has begun to shed some light on the sport workforce. Key findings from both studies illustrate a lack of organised career development policy and management practice for these key performance support staff. Both studies reveal that more needs to be done to better support sports scientists’ employment and career development, and the human resource management (HRM) practices of the sports administrators that employ them.

HRM in sport, which is critical to organisation effectiveness, has been largely ignored by scholars but has received more attention recently (16). HRM in the Australian sport system is poorly developed with only government funded organisations having clearly stated HRM policies along with a few well-funded non-government sport organisations such as the AFL (17). The uniqueness of sport relates to intangible aspects, that is, there is no specific product that you can see or touch as every game or event is unique and there is an inseparability between the product and the consumer (17). This means that it is difficult to separate a game or event from the customer, they co-exist. In the past, on-field success has been a predictor of the organisation’s success rather than operational effectiveness (17). There has been a long tradition of informal planning, control and administrative systems in the elite sporting
environment (18). This is despite the increasing demand for professionalism expected of athletes, coaches, administrators and professional support staff from both the public and government agencies such as the Australian sports commission (19). The Australian government has emphasised the importance of HRM and made it mandatory to qualify for funding (18), however professional sports do not rely on government funding so they are under no obligation to comply. The Australian Sports Commission (19) reports that sport organisations have minimal human resource management policies and practices and lag behind mainstream business. This lack of knowledge about the HRM practices in Australian sport organisations, especially to do with the employment and development of professional staff, presents considerable challenges for sport policy makers and managers when making decisions about the need for long-term sport workforce development.

The conception of this workforce study was derived long before the controversy emerged about the practice of pseudo sports scientist in Australia (20, 21). Recent media attention about the practices of pseudo sports scientists has brought the profession’s shortcomings in relation to accreditation and regulation to a head (6, 22-24). The subsequent Senate inquiry into the practice of sports science in Australia has highlighted the lack of clarity in defining sports science and an overall lack of understanding of the work that sports scientists do (2). A recent workforce study of Australian coaches has shown the value of undertaking a large-scale workforce project, providing a rich source of data about coaches’ work that informs policy and practice (15).

The purpose if this project is to provide a comprehensive overview of the High Performance and Sports Science workforce. The objectives of this project were to undertake a descriptive survey of the sports science industry to:

- Better define sports science and the role of the High Performance Manager and Sport Scientist;
- Determine current and future needs for assistance in career development of High Performance Managers and Sport Scientists;
- Examine the recruitment and selection policies of High Performance Managers and Sport Scientists;
- Identify concerns on the employment conditions of High Performance Managers and Sport Scientists;
- Identify current and future education and training requirements in sports science; and
- Identify the need of High Performance Managers and Sport Scientists for professional support from ESSA.
2.1 Design
The project used a cross-sectional, quantitative survey methodology to collect data about the Australian High Performance and Sports Science workforce, and the Sport Administrators that employ them.

2.2 Participants
Two groups of participants completed this research project. These were 1) Australian high performance and sports science employees, and 2) the Sports Administrators who were their employers. To capture as much of the workforce as possible, including those who worked outside organised sport systems and networks, a multipronged recruitment approach was utilised, including disseminating information via email about the surveys to people and organisations that had existing relationships with participants, recruitment messages through mailing lists and newsletters to online communities, and announcements on relevant websites, to ensure maximise response rates (25). This multipronged approach is effective when using web-based surveys (11, 25, 26).

2.2.1 Database of sport organisations and associations
Due to ethical restrictions in relation to the use of third party databases and mailing lists, a database was developed to provide the research team with a list of sport organisations and associations that potentially employed high performance and sports science workers. Contact details (name, email address and/or phone number) were obtained through publicly available information online, with the first point of contact primarily the administration or reception of organisations or associations. The relevant sport organisations and associations that were contacted for either completion or distribution of the surveys included national, state and community sport organisations; state sport institutes and academy networks; and professional Olympic/Paralympic sport associations.

2.2.2 Recruitment strategy
Approaches in the recruitment of participants for the High Performance and Sports Science survey included: 1) contacting sport organisations and associations described in the previous section; 2) distributing information to personal contacts of members of the research team; 3) announcements and messages via websites, social media, and online newsletters; and 4) encouraging recruited participants to pass information to colleagues and associates. These will be discussed in turn.

The initial recruitment of participants involved contacting sport organisations and associations using the database described in the database. This approach involved calling the first point of contact and requesting to be transferred to the employee in charge of human resource management and/or high performance and sports science staff within the organisation. Once transferred through to the appropriate person, the purpose of the call was explained and an email address was requested to send relevant documents for distribution to potential participants (e.g., plain language statement, consent form, and flyer containing...
the survey link). For those organisations where a phone number could not be located, an email was sent with the relevant documents, with a request to forward this information to the relevant people (i.e., the human resources contact or high performance/sports science manager). To enhance the recruitment of participants the strategy was modified to include convenience sampling approach via the research team’s personal contacts or associates. A convenience sampling strategy is considered appropriate when the sample size is small or it is difficult to recruit via conventional means, thus maximising participant response rates (27).

The personal contacts or associates that were contacted by research team members were employees or representatives of either governing bodies that represented a large proportion of the high performance and sports science workforce, or institutions that employed a large number of high performance or sports science staff. These relevant sport organisations were provided with a promotional flyer, which contained a link to the survey, to distribute to their members through email or online newsletter via their own mailing lists. These sport organisations and associations included: Sports Medicine Australia (SMA); the Australian Institute of Sport (AIS); the Australian Sports Commission (ASC); Council of Heads of Exercise, Sport and Movement Sciences (CHESMS); the Australian Strength and Conditioning Association (ASCA); Coalition of Major Professional and Participation Sports (COMPPS); the AFL Sports Science Association; the Australian Council for Health, Physical Education and Recreation (ACHPER); and ESSA.

Further recruitment strategies that were used were predominantly Internet-based, including industry websites, online newsletters, and social media. These types of recruitment campaigns have been recommended for studies which are Internet-based, such as the online survey instruments utilised for the current research project (25). Each of these Internet-based recruitment strategies involved an announcement of the research project, including information about the purposes and objectives of the study, as well as a call for participants and the hyperlinks for both surveys. Industry websites such as ESSA, online newsletters such as the ASC’s Daily Sport News, and social media platforms such as LinkedIn were used in these recruitment campaigns. The Deakin University research news website was also used to highlight the research being conducted and provide a further call out for participants. In addition, the promotional flyer used in the recruitment of participants encouraged high performance and sports science workers who had completed the survey to pass on this information to their fellow colleagues and associates in the profession who may have been interested in the research project (i.e., snowballing).

Due to the lack of success in the initial recruitment of high performance and sports science participants, the overall recruitment strategy was modified in the recruitment of participants for the Sport Administrator survey. The approaches included: 1) distributing information to personal contacts (who currently work in the industry) of members of the research team; 2) announcements and messages via websites, social media, and online newsletters; and 3) encouraging recruited participants to pass information to colleagues and associates (i.e., snowball sampling). These recruitment strategies were similar in nature to those described in the previous paragraphs, with sports administrators targeted instead.

2.3 The Surveys

This research project utilised two separate online surveys to collect population data from the two participant groups: 1) High Performance and Sports Science Workers; and 2) Sport Administrators.

2.3.1 Survey instrument development

Development of both survey instruments was undertaken by the research team through an in-depth process. This process initially started with a review of the literature to determine potential areas of investigation and examination of
previous workforce surveys and reports. This was completed in conjunction with the development of survey questions, which not only met objectives of the research project but also were aligned with previous Australian workforce studies for comparison. The research team met on a number of occasions in this development process to amend and refine both survey instruments. Both surveys were also piloted to determine face validity, comprehension and understanding, and ensure that length was not too burdensome (see Section 2.3.2 for greater detail). Overall, the development of both survey instruments was completed over a three-month time period.

The High Performance and Sports Science survey comprised 74 questions separated into 6 sections that were focused on their background, work, views on professional membership and accreditation, professional development activities, career pathways and future career intentions. A proportion of these questions were extracted from previous workforce surveys including Staff in Australia’s Schools 2010: Teacher Survey (28), the 2012 National Aged Care Workforce ‘Census’ (9), and Profiling the Australian Coaching Workforce Survey (29). These surveys were comprised of questions that had been validated either from established sources (e.g., ABS) or through their use in previous data collection (9, 28).

The Job Satisfaction Scale (JSQ) is a validated scale used to measure overall job satisfaction. The JSQ was developed by Andrews and Withey and consists of five items that measure job facets on a seven-point Likert scale which ranged from ‘delighted’ to ‘terrible’ (30, 31). These five items were: “your job”, “the people you work with – your co-workers”, “the work you do on your job – the work itself”, “what it is like where you work – the physical surroundings, the hours, the amount of work you are asked to do”, and “what you have available for doing your job – I mean the equipment, information, good supervision, and so on” (30, 31). The survey also two contained open-ended questions at the end, with the first centred on participants’ career progression and the second focused on their experiences as a high performance or sports science worker.

The Sport Administrator survey comprised 33 questions which were focused on their background, work, the employment of high performance and sports science workers, HRM practices of their workplace, views on the sports science profession, and workplace turnover. A proportion of these questions were extracted from previous workforce surveys as mentioned earlier in this section. Two validated scales developed by Wan, Kok and Ong (32) and adapted by Taylor and McGraw (18) were also used to measure two specific HRM practices: 1) selection processes of employees; and 2) employee performance appraisals and reward systems. The Selection Scale consisted of five items: “we have detailed selection criteria”, “we have substantial performance appraisals”, “a great deal of effort is expended to select the right person”, “great importance is placed on staffing”, “selection processes and procedures are extensive”, and “there is a great deal of money spent on selection” which are rated using a 6 point rating scale. This scale is reported to have good internal consistency ($\alpha = 0.84$) (18, 32). The Performance Appraisal and Reward System Scale comprised four items: “pay rises and promotion are tied to performance”, “pay is tied to group/team performance”, “performance appraisals are tied to personal development” and “we have performance-based pay incentives” measured using a 6 point response scale. The scale is reported to have good internal consistency ($\alpha = 0.78$) (18, 32). The survey also contained two open-ended questions at the end, with the first centred on participants’ experiences as a high performance or sports science worker.
Performance and Sports Science survey, and three screening questions for the Sport Administrator survey before the actual survey items were displayed. In some instances the same or similar questions were asked of both high performance and sports science workers, and the sport administrators that employed them, allowing for perspectives from both groups and comparisons of their responses to one another. For example, respondents of both surveys were asked about their views on the qualifications, accreditation and regulation of Sports Scientists and High Performance Managers.

