




WELSH INSTITUTE
OF PERFORMANCE SCIENCE
SEFYDLIAD GWYDDORAU
PERFFORMIO CYMRU



**WELSH INSTITUTE OF
PERFORMANCE SCIENCE
ANNUAL REPORT**

2022



THE YEAR IN REVIEW

With the increasing return of competition and training through 2022, the Welsh Institute of Performance Science (WIPS) have been delighted to continue our ongoing collaboration with practitioners and sports across Wales and beyond.

We have been particularly pleased to see increasing interest in the work of WIPS from new practitioners and different sports organisations, with the Football Association of Wales joining WIPS an excellent example. Additionally, WIPS has been adapting to the revised Inclusive Athlete Development strategy and project-based approach being taken by the Sport Wales Institute.

During 2022, members of the WIPS have been involved in over 10 projects, ranging from developing female football players through

integration with the male game, assessing lower limb demands in squash and exploring menstrual cycle education in schools related to participation and development in physical activity and sport performance.

While the core business of WIPS continues to be the identification of key performance issues and support for research to address these, we have been delighted to be able to offer strategic insight and evidence-informed suggestions regarding the shifting approach to overall athlete development. Additionally, we have relished the opportunity to share insights and learning through different means, this has included practitioner and sport presentations for example on the areas of mental health and thriving environments. Resources have also been developed and disseminated in person and through online newsletters along with a



coaches e-module on the menstrual cycle in sport and attraction from the media to promote research completed into menstrual education provision in schools.

We are very grateful for the ongoing support and involvement of all the athletes, coaches, practitioners, and institute staff who suggest projects, support data collection, and engage with our knowledge dissemination activities. Further, a number of these projects would not be possible without the dedication of the WIPS research associates, PhD students and MSc students who are at the forefront of data collection and analysis and so of course we extend our substantial gratitude to these individuals as well.

Sadly, we have had to say goodbye to two of the key members of the WIPS team this year. Firstly, Brian Hughes who has been the Sport Wales link for the last 3 years and played an instrumental role in facilitating communication with sports and practitioners, particularly during the challenges of COVID-19. Secondly, Hamish Cox one of our hardworking research assistants who has been leading on the very important thriving project. We wish both the very best of luck with their new roles and thank both for their contributions and efforts. We are also delighted to welcome Kath Brown who is the new Sport Wales link for WIPS and cannot wait to see what we can achieve in the next year.

Wishing you all a happy, healthy, and successful year ahead,

Liam, Kath, Camilla
and the members of the RSG & SMB





Overview of the Welsh Institute of Performance Science

Statement of Purpose

The purpose of the Welsh Institute of Performance Science is to conduct multi-disciplinary, world-leading applied performance science projects that enhance the performance of Welsh athletes and businesses, improves the performance pathway, and builds capacity in these areas for the future. Additionally, WIPS aims to train future scientists and increase strategic collaboration between Welsh sport, academia and business.

FUNCTION AND PROCESS

The Welsh Institute of Performance Science will work to enhance performance in Welsh sport and increase links between sport, academia, and business in the following ways. Priority will be given to the first three approaches:

1. Performance Driven Questions, Science Driven Answers

Following evaluation of Welsh Sport performances and systems, performance issues or areas to improve will be identified; the Research Steering Group and Sport Wales representatives will then discuss and seek out potential strategies, leading to projects being conducted to address the question or issue.

2. Performance Driven Questions, Industry Driven Answers

Following evaluation of Welsh Sport performances and systems, performance issues or areas to improve will be identified; the Research Steering Group will then discuss and seek out potential strategies, leading to collaboration with appropriate industry partners to answer the performance question.

3. Performance Driven Questions, Science and Industry Driven Answers

Following evaluation of Welsh Sport performances and systems, performance issues or areas to improve will be identified; the Research Steering Group will discuss and seek out potential strategies, leading to research being conducted in conjunction with industry partners to answer the performance question/issue.