2.3.2 Pre-survey testing
Both surveys were piloted to determine the face validity of the questions, comprehension and understanding of the questions as well as to evaluate the online delivery method, and ensure the time taken to complete the survey was not too burdensome. The surveys were initially piloted by the six members of the research team using the online survey program. Electronic word-versions of the survey items were also reviewed by the ESSA Sports Science Advisory Group (SSAG), with feedback provided by three members of SSAG. Pilot participants were invited to participate via an email which contained a hyperlink directing them to the online survey. The High Performance and Sports Science survey was piloted by staff (n=9) within the Centre for Exercise and Sports Science research group, and postgraduate students (n=6) who had completed the Bachelor of Exercise and Sports Science and were currently completing research or employed work within the field. The Sport Administrator survey was externally piloted by members of staff from the School of Management and Marketing (n=4) and managers of sport organisations from the Exercise and Sport Science Course Advisory Board (n=3). In total, 15 pilot participants completed the High Performance and Sports Science survey, whilst 7 pilot participants completed the Sport Administrator survey. The responses obtained were considered sufficient to ensure appropriateness of the survey instruments for use in the actual research. Adjustments were made to the surveys based on the feedback received through the piloting process. These adjustments included the addition of five survey questions to the High Performance and Sports Science survey, and two survey questions to the Sport Administrator survey to ensure the objectives of the tender were met, as well as additional items to questions to ensure that the data cleaning and preparation process was less onerous for the research team. A further 11 questions were also added to the Sport Administrator survey to capture additional demographic data for those respondents who indicated they were High Performance Managers. These changes were then re-reviewed internally by the research team before the surveys were activated for data collection.

2.3.3 Participant screening
To ensure that the participants who responded to the surveys were members of the two participant groups, screening questions were included at the beginning of the surveys. Participants of both surveys were required to be over the age of 18 and either currently employed as, or involved in the employment of, high performance and sports science workers. The Sport Administrator survey also had an additional screening question to ensure that their workplace currently employed high performance/sports science workers. Participants who answered no to one or more of the screening questions were redirected to the end of the survey thanking them for their time and explaining the reasons why they could not participate in the survey. However, it was not possible to verify those participants who answered yes to all of the screening questions.

2.4 Procedures
Upon finalisation of the surveys, the surveys were activated online to allow the research team to begin data collection of respondents. The surveys were launched online on August 16, 2013 and remained open for data collection for a three month period. Qualtrics, an online survey software program, was used to collect the data,
with screening of the data completed in the early stages of data collection to screen for possible errors within the online survey program and to examine the data for any inconsistencies and patterns of missing data (33, 34). No issues were identified during this process. Once the surveys were deactivated online, the data was downloaded from Qualtrics and then prepared for statistical analyses by the research team. The surveys and methodology received ethics approval from the Deakin University Faculty of Health Human Ethics Advisory Group (HEAG-H).

2.5 Data Cleaning and Analysis

2.5.1 Data cleaning

At the completion of the three month data collection period, the survey was deactivated and the data downloaded from the Qualtrics online survey program into a data file to allow the data to be cleaned and analysed using IBM SPSS 21.0 for Windows (IBM Corporation, Armonk, USA). The diagnostic phase of the data cleaning process involved the identification and clarification of worrisome data points (33, 34). The data cleaning process required any odd data points to be corrected, deleted, or left unchanged (34). Impossible values were deleted and specific codes (e.g., the number -99) were used to represent missing values (33).

2.5.2 Data analysis

Once the data cleaning and treatment process had been completed, the data was analysed using IBM SPSS 21.0 for Windows. Frequency and descriptive analyses were run in SPSS to determine percentages, means and standard deviations. The scale scores from the five items of the Job Satisfaction Questionnaire were combined and then averaged to produce a mean job satisfaction rating (35). The scale scores from the six items of the Selection Scale, and the four items of the Performance Appraisal and Reward System Scale were also combined and then averaged to form mean scores for selection and performance-based pay, respectively. Textual responses to open-ended questions were examined to identify any key quotes from participants, which were then extracted from the data file and used to support the quantitative data (36). For the purposes of the report, descriptive statistics were used to describe the basic features of the data in this research project. Categorical survey items were summarised as frequency distributions (i.e., number and/or percentage of respondents), whilst continuous survey items were summarised as summary statistics (i.e., means and standard deviations) (33). No inferential statistics were conducted.

<table>
<thead>
<tr>
<th></th>
<th>HPM/Sport Science</th>
<th>Sport Administrator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated denominator</td>
<td>450</td>
<td>130</td>
</tr>
<tr>
<td>Number surveyed</td>
<td>210</td>
<td>32</td>
</tr>
<tr>
<td>Response rate (%)*</td>
<td>47%</td>
<td>25%</td>
</tr>
<tr>
<td>Completion of demographics</td>
<td>202 (96%)</td>
<td>30 (94%)</td>
</tr>
<tr>
<td>Completion of demographics and &gt;50% of survey</td>
<td>148 (71%)</td>
<td>24 (75%)</td>
</tr>
<tr>
<td>Completion of demographics and &gt;80% of survey</td>
<td>129 (61%)</td>
<td>20 (67%)</td>
</tr>
</tbody>
</table>

* RR calculation based on total number surveyed divided by the estimated denominator

Table 2 Survey statistics including number surveyed, response rates and percentage completed
2.6 Response to the High Performance and Sports Science Survey
At the time of data collection the Australian sports science population was estimated to be between 400 and 500 nationally (2), with only 24 of these ESSA accredited sports scientists (37). Due to the nature of survey distribution (through multiple databases, personal contacts, Internet-based and snowballing strategies) and lack of accurate depiction of the workforce population, it was not possible to calculate an exact response rate for high performance and sports science workers survey. Based on the current estimation of the workforce, the estimated n for this research project was 450.

2.7 Response to the Sport Administrator Survey
At the time of data collection the number sport organisations and associations in Australia that employed high performance and sports science workers, and how many of these workers were employed in these workplaces was unknown. Therefore, similarly to the high performance and sports science survey, it was not possible to calculate an exact response rate for sport administrators’ survey. For the purposes of this research project, an analysis of potential employers of high performance managers and sports scientists provided an estimated n of 130.

In a number of questions, comparisons have been made based on age, gender, qualifications, industry sector, position title, and ESSA membership subgroups. However, for some questions these subgroup comparisons were not possible because of low numbers in one of more of the subgroups. In these cases, additional descriptive analysis for the larger subgroup(s) were performed.

3.1 Characteristics of the Workforce

3.1.1 Number and position
The majority of respondents were employed in one position. Not surprisingly, those respondents who held two or more positions (30%) were those who were employed on a part-time or casual basis, with around 44 per cent of respondents in these employment categories working across multiple positions.

Respondents who were aged between 36-45 years (n=63) had the highest percentage of respondents (41%) with two or more positions. Of the small number of respondents who held four or more positions, two were aged between 26-35 years, with the remaining respondents aged between 36-55 years. Interestingly, respondents who were aged 25 years or less (n=25; 80% of this group), or 56 years or more (n=13; 77%), were the most likely to be employed in one position.

Overall, those respondents who held a graduate certificate/diploma (n=12) had the highest percentage (92%) currently employed in one position. In comparison, respondents with a PhD/Doctorate (n=59) were the most likely group to have two or more positions (37%), with three quarters of the respondents with four or more positions holding a PhD/Doctorate (with the remaining respondent holding only a certificate/diploma).
Those respondents who worked in institutes or academies of sport (n=71) had the highest percentage (82%) currently employed in one position. In contrast, respondents working in universities or research institutions (n=26) were the most likely to hold multiple positions, with 54 per cent of respondents in this group holding two or more positions.

There was a considerable variety of job titles reported with a relatively even spread of Sports Scientists, Strength and Conditioning Coaches and High Performance Managers. Sport Physiologists and Academic Sport Scientists completed the top five. Those respondents who indicated ‘other’ included those working in the health professions such as aged care, myotherapy and rehabilitation, as well as those working in management roles (e.g., Director of High Performance).

There were also several respondents who could not differentiate between the multiple positions they held and the skills they utilised, as highlighted in the following statement:

<table>
<thead>
<tr>
<th>Position title</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength and Conditioning Coach</td>
<td>36</td>
<td>18</td>
</tr>
<tr>
<td>Sports Scientist</td>
<td>35</td>
<td>18</td>
</tr>
<tr>
<td>High Performance Manager</td>
<td>31</td>
<td>16</td>
</tr>
<tr>
<td>Sports Physiologist</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>Academic Sports Science</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td>Sports Biomechanist</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Performance Analyst</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Skill Acquisition Specialist</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Sports Dietitian</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Osteopath</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Sports Psychologist</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Sport Physiotherapist</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>199</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 3 Position title most representative of main employment in high performance and/or sports science

“Combination of physiology, strength and conditioning, performance analysis and Biomechanist”

Almost two thirds of the respondents have worked for five years or less in their position in the high performance and sports science industry. Further analysis revealed that those who were working in private consultation (86%; n=14) and professional sporting clubs (78%; n=40) were the most likely to have had the least amount of time (5 years or less) in their current position. In comparison, just over
50 per cent of respondents who were working at institutes and academies of sport (n=71) had spent 6 years or more in their current position.

### 3.1.2 Qualifications and training specialisation

The highest academic qualification completed by respondents was a PhD/Doctorate. Respondents who identified as being in the field of academic sports science were the most qualified (27% of all PhDs held), followed closely by Sports Physiologists (22%) and Sports Scientists (19%). In comparison, Strength and Conditioning Coaches (32%) and High Performance Managers (22%) were more likely to have a Masters by Coursework qualification.

Not surprisingly, respondents who were working in universities or research institutions (n=26) were the most likely industry sector to hold a PhD/Doctorate (69% of this group). In fact, those respondents who were employed at universities or research institutions held either an Honours qualification (31%) or a PhD/Doctorate. Respondents who were working in institutes or academies of sport (n=71) also had a high percentage of respondents (85%) holding an Honours qualification or higher (38% of these a PhD/Doctorate). In contrast, respondents from professional sporting clubs (n=40) were most likely to hold a Masters by Coursework degree (30%).

The majority of qualifications (89%) held by respondents were in the field of high performance and/or sports science. Initial area of training, position title, and industry sector were not indicative of those respondents who held a qualification in a field other than high performance and/or sports science.

Respondents were then asked about their engagement in further study in the field of high performance and sports science. Just under one quarter of respondents were currently engaged in further study. Interestingly, only one of the respondents who indicated that they did not have a current qualification in high performance and/or sports science was currently studying in this field.

Of those engaged in further study, almost two thirds were completing a PhD/Doctorate, with 26 per cent of this cohort currently working as Sports Scientists (n=8). High Performance Managers (n=5), Sports Biomechanists (n=5) and Academic Sports Scientists (n=5) comprised the majority of the remaining respondents currently completing a PhD/Doctorate (16% each).

The respondents primary area of training was mostly sport related (89%), with the most frequently reported area exercise and sports science. The remaining 11 per cent were trained in allied health professions such as physiotherapy, dietetics/nutrition, osteopathy and myotherapy.
3.1.3 Age and gender
The majority of respondents were male (72%). When examining the current position titles of respondents, several were male dominated, in particular in Strength and Conditioning (n=36) where almost 92 per cent of respondents in this group were male. High Performance Managers (n=31) and Sports Physiologists (n=24) were also predominantly male, accounting for 81 and 79 per cent of this cohort, respectively. In comparison, females were more likely to work as Sports Scientists (n=35) and Sports Biomechanists (n=16), comprising 37 per cent of each group.

Two thirds of the respondents were aged between 26 and 45 while just over a fifth were 46 years of age or older. Only a small proportion of respondents were aged between 18 and 25 years. Further analysis based on the industry sector of respondents revealed that respondents working in sport associations/organisations (n=23) were the oldest cohort, with almost 40 per cent aged 46 years and older. In comparison, respondents working in non-professional sporting clubs (n=9) were the youngest cohort, with 67 per cent of respondents in this group aged 35 years or younger.

<table>
<thead>
<tr>
<th>Primary area of training</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise and Sports Science</td>
<td>63</td>
<td>30</td>
</tr>
<tr>
<td>Strength and Conditioning</td>
<td>43</td>
<td>21</td>
</tr>
<tr>
<td>Biomechanics</td>
<td>34</td>
<td>16</td>
</tr>
<tr>
<td>Physiology/Biochemistry</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Performance Analysis</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Psychology</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Sport Coaching</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Dietetics/Nutrition</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Osteopathy</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Sport Management</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Motor control and development/skill acquisition</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Myotherapy</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>205</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

*Table 4 Primary area of training of the high performance and sports science workforce*
with that of the Australian population, the main differences were in the ACT (only 2% of the Australian population compared to 16% in the current study) and NSW (only 20% of the Australian population compared to 32% in the currently study) (38).

Three per cent of respondents were of Aboriginal and/or Torres Strait Islander origin, which is consistent with the larger Australian population where Aboriginal and Torres Strait Islander people make up 2.5 per cent of the population (39).

The majority of respondents were born in Australia, with a small proportion of respondents from the United Kingdom and New Zealand. The remaining respondents were born in ‘other’ countries including Aland Islands, Bahrain, Bangladesh, Brazil, Canada, Germany, India, Iran, Ireland, Italy, Japan, Singapore, South Africa, Sweden and the USA.

Of those respondents not born in Australia, the majority had lived in Australia for 6 years or more (78%), with the remaining respondents having lived in the country for five years or less (22%).

3.1.5 Professional membership and accreditation

The majority of respondents were aware of ESSA. Of those respondents who were not aware of ESSA, two were High Performance Managers, two were Osteopaths, and the remaining were a Sports Scientist, Strength and Conditioning Coach, Sports Physiologist, Sports Physiotherapist and Director of High Performance.

Overall, most respondents were not members of ESSA. Just over a quarter of respondents were ‘Exercise Science’ members of ESSA, with the remaining five per cent consisting of student (n=1), academic (n=2), associate (n=1) and fellow (n=2) members. Of those respondents who were not members of ESSA, they were most likely to be Sports Scientists (19%), High Performance Managers (17%) or Strength and Conditioning Coaches (16%).
However, these same positions were also the top three positions for those respondents who held Exercise Science membership, with the highest level of membership from respondents working as Strength and Conditioning Coaches (25\%) followed closely by Sports Scientists (19\%) and High Performance Managers (17\%). Academic Sports Scientists (17\%) and Sports Physiologists (14\%) rounding out the top five.

There were a large proportion of respondents that were members of at least one professional organisation or association. Of those that were members, the most popular were the Australian Strength and Conditioning Association (ASCA) and Sports Medicine Australia (SMA).

‘Other’ professional organisations or associations mainly included international memberships such as the European College of Sport Science (ECSS), the American College of Sports Medicine (ACSM), and the International Society of Biomechanics in Sport (ISBS). Other Australian professional organisations and associations mentioned were the Australian Physiotherapy Association (APA), Fitness Australia, and the Australian Track and Field Coaches Association (AFTCA). There were also a number of respondents who were members of multiple professional organisations or associations. Surprisingly, 37 per cent of respondents indicated that they were not a member of any organisation or association at all. Those non-member respondents were most likely to be working in institutes or academies of sport, comprising 48 per cent of this group.

The majority of high performance/sports science respondents who were not ESSA members were in strong agreement that ESSA membership was not of value to them. Sports Scientists were particularly in strong agreement, with 75 per cent of respondents in this group indicating that ESSA membership was not of value to them. ESSA membership was also not required for respondents’ positions, was too difficult to obtain, and too expensive.
3.2 Employment Conditions and Roles

3.2.1 Employment status and contract conditions

Three quarters of respondents were employed full-time, with a large proportion of those on fixed-term contracts. In comparison, respondents who were employed part-time and casually were more likely to be self-employed. The remaining respondents were either volunteers, students or self-employed.

The most commonly reported form of employment was a fixed-term contract, followed closely by respondents who had ongoing/permanent positions. Of those who indicated they were on a fixed-term contract, Sports Scientists (n=34) and High Performance Managers (n=30) were the most likely positions to working under contract conditions (21 per cent and 18 per cent of these cohorts, respectively). In comparison, Strength and Conditioning coaches (n=34) and Academic Sports Scientists (n=22) were the top positions employed on an ongoing/permanent basis (22 per cent and 19 per cent of these groups, respectively).

There were a range of different positions that were self-employed, however, Sports Physiologists (26%) and Strength and Conditioning Coaches (19%) were the most likely to be working for themselves.

Of those respondents on fixed-term contracts, almost 90 per cent were on contracts between one to four years in length, with contracts of five years or more rare. Respondents working in institutes or academies of sport (n=41) were the most likely to have four year contracts (42%). In saying this, however, of the seven respondents who indicated they were on short-term contracts of six months or less, five were from institutes or academies of sport. In comparison, those respondents working in professional sporting clubs (n=26) were most likely to on a one year contract (42%).
Those respondents who were on a salary of less than $50,000 (n=8) were the most likely to be on a one year contract, with 100 per cent of these on a short contract. In comparison, almost 86 per cent of respondents who were currently paid in excess of $150,000 (n=7) for their work were employed on 3 year contracts. Respondents who were on contracts of 5 years or greater (n=3) were paid a salary between $50,000 to $150,000 for their work.

In relation to the qualifications of respondents, those respondents with either a PhD/Doctorate (n=22) or Masters by Research (n=11) were the most likely to have contracts 4 years length, with 36 per cent of respondents in each of these groups holding these contracts. In contrast, respondents with a Bachelor degree (n=15) were the most likely only be on a one length contract, with 40 per cent of respondents in this group employed on this shorter term contract.

Non-ESSA members (n=54) had a higher percentage of respondents on longer contracts, with 38 per cent of respondents in this group holding contracts 4 years in length. In comparison, ESSA members (n=13) were most likely to hold contracts 2 to 3 year contracts (69% of respondents in this group).

The four most commonly cited components of the respondents’ contract arrangements were ethical conduct; intellectual property ownership; and confidentiality/non-disclosure. Despite ethical conduct being a major component of respondents’ contract arrangements, just over half of respondents highlighted the job insecurities that are synonymous with contract work, especially in a rapidly changing profession where even contracts are not always secure:

“There can be a high level of insecurity even when you are employed in sport. The most any of us can hope for is a 4 year contract and whether you continue with a sport or not is not always due to how you perform in that role. My sport changed leadership, my contract lost funding unrelated to my service delivery and the Australian sport system is in transition. This adds a high degree of stress over and above that required to deliver at the high level required by performance sport.”

Figure 13 Current employment status of the high performance and sports science workforce

One respondent highlighted the job insecurities that are synonymous with contract work, especially in a rapidly changing profession where even contracts are not always secure:

“...”

Figure 14 Type of current employment of the high performance and sports science workforce (n=194)

Figure 15 Length of current contract of the high performance and sports science workforce (n=87)
of respondents had received any ethics training in their formal induction, with only 16 per cent receiving ethics training in those workplaces with more informal induction processes.

Less commonly cited components were individual performance bonuses and team performance bonuses. This not surprising given that sport administrators indicated performance-based pay incentives and payment tied to group/team performance were not implemented in their workplaces (see Figure 69 and page 86 for further details). Interestingly, 20 per cent of respondents were unsure whether they had a termination clause in their contract arrangement.

3.2.2 Location, sector and level of employment

The main location of employment was in metropolitan areas (87%) with the remaining 13% of respondents located in regional areas. The Australian Capital Territory (n=34) and Inner Melbourne (n=24) comprised just over 30 per cent of those working in metropolitan areas, whilst the Sunshine Coast (n=6) was best represented for those working in regional areas.

More than one third of respondents were working in the sports institute/academy system, with a further 21 per cent of respondents working for professional sporting clubs. Female respondents were most likely to be working in institutes or academies of sport, with 54 per cent of respondents working in this industry sector (n=27). In comparison, male respondents were more evenly spread throughout the two main industry sectors, with 31 per cent working in the sports institute/academy system (n=44) and 24 per cent working in professional sporting clubs (n=33).

‘Other’ respondents included several working in aged care, one working for the government, a respondent working for a technology company, one working in a high school, and several who had difficulty choosing the industry sector that best represented where they were mainly employed, as the respondent below explains:

“My clientele is very broad, includes all of the above as well as delivering performance psychology in corporate, education, health care, the arts, and other settings”

ESSA members (n=42) were most likely to be working in either professional sporting clubs (26% of this group) or in universities or research institutions (21% of this group). In comparison, those respondents without ESSA membership (n=90) were most likely to be working in institutes or academies of sport, with 54 per cent of respondents in this industry sector non-ESSA members.

When examining those early career high performance and sports science workers (n=40) in comparison to those respondents who had been working in the profession for greater than 5 years (n=105), there were no large differences in the industry sectors in which they worked, with both groups having the largest proportion of respondents working in institutes/academies of sport and professional sporting clubs.

Respondents worked with athletes and teams at various levels of participation; however, the majority (67%) were working at the National level or higher (with most of their work Australian based). ESSA members (n=42) were mostly likely working with National level athletes and teams, with 43 per cent of this group employed at this level.
level. In comparison, there was a relatively even spread of non-ESSA members (n=89) who were based mostly in Australia working with International level (43%) and National level athletes and teams (40%).

Respondents who were in the early stages of their careers in high performance and sports science (5 years or less; n=40) were most likely to be working with National level athletes and teams, with 48 per cent of this cohort employed at this level. In contrast, respondents who had been working in the high performance and sports science industry for greater than 5 years (n=104) were most likely to be working in Australia with International athletes and teams (40%), although there were a high number of respondents also working at the National level (37%).

Of those respondents who indicated ‘other’ (n=2) one respondent was undertaking fitness work for the police force, and similarly to the previous question in relation to industry sector, the other respondent could not select one particular competitive level:

“From 2000-2012 most of my work was in option 2 [international – mostly Australian] closely followed by option 1 [international – mostly overseas], 3 [national] and 4 [state], now it is mostly an even spread across options 2-6 [5 – regional; 6 – club/community]”

3.2.3 Employer requirements
A Bachelor degree was the most frequently cited qualification requirement for employment in respondents’ current position. Strength and Conditioning coaches (n=27) were the most likely of all positions to require a Bachelor degree, comprising 75 per cent of all respondents who required this qualification. Sports Scientists (n=34) and High Performance Managers (n=29) rounded out the top three positions that required a Bachelor degree for their current position (52 and 44 per cent of these cohorts, respectively).