4. Science Driven Performance

Applications to Enhance Performance

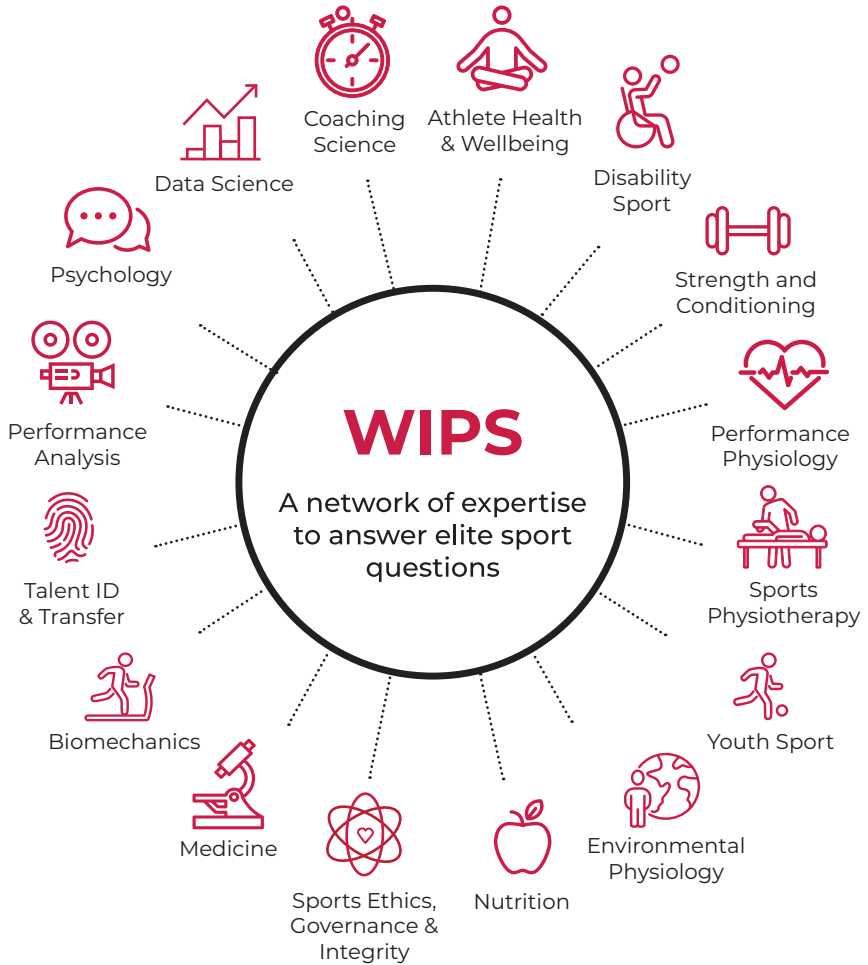
Based on current research findings, Research Steering Group members can make suggestions to the wider Research Steering Group regarding potential performance enhancing strategies. If the Research Steering Group deem appropriate, research and discussion examining the feasibility and applicability of these strategies to Welsh sport performance will be conducted. If the findings yield positive outcomes these strategies may be implemented within Welsh Sport via Sport Wales Institute.

5. Industry Driven Performance

Applications to Enhance Performance

Industrial partners (and other innovation specialists) can approach the Research Steering Group regarding technological or industrial advances that might enhance sporting performance. If deemed appropriate by the Research Steering Group, research and discussion examining the feasibility and applicability of these strategies to Welsh Sport performance will be conducted. If the findings yield positive outcomes these strategies may be implemented within Welsh Sport via Sport Wales Institute.

THE 2022 RESEARCH STEERING GROUP COMPOSITION



EXAMPLES OF PROJECTS COMPLETED OR SUPPORTED BY WIPS THIS YEAR

PROJECT TITLE	PROJECT AIMS	SPORTS & DISCIPLINES INVOLVED
The effect of the menstrual cycle on participation in physical activity in schools across the UK	<ol style="list-style-type: none"> 1) Understand young peoples' perceptions and experiences of menstrual cycle education received at school. 2) Understand reasons why periods affect participation in physical activity. 3) Understand how young people would like to learn and receive information about the menstrual cycle. 	Psychology, Health & wellbeing
FAW Women and Girls Project – Developing Female Football Players through Integration into Male Competition (Season 2)	<ol style="list-style-type: none"> 1) Continue to assess female players' physical, technical, tactical and psychosocial development as a result of competing in the boy's academy league. 2) Explore the impact of the change in context on the national girls' teams' coaches. 3) Examine the role and experience of the female players' parents as a result of their children competing in a boy's league. 	Coaching Science, Psychology, FAW
Start performance optimisation in swimming	<ol style="list-style-type: none"> 1) Validate the nemo analysis system, specifically start to 15m time. 2) Identify the validity and impact of 15m time on swimming performance across males and females and different race distances. 3) Develop pre-competition interventions to optimise start to 15m time. 	Swimming, Performance Analysis
Bio-psycho-social framework for understanding of adolescent development through and in sport	<ol style="list-style-type: none"> 1) Review of literature pertaining to biopsychosocial development in and through sport. 2) Coach education concerning adolescent biopsychosocial development and how principles associated with this model can be integrated into coaching practice. 	Coach Education, Psychology