Not surprisingly, those working in the area of Academic Sports Science (38%; n=14) were the most likely to require a PhD/Doctorate qualification for their current position. Interestingly, of the ten per cent of respondents who did not require a qualification for their current position, 47 per cent were High Performance Managers (n=9).
When examining the industry sector of respondents, the main qualification requirement in professional (n=40) and non-professional (n=9) sporting clubs was a Bachelor degree, accounting for 58 and 56 per cent of each cohort, respectively. Sport associations or organisations (n=23) also had just over half (52%) of their respondents requiring a Bachelor degree. This industry sector was also the most likely to require no qualification at all (30% of this group). And not surprisingly those respondents working in universities or research institutions required a PhD/Doctorate, with 54 per cent of this group needing this qualification for their current position in high performance and sports science.

The vast majority of respondents indicated that they did not require any professional affiliations for their current position, with professional registration the least required by workplaces. Respondents working in sporting associations or organisations (n=21) were the most likely to require professional accreditation for their current position, with 33 per cent of respondents in this cohort indicating this was a requirement. In comparison, respondents working in private consultation (n=11) were the most likely to require professional membership (46 per cent of this group).

Overall, most respondents (73%) were employed through external processes. More than half of the respondents indicated they were employed via an external, competitive process, such as an interview and/or advertised job. External, non-competitive selection processes, such as headhunting and networking were less common for employment.

Institutes and academies of sport were the most likely to utilise external, competitive processes, comprising 72 per cent of their overall selection processes (n=48). In comparison, professional sporting clubs most utilised external, non-competitive processes (43%; n=15) in their selection of sports science and high performance employees.

Upon successfully gaining a position, only 57 per cent of respondents were required to take part in a formal induction program. This is despite the fact that 88 per cent of sports administrators (n=18) indicated they had a formal induction process (discussed further in Section 4.3.3, on page 87).

Given that many who are working in private consultation are self-employed, it was not surprising that the majority of these respondents did not participate in a formal induction program (80%; n=8). Those respondents working in professional sporting clubs (63%; n=22) and sport associations or organisations (57%; n=12) were also less likely to participate in a formal induction program. In comparison, respondents working in the institutes or academies of sport were the most likely to be inducted formally into their new position (73%; n=49).

High performance and sports science workers indicated their employers provided a range of facets in the formal induction process at their workplace. General induction processes such as orientation sessions, workplace tours and employee handbooks were the most commonly reported by respondents. However, more job-specific aspects such as meeting with athletes and ethics training were only reported by approximately half of the respondents in their formal induction program. Formal mentoring arrangements were the least reported by respondents in their formal induction, which could be related to the more long-term implementation of such a process.
3.2.4 Payment, support and hours of work

The majority of respondents were paid a salary/wage for their work, with a small number of respondents paid on a casual basis. Of those respondents who indicated they were paid an honorarium/stipend, the amount earned ranged from $1000 to $36,000 (or an average of $17,583 annually).

Further examination based on the industry sector revealed that those working in institutes and academies of sport were the most likely to be paid a salary/wage, with 91 per cent of this cohort paid a salary/wage (n=58). All other industry sectors had at least 79 per cent of their respondents paid a salary/wage, with the exception those respondents working in private consultation, who were more likely to be paid hourly/casual rates (70%; n=7).

Just over half of the respondents who received a salary were earning between $50,000 and $99,999 annually. There was, however, a considerable cohort of respondents who were earning $100,000 or more per year.

Respondents who were working as High Performance Managers had the highest incomes, with 75 per cent of this group earning $100,000 and over (n=18). Not surprisingly, High Performance Managers were also one of only two positions earning over $150,000 annually, comprising 73 per cent (n=8) of all.

The industry sector most likely to provide ethics training were professional sporting clubs (n=13), with 62 per cent of respondents in this group providing this in their formal induction programs. In contrast, sport associations and organisations (n=9) were the least likely to provide ethics training in their formal induction program, with 78 per cent of respondents in this group not providing ethics training as part of their formal induction processes.

Respondents who indicated that their workplace did not have a formal induction program were asked to report what types of induction processes they did participate in upon commencement of their current position. Overall, those respondents in workplaces with no formal induction were considerably less likely to participate in any induction processes, with meetings with athletes and the coaching team the most commonly reported.

There were some key differences between those respondents completing a formal induction program, versus those participating in more informal processes, indicating some inconsistencies in the administration of human resource management policies. Most notably, only 16 per cent of respondents received ethics training in comparison to those in formal induction programs where 53 per cent of respondents participated in training related to ethics.
respondents earning this level of income (with Academic Sports Scientists the other position). In comparison, there were a range of positions earning less than $50,000 (n=10), with Strength and Conditioning Coaches the most likely to earn this level of income annually (40%; n=4).

Industry sector also influenced the salary of respondents, with 58 per cent of respondents working in professional sporting clubs earning $100,000 or more in their high performance and sports science positions. In fact, all respondents earning in excess of $150,000 per year were either working in professional sporting clubs (n=8) or universities/research institutions (n=3). In comparison, respondents working in institutes or academies of sport (n=55) were the most likely to be earning between $50,000 and $99,999 annually, with 64 per cent of this cohort earning this level of income.

Not surprisingly, the youngest cohort of respondents (aged 25 years or less; n=7) were earning a salary of less than $100,000 per annum (100%). Respondents aged between 26 and 35 years (n=50) were the most likely to be earning between $50,000 and $99,999 annually in their role, with 74 per cent of this group having this level of income. In contrast, respondents aged between 36 and 45 years (n=44) and 46-55 years (n=16) were the most likely age group to be earning between $100,000 to $149,999 for their annual gross salary (48% and 44% of these cohorts, respectively). Those respondents earning in excess of $150,000 (n=11) were over the age of 35, with most aged between 26 and 45 years (n=6).

To be earning a high salary in the high performance and sports science profession, respondents generally had to hold a Masters or PhD qualification, with all bar one of the respondents earning more than $150,000 annually (the remaining respondent holding only a Bachelor degree). In comparison, respondents with either a Bachelor degree (n=17) or Honours qualification (n=23) were the most likely to be earning between $50,000 and $99,999, with 65 per cent of both cohorts earning this level of pay per year. In contrast, ESSA members had a higher percentage of respondents earning in excess of $150,000 annually (18% of this group in comparison to 5% of respondents without ESSA membership).

Non-ESSA members (n=75) were the most likely to be earning less than $50,000 per year (9%) in comparison to ESSA members were only one respondent (4% of the group) was earning this annual gross salary. Non-ESSA members were also more likely to be earning between $50,000 and $99,999 per annum, with 55 per cent of the cohort earning this level of pay per year. In contrast, ESSA members had a higher percentage of respondents earning in excess of $150,000 annually (18% of this group in comparison to 5% of respondents without ESSA membership).

Overall, there was a relatively even spread of hourly rates of pay for the small number of respondent who indicated this as their type of payment. Respondents were most likely to be earning between up to $50 per hour, with the least
Respondents who were working in institutes or academies of sport (n=63) appeared to be the most supported by their employers, especially in relation to work-related uniform (98%; n=62), workspace (97%; n=61), and professional development (87%; n=55), which were well above the overall averages across industry sectors. In comparison, respondents working in professional sporting clubs were less likely to receive support for workspace (82%; n=27), and professional development (64%; n=21), although they received a high level of support for their work-related uniform (91%; n=30).

Those respondents working in sport associations or organisations (n=19) were the most likely to receive support for indemnity insurance, with over 63 per cent of respondents receiving additional financial or in-kind support from their employer (n=12), compared to the overall average (40%).

However, when sport administrators were asked the same question, they indicated they provided very little support to their employees, especially in relation to professional development (100%; n=24) and work-related uniform (96%; n=23).

The majority of respondents (71%) were contracted to work a 35-40 hour week (full-time), which generally reflects the number of respondents who indicated they were currently employed full-time.

Sports Scientists (28%; n=5) and Strength and Conditioning Coaches (22%; n=4) were the most likely to be contracted to work 10 hours or less per week (n=18). Strength and Conditioning Coaches (40%; n=6) were also the most likely to working on a more part-time basis between 11 and 34 hours per week. There was a relatively even spread of respondents working full-time, with Sports Scientists (185%; n=20), High Performance Managers (17%; n=19), and Academic Sports Scientists (16%; n=18) the top three positions contracted to work between 35 and 40 hours in a typical week. And of those respondents who were contracted to work 41 hours or more (n=14), 43 amount of respondents earning greater than $110 per hour.

Respondents aged between 36 and 45 years were the most likely to be earning an hourly rate, comprising 44 per cent of all respondents (n=10). This age group was also the most likely to be earning in excess of $110 per hour, so although they were not on a salary, this was compensated by a significant hourly rate. No respondents aged 66 or over were working for an hourly rate of pay.

Overall the majority of respondents indicated they were well catered for in terms of financial and in-kind support for work-related expenses, with most above 70 per cent. In contrast, more individual related work expenses such as indemnity insurance (40%; n=62) and professional membership costs (n=35) were generally not supported by employers.
When examining the relationship between the industry sector and additional hours worked, respondents working in private consultation were working the most hours, on average, above which they were contracted to do (M=19.3; SD=3.8). Those respondents working in university or research institutions were also completing a large degree of work outside of contracted hours (M=17.9; SD=8.9). There was only a small difference between respondents working in professional sporting clubs (M=14.7; SD=10.4) and institutes/academies of sport (M=13.2; SD=12.0). In comparison, respondents working in non-professional sporting clubs were working the least number of hours outside of the hours they were contracted to do (M=9.2; SD=7.1).

Furthermore, despite the view a number of respondents that sports scientists were exploited in their early stages of their career, respondents who had been working in the high performance and sports science industry for less than five years (M=12.4; SD=10.2) were not working a greater number of hours than their more experienced counterparts (M=14.8; SD=11.7).

On average, respondents spent the larger part of a typical week working during the standard hours of nine to five pm. In saying this, however, respondents spent just over a quarter of their work week working early mornings and late evenings. Seven respondents indicated that none of their work was during standard working hours, with only two respondents indicating that 100 per cent of the work was currently working as High Performance Managers.

A greater proportion of ESSA members (n=40) were working part-time, with 28 per cent of respondents in this group contracted to work 34 hours or less per week. In comparison, the large majority of non-ESSA members (n=89) were working full-time, with 85 per cent of this cohort contracted to work 35 hours or more per week.

Respondents working in professional sporting clubs (n=35) worked the most variable hours. Although just over 50 per cent of this industry sector were contracted to work full-time hours, a number of respondents were contracted to work less than 10 hours (20%) or greater than 41 hours (17%). This was in comparison to university and research institutions (n=21) and institutes/academies of sport (n=64) where the large majority of participants were contracted to work full-time hours (91% and 84% of this groups, respectively).

Overall, on average, respondents worked 14.5 hours more than they were contracted to do in a typical week, with only 5 per cent of respondents not required to complete any additional hours. The large number of hours above those that respondents were contracted to do appeared to be accepted as part of the sport industry:

“It’s really essential to have a passion for sport to work in sport. There are countless hours over and above that are expected in an industry that is generally underpaid and under resourced.”
23 per cent of their overall working week spent managing others (M=23.2; SD=10.2). And not surprisingly, Academic Sports Scientists (n=18) spent a greater proportion of time, on average, undertaking research than any other position, with 37 per cent of their hours worked in a typical week dedicated to research (M=36.6; SD=21.3).

### 3.2.5 Work conducted and job satisfaction

The majority of respondents indicated they were required to have a broad range of skills in their daily work with athletes and teams. Two of the top five job requirements were not sport specific, with communication skills in both written and oral form the most required skill for the high performance and sports science industry.

The top two sport specific job requirements were related to respondents’ practice, both in what is seen as best practice and ethical practice in their industry. However, respondents were less likely to require knowledge, skills and competencies which were associated with the sub-disciplines of sports science, such as sport psychology (e.g., use of psychological skills training), sport nutrition (e.g., provision of nutrition or supplement advice), and motor learning (e.g., assessment of motor skills).

When comparing the job requirements of Sports Scientists (n=31) and High Performance Managers (n=26), there was a clear difference in the top knowledge, skills and competencies required for these positions. Although both positions required communications skills, 100 per cent of High Performance Managers stated that communications skills in both written and oral form were required for their position. The job requirements for Sports Scientists on the other hand were focused mostly around data and research, whilst High Performance Managers required knowledge of ethics, and management type skills.

The majority of respondents (96%) indicated that they collaborated with other health
professionals and/or sports science staff as part of their employment. Of the seven respondents who did not collaborate with others in their work, three were Sports Scientists, three were Strength and Conditioning Coaches, and one was a High Performance Manager. They were mostly working with club/community level (n=3) or international level athletes/teams (n=3) in a range of industry sectors.

Overall, collaboration with others appeared to be a key requirement of working in the high performance and sports science industry, as the quote below demonstrates:

“Inter-disciplinary cooperation and good working relationships are the key to success”

High performance and sports science workers were most likely to collaborate with Sports Coaches (M=4.3; SD=0.93) and/or Strength and Conditioning Coaches (M=4.3; SD=0.98).

Not surprisingly, respondents working in non-professional sporting clubs (M=4.7; SD=0.58), institutes or academies of sport (M=4.5; SD=0.65), professional sporting clubs (M=4.5; SD=0.91), and sport associations or organisations (M=4.5; SD=0.72) all had a high level of collaboration with Sports Coaches. In comparison, respondents working in sporting clubs, both non-professional (M=4.7; SD=0.58) and professional (M=4.36 SD=0.61), were the most likely to collaborate with Strength and Conditioning Coaches.

In comparison, respondents collaborated less with those in sports science sub-disciplines such as Sport Psychologists (M=2.6; SD=1.1) and Skill Acquisition Specialists (M=2.8; SD=1.2). ‘Other’ individuals that respondents collaborated with included administrators and managers (e.g., High Performance Managers; Team Managers), academic sports scientists (e.g., Lecturers; Researchers), and technicians (e.g., IT departments; data specialists).

Overall, high performance and sports science workers were mostly satisfied with their current position, with a global job satisfaction scale score of 5.6 (SD=1.2). The majority of respondents (95%) were between satisfied and delighted with their job.

Respondents were least satisfied with what it is like where they worked, which is reflected in the following response:
“I love and am passionate about the work that I do, but with equal passion I loathe the sport institute that I currently work for due to the poor vision, management and leadership of the organisation. Most of the highly regarded and exceptionally skilled colleagues have already left. I will follow suit soon. May the last person please turn off the lights”

However, despite some concerns from respondents in relation to the work that they do, the overall satisfaction of high performance and sports science workers was revealed in a number of the qualitative responses, as shown below:

“Rewarding profession”

“I love the industry”

“I love my job”

“I have never seen it as a job but rather who I am and what I do on a day to day basis. It is demanding and sometimes thankless but I cannot think of anything I would rather be involved in.”

When examining the industry sector in which respondents worked, those working in non-professional sporting clubs were the most unsatisfied overall, with a global job satisfaction scale score of 5.1 (SD=1.5). In comparison, respondents working in university or research institutions were the most satisfied, with a global job satisfaction score of 5.7 (SD=1.3).

### 3.3 Professional Development Activities

#### 3.3.1 Participation and payment

The large majority of respondents (90%) participated in professional development activities, with the largest proportion of respondents participating in a blend of formal, non-formal and informal activities.

Of the respondents who had not participated in any professional development activities in the previous 12 months, over a third were Sports Scientists (n=5), with the remaining respondents Sports Biomechanists (n=2), Sports Physiologists (n=2), and one each of a High Performance Manager, Strength and Conditioning Coach, Performance Analyst, Skill Acquisition Specialist, and Academic Sports Scientist.

Almost 60 per cent of respondents had to pay for some or all of the professional development they had participated in the previous 12 months. In saying this, however, there were a considerable number of respondents who had been fully supported in their professional development participation.

Those respondents working in institutes or academies of sport (n=48) were provided with the most financial support for their professional development activities, with almost 90 per cent of respondents working in this industry sector either partially (31%; n=15) or fully funded (58%; n=28). And although respondents working in professional sporting clubs (n=29) were also well supported, with 83 per cent of respondents receiving partial or full funding, they were more
and sports science worker, with formal mentoring (M=3.3; SD=0.7) also having a large impact. In contrast, nonformal learning activities such as conferences/seminars (M=2.9; SD=0.7) and workshops/short courses (M=2.9; SD=0.7) had the least impact on respondents’ development (although still a moderate impact).

Respondents who had indicated that they had participated in a formal qualification in the previous 12 months were then asked to cite the reasons for their participation. The two top reasons for undertaking a formal qualification were related to the development of respondents’ knowledge, skills and competencies. In contrast, respondents were less likely to participate in formal qualifications for more extrinsic reasons such as meeting conditions of employment (36%; n=12) and attaining professional accreditation (44%; n=15).

The respondent below highlights those professional development activities that helped in their development, but were not undertaken for accreditation purposes:

“I am happy with the training that I have received (formal in terms of PhD), informal in terms of unbelievably good mentoring from a range of the world’s best ethical sport science practitioners and researchers. Incidentally, none of them are currently ESSA accredited.”

3.3.3 Barriers to professional development

Of the respondents who indicated that they had not participated in any professional development activities in the past 12 months (n=14), the most common reasons cited were lack of time due to other commitments such as work, study and family (36%; n=5), lack of employer support (29%; n=4), and no suitable professional development available (21%; n=3).

When respondents were asked about their desire to participate in more professional development activities in the previous 12 months, a larger...
The Australian High Performance and Sports Science Workforce

Support were also factors, which is not surprising given that a number of respondents had indicated previously that they had to financially support their professional development activities. ‘Other’ responses were ‘political’ and ‘combination of non-suitable, too expensive and no time’. Strength and Conditioning Coaches (n=17) appeared to have the least amount of time for professional development, with 41 per cent of respondents from this group stating this as the main reason for not participating in more professional development activities (n=7).

Further examination revealed that Strength and Conditioning Coaches (n=24) were the least content with their participation in professional development in the past 12 months, with 71 per cent of respondents in this group wanting to undertake more professional development than they did. In comparison, those respondents working in academic sports science (n=17) appeared the most content with the professional development they had undertaken in the previous 12 months, with only 35 per cent of respondents in this group indicating that they had a desire to participate in more professional development (n=6).

The main barrier to participation in more professional development activities was no time due to other commitments such as work, study and family. The expense of undertaking professional development and lack of employer support were also factors, which is not surprising given that a number of respondents had indicated previously that they had to financially support their professional development activities. ‘Other’ responses were ‘political’ and ‘combination of non-suitable, too expensive and no time’.

3.3.4 Further development needs

When asked about their professional development needs, respondents appeared to have the highest level of need in relation to knowledge (56% moderate-high need), design (47%) and interpretation of research (45%). The lowest level of need was in the assessment of fitness components, with 40 per cent of respondents indicating they had no need at all for further development in this area.

Despite just over 50 per cent of respondents receiving ethics training, overall respondents indicated that they had a low level need or no need at all for further development in ethical practices in sports science (69%) and knowledge of the ASADA and/or WADA code (64%).

3.4 Career Pathways and Future Career Intentions

3.4.1 Career motives and early career pathways

Respondents were asked about the importance of a number of factors in their decision to pursue a career in high performance and/or sports science. The most important factor reported by respondents was passion about sports science, a predominantly intrinsic motivating factor.
Respondents also wanted to work in an elite sport environment with athletes, believing that their abilities were suited to a career in sport science. In comparison, extrinsic motivating factors such as a high income and job security were considered unimportant in pursuing a career in high performance and/or sports science. The quote below highlights a number of respondents’ views on why they were working in the industry:

“Overall, [it has been] a positive experience [as a high performance or sports science worker]. I am in this profession because I really enjoy the work and the high performance environment. Not in the job for the money, the hours, etc.”

The majority of respondents started their career in a scholarship or internship program. In fact, almost 50 per cent of respondents currently working at institutes or academies of sport had followed the scholarship/internship pathway for their first position in sports science (49%; n=28).

The qualitative data, however, indicated that the internship pathway was a difficult one and often resulted in the exploitation of young sports scientists:

“It is very difficult for young sport scientists to get an opportunity. Employers take advantage of internship programs as free staff. Few organisations pay young scientists what they are worth - but sell them the ‘opportunity’ of working in sport. Young sports scientists need help with this and pay scales.”

However, it appeared that high performance and sports science workers had accepted this as the main career pathway to working in the industry:

“Getting a foot in the door with the high performance sport industry is very much about being willing to go through the shit work at the start. Cleaning gyms and taking data.”

“Doing tons of work for little or no pay early on was the best for future employment.”

Respondents were asked about the proportion of time they had spent in both paid and unpaid positions across their entire career in the high performance and sports science industry. A large proportion of respondents’ time had been spent working in paid positions, with 29 per cent of respondents having spent no time working in unpaid positions. However, there was a still a considerable proportion of time that had been spent in unpaid positions.

Respondents were then asked about the total number of positions they had held in the high performance and sports science industry since their first position. Respondents who were working in institutes or academies of sport (n=57) had spent the largest proportion of time in paid positions, with only 14 per cent of their time spent in the high performance and sports science
industry in unpaid positions. In contrast, those respondents who were currently working in non-professional sporting clubs (n=4) had almost worked an even proportion in paid and unpaid work, with only 60 per cent of their time spent in paid employment (please note the small sample size). On average, respondents had held just over 4 paid positions (M=4.2; SD=3.7) and over 2 unpaid positions (M=2.5; SD=3.7) since their first position in the high performance and sports science industry.

Almost one third of respondents (28%) reported that they were in the first 5 years of their career in the high performance and sports science industry. Not surprisingly, the majority of these people were aged between 26 and 35 years (43%; n=17) or less than 25 years of age (40%; n=16). These respondents were then asked to report on factors that were the most helpful in their early career development. On the job training was considered by respondents to be the most helpful in the initial stages of their career in the high performance and sports science industry, followed closely by formal qualifications and professional development. In comparison, professional memberships were reportedly the least helpful in the respondents’ early career development.