<p>Nutrition management strategies for the menstrual cycle</p>	<p>1) A systematic review of non-pharmaceutical supplements to manage menstrual symptoms.</p>	<p>Nutrition</p>
<p>Lower limb demands in squash competition and training</p>	<p>1) Identify the external load parameters of matches and different training sessions. 2) Share findings with athlete (and coach) in active discussion of competition demands and training session selection.</p>	<p>Biomechanics, Physiology, Squash</p>
<p>Practitioner insights into knowledge, confidence and importance placed on the menstrual cycle when supporting female athletes (phase 2)</p>	<p>1) Continue to identify practitioner knowledge, confidence and importance placed on the menstrual cycle when supporting female athletes through focus groups. 2) Develop education resources and opportunities for practitioners to enhance awareness and knowledge relating to the menstrual cycle.</p>	<p>All sport science disciplines</p>
<p>Coach education on the menstrual cycle</p>	<p>1) Develop resources including workshops to be delivered for coach education. 2) Record the effect of coach education on knowledge about the menstrual cycle and reported impact on coaching and conversations.</p>	<p>Multiple sports</p>
<p>Enhancing mental health and wellbeing of athletes</p>	<p>1) Identify and explore the key psychological factors which can protect/enhance the wellbeing and mental health of athletes within the sports of cycling and judo. 2) Develop and implement an intervention, which consists of the production of resources (e.g., podcasts and infographics) and delivery of environmental strategies. 3) Evaluate the impact of the intervention on athletes' wellbeing and mental health is currently being evaluated.</p>	<p>Boxing, Judo, Cycling, Practitioners across institute</p>

Athlete experience insight	<ol style="list-style-type: none"> 1) Gain insight into athlete experience using a variety of quantitative and qualitative methods. 2) Pilot an assessment procedure with the sport to ensure they are familiar with monitoring and evaluating their environments. 3) Co-create an Athlete Experience Map to outline the potential steps involved in developing and evaluating a thriving environment and positive experience. 4) Test usability of Thriving Environments Framework as a tool to support the autonomy of sports considering future insight into athlete experience. 	Psychology
Comparisons between junior and senior athlete experiences of the menstrual cycle in athletics	<ol style="list-style-type: none"> 1) Compare differences in knowledge and communication of the menstrual cycle between junior and senior athletes. 2) Explore the coaching role and interaction between athletes in relation to the menstrual cycle. 3) Identify if different support or information is required for junior compared to senior athletes. 	Psychology, Coaching science
Biofeedback for Recovery	<ol style="list-style-type: none"> 1) Understand athlete's motivations and perceptions of recovery. 2) Improve recovery strategy engagement. 3) Feedback to Sport Wales Institute on potential adaption to the recovery strategies. 4) Understand the recovery process from an athlete and coach's perspective to effectively implement a recovery intervention strategy. 	Psychology

SPOTLIGHT ON PROJECTS:

1. NUTRITIONAL PRACTICES TO MANAGE MENSTRUAL SYMPTOMS: A SYSTEMATIC REVIEW

Project Contributors:

Natalie Brown, Ruth Fairchild, Mark Waldron, Georgie Bruinvels, Dan Martin, Alice Murray-Gorlay.

Aims

The menstrual cycle has grown in attention within elite sport regarding the potential negative impact it can have on training and competition. This is the result of menstrual-related symptoms experienced by female athletes. Consequently, practitioners are seeking methods to reduce symptoms or reduce the negative impact on sport performance caused by inflammation associated with the menstrual cycle. Therefore, one area requiring investigation is food and nutrition, due to the known anti-inflammatory properties.