The importance of the degree/qualification and then subsequent on-the-job training is reflected in the response below:

“Practical placements have been the most important to professional development, university was important for giving me the base knowledge but completing internships as a student as well as postgraduate research has been the best career development.”

3.4.2 Intentions to leave and future careers

Almost one third of the respondents were reportedly happy with their current position/employer, with a further 18 per cent of respondents happy at their current employer, but wanting a higher-level position. In comparison, just over 30 per cent of respondents wanted a position with another employer, whether it was their current position as a stepping stone or a higher-level position.

For those respondents who indicated that they had other plans for their career (n=9), one respondent reflected on the lack of opportunities in their career progression:
“Not really anywhere to career progress in the current industry. Therefore, either have to accept to keep doing or get out of elite sport to pursue a more manageable career.”

Those respondents working in sport associations or organisations (n=18) appeared to be the most content, with 44 per cent of this group happy with their current position and/or employer. Respondents working in universities or research institutions (n=19) and institutes or academies of sport (n=54) were also relatively content, with 37 per cent and 32 per cent of respondents in these industry sectors happy with their current position and/or employer.

Overall, the large proportion of respondents rated the career progression opportunities with their current employer as poor to good, with just under a third of respondents believing that opportunities for career progression were fair.

Respondents working in universities or research institutions (n=18) appeared to have the greatest opportunities for career progression with their current employer, with over 39 per cent of respondents in this industry sector rating their career progression opportunities as very good to excellent. In comparison, those respondents working in professional sporting clubs (n=29) had the least opportunity for career progression with their current employer, with only 10 per cent of respondents in this industry sector rating their career progression opportunities as very good to excellent.

Respondents were more likely to be thinking about leaving and actively seeking work with their current employer, rather than the high performance and sports science profession.

When examining the industry sector in which respondents worked, those respondents working in institutes or academies of sport (n=55) were the most likely to be thinking about leaving (44% of respondents in this group) and actively seeking work (36%) outside of their current employer. In comparison, those respondents working in
universities or research institutions (n=19) were the least likely to be thinking about leaving (26% of respondents in this group) and actively seeking work (16%) outside of their current employer.

The main factors contributing to the respondents’ intention to leave their current employer were all related to job strain or stress, including insufficient support, issues with management, stressful job and lack of job satisfaction. The least frequently cited factors were related to financial security and salary.

Respondents working in institutes or academies of sport were the most likely out of all industry sectors to respond yes to the three top factors in why they were thinking about leaving or actively seeking work outside of their current employer. For example, respondents working in institutes or academies of sport (n=60) accounted for 65 per cent of all respondents thinking about leaving or actively seeking work because their current job was too stressful. Respondents working in institutes or academies of sport (n=55) also accounted for 62 per cent of those dissatisfied with their currently employer, and 57 per cent of all respondents who were thinking about leaving or actively seeking work because they received insufficient support at their current employer (n=58).

When respondents were asked about their experiences in the open-ended questions, the stress related to the job and overall lack of work-life balance in relation to their current employer and the profession became apparent:

“*The hours and stress of the job and the impact that has on my family is the biggest single factor that will probably see me leave the profession in the future.*”

“I have thoroughly enjoyed working in High Performance Sport Science but...I am also planning to have a family in the next few years and think it would be very difficult to maintain my current position and workload whilst also being the best parent that I can be.”

Close to one third of respondents intend to remain in the industry for the next 20 years or more. A relatively even proportion of respondents intend on ceasing work within the industry within the next 5 to 20 years. Only 6 per cent of respondents intend on ceasing work within the next year.

Overall, the main stated reason for the respondents’ intention to cease work was retirement.
3.5 Views on the High Performance and Sports Science Profession

3.5.1 Professional accreditation, qualifications and regulation

There was overall agreement by respondents that both the High Performance Managers and Sports Scientists should be regulated, and that practitioners should be accredited and appropriately qualified to work in sport organisations. Respondents did, however, hold stronger views when it came to Sports Scientists, particularly in relation to qualifications. Respondents were least likely to agree about the accreditation of High Performance Managers.

When comparing respondents with (n=42) or without (n=90) ESSA membership, there were clear differences between views on the employment of both Sports Scientists and High Performance Managers that are accredited. Overall, those respondents who were not ESSA members were less likely to agree on the regulation, accreditation and qualifications of high performance and sports science workers.

As Table 5 below shows, those working in sport association and organisations had the strongest views in relation to the accreditation, qualifications and regulation of Sports Scientists, in particular about the employment of Sports Scientists being dependent upon having the appropriate professional qualifications. In comparison, respondents working in professional sporting clubs had the strongest views overall in relation to the accreditation and qualifications of High Performance Managers. However, respondents working in sport associations and organisations held the strongest views in relation to the regulation of High Performance Managers.

Several respondents also raised concerns about who was in the best position to be the accrediting body of Sports Scientists in Australia, including...
The Australian High Performance and Sports Science Workforce

3.5.2 Thoughts on professional development

Only one respondent separated those who were aware of the continuing professional development requirements through ESSA for Accredited Sports Scientists. Non-ESSA members (n=90) were far less likely to be aware of the professional development requirements, accounting for 62 per cent of respondents in this category (n=34). In comparison, those respondents with ESSA membership (n=42) were very much aware of these requirements, with 81 per cent of respondents indicating they knew of the professional development requirements (n=34).

Overall, the majority of respondents agreed with mandating continuing professional development of high performance and sport science workers. When comparing those respondents with ESSA membership versus those who were not members of ESSA, there was only a small difference in overall agreement for mandatory continuing professional development for the workforce. Although non-ESSA members were in stronger agreement (31%; n=28), overall ESSA members

approver. Their focus is too heavily on AEPs and build that industry that they haven’t focused enough on building the sport science side of the organisation”

“With regard to accreditation for sports science professionals, I have concerns about the ESSA accreditation framework with regard to the continuing professional development (CPD) requirements. As very few of the external professional development courses endorsed by ESSA are relevant to Accredited Sports Scientists (ASps), the only suitable professional development opportunities for ASps are international conferences, which makes re-accreditation prohibitively expensive. This reflects that as an organisation, ESSA is skewed towards clinical exercise physiology and provides very little promotion and support to sport science professionals. Thus, I have concerns whether ESSA has an appropriate framework for accreditation of sport science professionals.”

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had a slightly higher agreement rate for mandating continuing professional development (72%; n=30).

Respondents believed that informal learning activities were the main continuing professional development activities that high performance and sports science workers should participate in, followed closely by nonformal learning activities. Respondents were most unsure about formal continuing professional development activities (17% unsure).

Not surprisingly, when examining the types of continuing professional development activities high performance and sports science workers should participate in, the top two were informal learning activities. A resounding 95 per cent of respondents believed that reading professional literature was the most important of all continuing professional development activities. In comparison, respondents were most unsure about participation in formal mentoring, with 20 per cent indicating they did not know if high performance and sports science workers should be participating in this type of continuing professional development activity.
The Australian High Performance and Sports Science Workforce

**Figure 56** High performance and sports science workers’ views on the accreditation, qualifications and regulation of Sports Scientists and High Performance Managers (n=140)

**Figure 57** High performance and sports science workers’ awareness of the professional development requirements for Accredited Sports Scientists (n=141)

**Figure 58** High performance and sports science workers’ perceptions about mandatory continuing professional development for the profession (n=141)

**Figure 59** High performance and sports science workers’ perceptions in relation to formal, informal and nonformal continuing professional development activities that those in the profession should undertake (n=128)

**Figure 60** High performance and sports science workers’ perceptions regarding the types of continuing professional development activities that should be undertaken by those in the profession (n=128)
Profiling the Australian High Performance & Sports Science Workforce

<table>
<thead>
<tr>
<th>Sports Scientists</th>
<th>Professional Sporting Club (n=31)</th>
<th>Institute/Academy of Sport (n=55)</th>
<th>Sport Association/Organisation (n=18)</th>
</tr>
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<tbody>
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<tr>
<td>Accreditation</td>
<td>39%</td>
<td>38%</td>
<td>72%</td>
</tr>
<tr>
<td>Regulation</td>
<td>45%</td>
<td>40%</td>
<td>78%</td>
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</table>

<table>
<thead>
<tr>
<th>High Performance Managers</th>
<th>Professional Sporting Club (n=31)</th>
<th>Institute/Academy of Sport (n=55)</th>
<th>Sport Association/Organisation (n=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualifications</td>
<td>45%</td>
<td>35%</td>
<td>39%</td>
</tr>
<tr>
<td>Accreditation</td>
<td>39%</td>
<td>27%</td>
<td>27%</td>
</tr>
<tr>
<td>Regulation</td>
<td>39%</td>
<td>38%</td>
<td>67%</td>
</tr>
</tbody>
</table>

*Non-professional sporting clubs have been excluded due to small n

Table 5 High performance and sports science workers’ level of strong agreement (%) on the accreditation, qualifications and regulation of Sports Scientists and High Performance Managers based on industry sector employed
4.1 Characteristics of the Workforce

4.1.1 Position title and workplace size
There was a relatively narrow assortment of job titles reported, with the majority of respondents employed as High Performance Managers. There were also a number of respondents in management/coordinator type positions such as General Managers, Operations Managers, and Athlete Development Coordinators. Those who responded ‘other’ included those working as a Chief Operating Officer (n=1), medical administrator (n=1), and a Strength and Conditioning coach (n=1).

The High Performance Managers who completed the sport administrator survey were predominantly working in professional sporting clubs (64%), with the remaining 36 per cent working in sport associations or organisations. And those respondents in management/coordinator type positions were also largely working in professional sporting clubs (56%).

The majority of respondents worked at medium-sized sport organisations with 50-99 employees. Of those respondents working at professional sporting clubs (n=12), 53 per cent reported working in sport organisations with 50 to 99 employees while 33 per cent reported that they were employed in an organisation with 100 to 999 employees. Of those respondents working at an institute or academy of sport (n=5), 60 per cent reported to work in an organisation with less than 20 employees.

4.1.2 Age and gender
The majority of respondents ranged in age from 26 to 55 years. Only one respondent was aged below 25 years of age.

Further analysis based on the industry sector of respondents revealed that respondents working at an institute/academy of sport (n=5) were the oldest cohort, with 80 per cent in this industry sector aged 36 years and older. In comparison,

<table>
<thead>
<tr>
<th>Position title</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Performance Manager</td>
<td>11</td>
<td>37</td>
</tr>
<tr>
<td>Manager/Coordinator</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>Chief Executive Officer</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Administration Assistant</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Human Resources Manager</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

*Table 6 Position title most representative of main employment in the sport administrator workforce*
4.1.3 Location and country of birth

State by state, in descending order the highest proportion of respondents were based in Victoria, Western Australia, New South Wales, Queensland, South Australia, the Australian Capital Territory and Tasmania, with no respondents from the Northern Territory. Respondents working at professional sporting clubs (n=13) were predominantly from Victoria and Queensland (31%; n=4 respectively).

No persons of Aboriginal or Torres Strait Island origin participated in this study. The majority of respondents (94%; n=30) were born in Australia, with the remaining two respondents born in Singapore and the USA.

4.2 Employment Conditions and Roles

4.2.1 Employment status

The majority of respondents were employed full-time (94%; n=29), with the remainder working part-time. Interestingly, of those respondents that were employed in a part-time capacity (n=2), one was reported to be a Chief Executive Officer while the other was reported to be a High Performance Manager.

4.2.2 Sector and level of employment

Most participants who completed the sport administrator survey were working in professional sport clubs. The ‘other’ respondent indicated that they worked in facility management. Of those respondents working at professional sporting clubs (n=11), 85 per cent were male. The remaining industry sectors were represented by a relatively even spread of male/female respondents.

Respondents worked at various levels of participation; however, the majority were working at the national level, followed by state and international level (mostly Australian-based). No respondents were engaged in work at an international level based overseas.
Two respondents indicated that their workplace had some other arrangement when it came to responsibility for human resource matters:

“Each HP area is responsible for interviewing their own candidates for selection process”

“Each manager has a human resource element in their job description. We have Workplace Safety Officer, Accounts Manager, Reception Manager & GM that handle particular elevated matters.”

4.3.2 Recruitment and selection processes
The most popular method of recruiting high performance and sports science staff was to either advertise the role externally or network within the profession. Less common methods of recruitment included the use of newspaper advertisements, and recruitment agencies.

External, competitive recruitment methods were the most popular way of hiring performance and sports science staff, with less emphasis on internal, non-competitive methods such as internal promotions.

The general consensus among respondents was that a great deal of effort goes into the selection of high performance/sports science staff in their workplace as it is considered to be important.

Overall, respondents believed the selection processes and procedures used to select staff were quite extensive. While this appears to be the case,
a great deal of money is not often spent in the process.

Respondents in the sport administrator survey were then asked to indicate whether their workplace had any minimum specific requirements in relation to qualifications, experience and accreditation, for high performance and/or sports science workers to obtain employment.

Formal qualifications were the main requirement by employers, with professional experience also required by almost three quarters of sport organisations. Of the 50 per cent of respondents that indicated their workplace did require professional accreditation in the employment of high performance and sports science workers, the most likely were professional sporting clubs (n=8), with 63 per cent of these workplaces requiring this.

4.3.3 Induction processes

An overwhelming majority of respondents (88%; n=21) indicated that they had formal induction processes in place for new employees within their workplace. Professional sporting clubs (n=10) were the most likely to have formal induction processes in place, with 90 per cent providing this to new employees.

All of the respondents indicated that workplace tours and orientation sessions were part of the formal induction process in their workplace. Meetings with other staff members (e.g., sports science team) and athletes was also commonly reported. Interestingly, only 52 per cent of respondents stated that ethics training was provided for new employees in their workplace while less than 38 per cent of new employees were given access to a formal mentor when commencing their work.

Of the small number of respondents who indicated their workplace did not have a formal induction process (n=3), they all stated that formal based processes were still provided (e.g., orientation sessions and employee handbooks) together with informal processes such as meetings with coaches and athletes. Interestingly, all respondents indicated that ethics training was provided for new employees commencing work at the organisation (in contrast to those organisations with formal induction processes where only 56 per cent provided ethics training to new staff).
The Australian Sport Administrator Workforce

Of those respondents who indicated they did not have a formal induction process in place, the main stated reasons were the small size of the sport organisation, with no staff to manage or maintain it.

4.3.4 Payment and support

There is little support for the notion that high performance and sports science staff have individual and/or team performance-based pay and promotion incentives. Further, performance appraisals appear to be tied to the personal development of employees, rather than individual performance markers.

Overall, it appears very little financial or in-kind support is provided to high performance and sports science staff in the respondents’ workplaces. They are least supported in areas that relate to their working environment, including uniform, administration support, work-related equipment and a dedicated workspace (with more than 80% of the respondents’ workplaces failing to provide support for each of these). Sport administrators also indicated that they provided no support in regards to the professional development of their high performance and sports science employees.

One respondent was particularly wary of the need to provide support to encourage “employee benefits and retention” with the overall view of maintaining a healthy “work/life balance”.

The majority of sport organisations provided their high performance and sports science employees with time in lieu for work conducted outside of their contracted hours and time off in relation to professional development. In comparison, only half provided high performance and sports science employees with time off for study leave to complete formal qualifications during paid working hours. Professional sporting clubs (n=10) were the most likely to provide additional support to high performance and sports science employees, especially time off for professional development activities during paid working hours (100%). Therefore, it appears that sport organisations were happy to provide time off work for participation in professional development, but were not willing to financially support these activities (see Figure 76).

4.3.5 Workplace turnover and impact

Just over half the respondents indicated that high performance and sports science staff had left their organisation. The majority of respondents indicated that those staff that left their organisation in the last 12 months did so voluntarily. One respondent indicated that this was related to better opportunities at the professional level, where salary was higher:

“Difficulty with retention of SS/SM personnel in SIS/SAS environment as it is hard to match professional sport wages and opportunities.”
The greatest impact of high performance/sports science staff leaving a sport organisation was on the investment of training a new employee, which was considered to have had a moderate impact on the workplace. The cost and time to find a suitable replacement, and the impact on the workload and stress of current employees were considered to have a more minor impact.

4.4 Views on the High Performance and Sports Science Profession

The most frequently cited reason for employing high performance and sports science staff was best practice, followed by innovation and filling staff knowledge and skills gap. A further 10 per cent reported the employment of these staff to be part of the organisations strategic plan.

Of those respondents who indicated that their organisation was filling knowledge and/or a skills gap shortage in their workplace, three were professional sporting clubs. And of those respondents who indicated that the employment of high performance and sports science staff in their workplace was part of their organisation’s strategic plan, two were from institutes or academies of sport.

Sport administrators were also asked about their views on the accreditation, regulation and qualifications of high performance and sports science workers. Respondents had the strongest level of agreement in relation to the employment of Sports Scientists based on the appropriate professional qualifications. However, their agreement was slightly less in relation to employment of High Performance Managers. Similarly to the views of high performance and sports science workers, the accreditation of High Performance Managers was again where respondents were least likely to agree.

Those respondents working in sport associations or organisations (n=7) were the most likely to strongly agree with the accreditation, regulation and qualifications of high performance and sports science workers, as Table 5 below shows (please note the small number of respondents from institutes or academies of sport).

Overall, sport administrators strongly agreed that Sports Scientists should collaborate with others, which included consultation in regards to supplement use. Respondents also agreed that Sports Scientists were valuable and essential members of their workplace, and that they would welcome funding for the employment of more Sports Scientists. In comparison, sport administrators were largely indifferent when it came to the payment and influence of Sports Scientists.
Figure 73  Accuracy of the provision of additional financial or in-kind support provided to high performance and sports science employees by sport organisations (n=24)

Figure 74  Additional support in relation to work and professional development provided by sport organisations in the employment of high performance and sports science workers (n=24)

Figure 75  Cessation or discontinuation of high performance and sports science employees working in sport organisations (n=22)
Figure 76  Level of impact of high performance and sports science employees leaving sport organisations (n=12)

Figure 77  Sport administrators’ reasons behind the employment of high performance and sports science staff in their workplace (n=29)

Figure 78  Sport administrators’ views on the accreditation, qualifications and regulation of Sports Scientists and High Performance Managers (n=21)

<table>
<thead>
<tr>
<th>Sports Scientists</th>
<th>Professional Sporting Club (n=8)</th>
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<tr>
<td>Regulation</td>
<td>12.5%</td>
<td>25%</td>
<td>57%</td>
</tr>
</tbody>
</table>

*Non-professional sporting clubs have been excluded due to small n

Table 7  Sport administrators’ level of strong agreement (%) on the accreditation, qualifications and regulation of Sports Scientists and High Performance Managers based on industry sector employed
The purpose of this project was to use an online survey to profile some of the most important characteristics of the Australian High Performance and Sport Science workforce. The survey questions encompassed many topics spanning the educational pathways used to get into the profession, to perceptions of work satisfaction and intentions to leave the profession. The large number of survey questions provides a rich database of evidence to evaluate. The findings of this report provide a foundation of evidence upon which major stakeholders in the profession can base their future strategic and policy decisions. The following is a summary of the findings in each of the main themes of the survey.

5.1 CHARACTERISTICS OF THE WORKFORCE
Size of the workforce: The understandable limitations of the resources and survey techniques used in this work, make it difficult to precisely quantify the size of the workforce. Nevertheless, given what is known about the number of professional sporting organisations that employ High Performance and Sport Science staff, and estimates of the number that operate in small businesses and elsewhere, we estimate that the total Australian workforce is approximately 400. Consequently, we feel that the sample size of the present study is large enough to allow us to generalise our findings about important characteristics and issues, to the entire workforce.

Disciplines: The survey data confirm the perception that the workforce is multi-disciplinary, because respondents were fairly evenly distributed across five different sub-disciplines (i.e. Strength and Conditioning staff, Sport Scientists, High Performance Managers, Sport Physiologists, Academics and Biomechanists). This distribution is also reflected in the primary area of training respondents completed, during their tertiary studies. This important aspect of the workforce presents many challenges including complicating the process of defining the profession and determining appropriate accreditation criteria.

Qualifications: The majority of the workforce completed a bachelor’s degree in Exercise and Sport Science to gain entry into the profession and have also completed or are completing higher degrees at the tertiary level. This confirms that a bachelor degree is the minimum entry qualification for the profession, but the relatively large proportion of the participants who are pursuing further study suggests something more significant. Without having asked respondents specifically, it appears that there may be advantages of further study that relate to salary increases and or chances of career progression within the industry. The apparent willingness of the participants to complete further study also indicates that they would be willing to participate in other professional development opportunities.

Age of the workforce: The age of the workforce spans <25 years to >56 years of age, however only a third have been in their current position for 6 years or more. This reflects a workforce that is relatively young and a high turnover rate. It is not clear what significant and reliable conclusions can be drawn from this data, without further study.
However, these preliminary results may reflect a workforce that suffers from poor retention both within organisations and within the profession itself which presents problems for organisations wanting to plan for long-term development and avoid the risks associated with loss of highly specialised and valued expertise.

Gender and location: The workforce is dominated by men, which begs the question of why? The present survey wasn’t designed to explore this issue, although many in the workforce have firm views on why this is the case. A key theme to emerge from the qualitative data from both female and male participants indicated that working hours and travel commitments are not “family friendly” which may contribute to the gender bias especially as female sport scientists take leave to start a family and struggle to return to similar roles (14). The concentration of the workforce on the eastern seaboard is probably not important as it most likely reflects the concentration of the Australian population and employment opportunities.