Certain nutritional practices may reduce menstrual-related symptoms, but there was no current consensus on what foods/supplements are sufficiently evidenced to warrant promotion to reduce menstrual symptoms.

Therefore, the aim was to systematically review all studies investigating changes in menstrual-related symptoms in eumenorrhic women using foods or supplements as interventions for management.

Outcomes

The systematic review revealed there is inconsistency in information recommending nutritional interventions to women experiencing a natural menstrual cycle when aiming to reduce menstrual-related symptoms. There are some food/supplements which may be used by women to reduce severity of menstrual-w symptoms. Curcumin may reduce menstrual-related symptoms, however further investigation is required into the use of vitamin D, calcium, magnesium and zinc. Supplement doses were prescribed above safe upper limits and few studies reported physiological changes in both normal and deficient women. Furthermore, a large proportion of studies reviewed were found to be of low quality, 1509 records were screened and in total only 28 studies were reviewed with little consistency within the literature.

Impact

This research has informed Sport Wales nutrition team regarding support available to athletes suffering with menstrual-related symptoms or negative impacts on performance, improving confidence based on research of what interventions can be recommended. Further work is ongoing across sports in Wales to share the findings and explore next stages to investigate certain foods/supplements in more detail regarding the impact on symptoms, training and performance.



2. UNDERSTANDING TALENT DEVELOPMENT OF HIGH-PERFORMANCE BEACH ROWERS

Project Contributors:

Vicky Gottwald, James Hardy and Julian Owen, and applied practitioners at Welsh Rowing (Samantha English and Dan Fella).

Aims

Embedded within a multidisciplinary framework, the project will identify factors (e.g., athlete's demographics and family experiences, psychological profiling, practice and training activities, and performance milestones), that are important for the development of elite British Beach Rowers.

The beach sprints discipline of coastal rowing is an exciting (media friendly), relatively young sport that will be introduced to the Olympics Games in 2028. Dubbed the 'BMX of rowing', it is built on an inclusive oriented philosophy that contrasts with that of traditional ("middle class") flat water rowing. Little surprise then that it is the fastest growing discipline within rowing, with activity now on all continents of the world.



Outcomes

To date, the project team has collected anthropometric and psychological data from athletes competing at this year's World Coastal Rowing Championships held in Saundersfoot, Pembrokeshire. Testing incorporated 95 athletes representing 20 different nations across the globe. Anthropometric measures replicated data collected on Olympian (flat water) rowers (2000 Olympic Games; Ackland et al., 2001) capturing factors such as height, sitting height, body mass, arm span, thigh girth, and flexed arm girth. Psychological data was collected using an athlete psychosocial survey (APS), developed over the course of Bangor University Institute for Psychology of Elite Performance ESRC-UK Sport funded Pathway to Podium project.

Impact

Data will be used to inform talent identification, selection, and development protocols. Beach sprint rowing remains in its infancy and researchers and practitioners are yet to determine the optimal anthropometric and psychological profile for successful performance at the highest level of this sport. Having this unique data set will allow us to have genuine impact and raise the profile of the sport by enhancing the calibre of athletes competing within it.

Similarly, data will contribute to enhanced inclusivity in rowing. Where traditionally, rowing has relied upon selection protocols biased towards 'tall and talented', the different physical demands of beach sprints will likely suit a smaller stature retaining a broader range of athletes within the sport. However, this shift is unlikely to happen without the proposed data to support it.

3. MENTAL HEALTH AND OCCUPATIONAL STRESS IN OLYMPIANS AND PARALYMPIANS FOLLOWING THE COVID PANDEMIC

Project Contributors:

David Shearer, Brendan Cropley, Ross Hall, Kristin Minster.

Aims

This project began during the COVID pandemic in 2020 in response to the need for well-being support for athletes during this difficult time. Many athletes' lives changed drastically, from one where they were part of a squad or training group, to a situation where their training was completed in isolation. In addition, competition disruption meant many athletes were uncertain about their competition schedules, or even for some whether they would be able to compete again (e.g., older athletes). This included significant uncertainty around big multi-sport events such as the Olympic/Paralympic/Commonwealth Games.

During this period, it was also difficult for athletes to access support for well-being as many support staff were furloughed, or support was restricted to access online. Our aims for the project were two-fold. First, to understand the athletes' perspectives of the challenges they faced at the time. Second, to use this information to develop a digital support service that could be launched to support athletes if similar pandemics or other unforeseen critical life events happened in the future.