5.2 EMPLOYMENT CONDITIONS

Employment: Most of the workforce are employed in full time roles, but they are divided between medium term contract and continuing positions. About a quarter of the workforce are in part time or casual roles where they are in short term contracts or are self-employed. The low proportion of full time continuing positions within the workforce indicates limited job security and may influence notions of low job satisfaction. It would be difficult to make significant improvements in the proportion of continuing positions available to the workforce due to the uncertain nature of funding in elite sport.

Type of employer: The results of the survey clearly indicate that the largest employers in the industry are, institutes and academies of sport, professional sporting clubs and sporting associations. There are also two smaller but relevant cohorts of the workforce that are employed by universities or work as consultants. This diversity of employers may present a challenge if the profession needs to unite for the purposes of accreditation. While there is much in common amongst these employer groups, there are also probably differences in views on scope of practice and accreditation criteria.

Hours worked: When considering the characteristics of the work performed by high performance/sports science professionals, work outside of normal office hours and/or overtime (mostly unpaid) is common, tasks performed often require people management skills (which is not part of their undergraduate or post graduate training) and they are required to behave ethically and yet only half receive ethics training in their workplace. A high rate of unpaid overtime could cause a variety of problems for the workforce such as burnout and job dissatisfaction. A third of the workforce are actively seeking other employment and the most popular reasons for this include “the heavy workload” and perceptions of “insufficient support”. A lack of training in professional ethics across the entire workforce misses an important opportunity to reduce the risk of unethical behaviour by providing behavioural guidelines and disincentives.

Salary: Little is understood about the salary and conditions of High Performance and Sport Science workers. The data from this study reveals a wide range of salary or hourly pay rates applied across the workforce. The majority of staff are paid between $50,000 and $150,000, but up to a fifth of the workforce are also paid less than $50,000 or more than $150,000. As noted above, the bulk of those surveyed worked in the state and national institute/academy sport systems where there appears to be considerable dissatisfaction with the amount of unpaid work performed. This also presents a serious risk to sport organisations regarding the level of financial reward they provide for both High Performance and Sport Science workers expertise and the expectation that they work well beyond their contracted hours per week.
5.3 PROFESSIONAL DEVELOPMENT
Professional development: High performance/sport science staff indicated that their highest professional development needs were not being met by either the industry or their employer with over half having to fund their own development. The activities that participants nominated as having the greatest impact on their professional development were formal qualification upgrades, networking and formal mentoring.

Barriers for professional development: Key barriers for continued professional development were a lack of time due to high rates of unpaid overtime work, a lack of opportunities from industry and poor support from employers in terms of funding. The non-sport literature on organisational development stresses that staff working in high performance work systems (such as in Australian elite sport) require both time and financial support to enhance their knowledge and skills to stay at the cutting edge of innovation and best practice (40-47). It seems remiss that professional development is either absent or poorly supported by Australian sport organisations across the sport participation spectrum.

Ethics training: High performance/sports science professionals are required to behave ethically and yet only half receive ethics training in their workplace, while the requirement for ethics training in formal education programs are not well defined. A lack of training in professional ethics across the entire workforce misses an important opportunity to reduce the risk of unethical behaviour by providing behavioural guidelines and disincentives.

5.4 CAREER PATHWAYS AND FUTURE CAREER INTENTIONS
Motivational drivers: From a career development perspective, participants were highly motivated to work in elite and professional sport with the pathway into their career mostly through internships or strength and conditioning coaching. Although the pathway into the profession appears to be clear, career development once in the sport system appears to be unstructured and left up to the employee to manage themselves often at great cost to personal finances and leisure time due to high demands of working beyond their contracted workloads.

Job dissatisfaction and intentions to leave: A large proportion are looking to advance their career with a different employer citing dissatisfaction with their current employer (mostly institute-based employees) due to high job strain/stress and the negative impact the long hours has on work/life balance and family/relationships. This is a potential serious risk for sports managers and policy makers that needs to be addressed. Career development is an integral part of athlete development and yet it appears to be absent from the development of key performance managers of Australian sport. Career development has been found to be a key driver for organisational success in a number of high performance-focussed industries (41, 48). Both the sport and non-sport career development literature stresses that employees actively engaged in career development are both intrinsically motivated and remain in their workplace (14, 41, 42, 48-50) and yet there is little evidence from this study that career development is a key part of the management of Australian high performance and sport science work environments.

5.5 VIEWS ON THE PROFESSION
Membership: More than half of the workforce are not associated with any professional organisation such as ESSA, via membership, registration or accreditation. Those respondents that did declare a formal connection with a professional organisation were Strength and Conditioning staff (ASCA) or those that identify as specialising in areas such as dietetics and osteopathy. It appears that these two cohorts perceive a greater need for professional membership, than those who work in the other sub-disciplines of the profession. Much can be learned from the perceptions of these two cohorts when or if ESSA seeks to increases its rate of membership amongst the workforce. An
obvious factor in this issue is that a majority of workforce indicated that ESSA membership was not required for their position and therefore is presently not of value to them.

Accreditation: A very small fraction of the workforce possess ESSA accreditation as a Sport Scientist. This presents a problem for the industry as much of the high performance/sport science work is performed without either direct or indirect quality assurance by way of regulation or at least professional accreditation. This low rate of accreditation is almost certainly due to the fact that most positions within the industry do not require formal accreditation. Despite this, the workforce and the administrators that employ them, agree that accreditation and registration should become an industry standard and that regulation of the profession will improve professional standards. Respondents went further and agreed that accreditation should become a requirement for employment. These sentiments were not clearly apparent prior to this survey and this makes the process of implementing an accreditation scheme, that much easier. However, some of the written submissions we received suggested that ESSA and its scheme in its current form, may not best placed to take on the role of representing and accrediting the profession.

Challenges for human resource management in Australian sport: The human resource management of the high performance/sports science workforce is compromised by a lack of appropriately qualified and experienced personnel and resources to support and develop staff. Administrators and the high performance/sports science workforce value professional development, however, opportunities for this is limited by a lack of resources within organisations and by the expectation of staff to work longer (than contracted) hours. The literature on human resource management in sport is highly critical of sport organisations for their lack of policy and management on staff development (18, 41, 51). The results from this study support this notion with the sports administrators themselves stating they don’t have the funding, personnel nor the resources to support the career and professional development of their key performance managers, their high performance and sports science workforce.

5.6 HRM PRACTICES OF ADMINISTRATORS

Value of high performance managers and sport scientists to sport organisations: Sports administrators and managers believe high performance/sports science professionals are a valuable asset to their organisation and indicate that they would employ more (and provide better support to) if they had the funding to do so.

Recruitment and induction: The recruitment processes experienced by the workforce highlight that many positions are not advertised and many organisations do not follow “best practice” induction procedures due to limited access to funding, human resource management expertise and resources within their organisation.
6.1 Definition and scope of practice
As a precursor to future development and regulation of the sport science profession, a definition of a sport scientist and their scope of practice needs to be agreed. The definition drafted below, and the data provided in this report, should serve as a starting point for ESSA to lead this process.

“An Australian sports scientist is a university trained and nationally accredited, skilled practitioner and/or researcher engaged in supporting, developing and enhancing sport performance of athletes and coaches engaged in individual and team sports. In providing those performance enhancement services, sports scientists use evidence-based methods that ensure the protection of the health and welfare of the people they serve. They do so in an ethical manner within their scope of practice and discipline training. Sports scientists work in a variety of settings and can work as consultants, permanent employees, be self-employed or volunteers. Sports scientists are able to specialise in sub-disciplines such as: biomechanics, exercise/sport physiology, performance analysis and skill acquisition.”

Other service providers within sport contribute to the work of sport scientists and therefore may be considered sport scientists in some sport settings. These include: dietitians, physiotherapists, strength and conditioning coaches and sport psychologists.

6.2 Registration and accreditation
ESSA should foster the establishment of a national registration and accreditation scheme for the High Performance and Sport Science profession. The profession and those who manage these professionals, overwhelmingly support the need for a scheme, that accreditation should be based on qualifications and that employment should be dependent upon accreditation.

6.3 Ethical practice
Almost all employment contracts highlighted the importance of ethical conduct and the workforce also rate it as the third most important requirement for employment, yet only half of the workforce receive training in professional ethics. ESSA should use its experience in the oversight of ethical practice and its likely involvement in accreditation and professional development, to increase the rate of training in ethical practice in the profession.

6.4 Professional development
A majority of the workforce agree that continuing professional development should be compulsory. While many professionals feel that their employer would provide time to engage in professional development opportunities, nearly half of the profession do not complete any professional development. ESSA should consider its future potential role as a facilitator and or provider of professional development opportunities that are relevant to the High Performance and Sport Science workforce.
6.5 Human resource management practices & workforce retention
Sport organisations need to develop human resource management practices that both support and develop sports scientists and high performance managers in their roles and in their career development. The risk of inappropriate practice as well as worker stress, dissatisfaction, turnover and subsequent loss of corporate knowledge may be mitigated with improvements in organisational HRM practices. Sport organisations should be required to implement minimum human resource management standards and be supported in their capacity to do so.

6.6 Future research
A stronger evidence-base is required to underpin industry decision making related to the sport science profession. Future research should focus on investigating:

i. The views of other key stakeholders (e.g. policy makers, professional bodies, athletes, allied health professionals, university educators) related to sports science provision, professional training and regulation

ii. Best practice models in professional training and regulation, including international standards and practices

iii. Scope of practice for sport scientists, both collectively and within key sub-discipline areas

iv. Consequences of inadequate professional support to existing sport scientists and the outcomes of future interventions to develop the profession.
Australian and New Zealand Classification of Occupations (ANZSCO)
The ANZSCO is an occupation classification developed for the collection, analysis and dissemination of occupation statistics in Australia and New Zealand, improving comparability of occupation statistics between the two countries.

Accredited Sports Scientist
Qualified specialists who are associated with the provision of sports science services to athletes; the training of potential sports scientists; and/or the conduct of research relating to sport (ESSA, 2013).

Allied Health Professional
Practitioners who are tertiary trained, registered with a professional body, and work with others to support a person’s health care.

Competitive Level
The competitive level of the athletes/teams in which the respondent spends the most hours of work.

High Performance Manager
People who manage Sports Scientists and who may also specialise in helping an individual or team to improve their sporting performance through the uses of scientific knowledge, methods, and applications.

Hours Worked
The total number of hours worked in a typical week at the time of survey participation. The ABS definition (reference) has been used to differentiate between full-time and part-time work:

- Full-time: 35 hours or more per week
- Part-time: less than 35 hours per week

Job Descriptive Index
A five-item scale by Andrews and Withey (1976) designed to measure overall job satisfaction, with each item assessing satisfaction with specific job facets.

Job Satisfaction
An employee’s emotional responses to their job based on comparisons between desired versus actual outcomes (Fields, 2002).

Main Position of Employment
The position of employment where the individual engages in the most hours of work, at the time of survey participation.

Primary Area of Training
The field in which the individual either completed their qualification and/or had greatest experience working in.

Sports Scientist
People who specialise in helping an individual athlete or team to improve their sporting performance through the uses of scientific knowledge, methods, and applications.


5. ABS. Involvement in organised sport and physical activity. Canberra: ABS, cat. no. 6285.0; 2010.


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