While the collection of athletes insight into the challenges faced during this period (and now other critical moments) is still ongoing, we have pushed forward with developing the digital support platform. We have been working with our partner, United Agency, to develop a proof-of-concept web-app called 'Thrive Sport', which will be used for the delivery of well-being and performance content. This has been designed to marry up with Sport Wales' own Thriving Environment project.

Our current funding is due to end in February 2023, and consequently with little sport specific funding available, we have recently applied for a £150,000 grant from the Armed Forces Covenant. The aim is now to develop the platform further in a different performance domain, while we seek further funding to continue our work in elite sport. The longer-term view is that the platform could be adapted for a host of different performance scenarios.



Many athletes' lives changed drastically, from one where they were part of a squad or training group, to a situation where their training was completed in isolation.

How WIPS Projects work



THANK-YOU TO THE RESEARCH STEERING GROUP MEMBERS FOR THEIR CONTRIBUTIONS

Professor Neil Bezodis (Biomechanics Lead)

Professor of biomechanics, Swansea University.

Kath Brown (Co-Chair RSG) Nutritionist, Sport Wales (position formerly held by Brian Hughes).

Dr Richard Burden (EIS Representative)

Lead for Female Athlete Health & Performance and Bioscience Programmes, English Institute of Sport.

Professor Brendan Cropley

(Coaching Science Lead) Professor of Sport Coaching, University of South Wales.

Dr Ryan Chambers (WRU Representative)

Sport Scientist for Welsh Rugby Union.

Dr Ruth Fairchild (Nutrition Co-lead),

Reader in Oral and Public Health Nutrition, Cardiff School of Sport & Health Sciences, Cardiff Metropolitan University.

Dr Malcolm Fairweather

(SIS representative) Head of Performance Solutions, Sportscotland Institute of Sport.

Andrew Sommerville (SIS representative)

Senior Performance Physiologist, Sport Scotland Institute of Sport.

Dr Declan Gamble (SNISI Representative)

Head of Performance Science, Sport Northern Ireland Sports Institute.

Dr Vicky Gottwald (Talent ID and Transfer Lead)

Lecturer in Motor Learning at Bangor University.

Dr Denise Hill (Athlete Health and Wellbeing Co-lead)

Associate Professor in Applied Sport Psychology, Swansea University.

Brian Hughes (Co-Chair RSG)

Physiologist, Sport Wales.

Professor Liam Kilduff (Co-chair RSG)

Professor in Performance Science, Swansea University.

Professor Camilla Knight (Youth Sport Lead)

Professor in Sport Psychology and Youth Sport, Swansea University.

David Lasini (SNISI representative)

Head of Strength and Conditioning, Sport Northern Ireland Sports Institute.

Dr Thomas Love (Nutrition Co-lead)

Senior Lecturer in Sports Nutrition, Swansea University.

Professor Melitta McNarry (WIPAHS link)

Professor of Physical Activity and Health, Swansea University.

Dr Rhodri Martin (Medicine Lead) Sport and Exercise Medicine Consultant, Sport Wales.

Professor Jon Oliver (Strength and

Conditioning Lead) Professor in Applied Paediatric Exercise Science, Cardiff Metropolitan University.

Dr Sam Oliver (Extreme Physiology Lead)

Reader in Sport & Exercise Science at Bangor University.

Dr Tom Poulson (Disability Sport Lead)

Head of Paralympic Performance Support, English Institute of Sport.

Dr Liba Sheeran (Sports Physiotherapy Lead)

Reader in Physiotherapy, Cardiff University.

Professor Dave Shearer (Psychology Lead)

Professor of Elite Performance Psychology, University of South Wales.

Dr Mark Waldron (Performance Physiology

Lead) Associate Professor in Sport and Exercise Sciences, Swansea University.

And the outstanding WIPS Research Associates (who do all the hard work on the projects!):

- **Dr Natalie Brown**
- **Dr Dan Cunningham**
- **Dr Hamish Cox who has recently vacated the position**

If you would be interested in connecting with any of the research steering group members or learning more about their research, please contact us at: WIPS@swansea.ac.uk and we will be more than happy to connect you.

WELSH INSTITUTE
OF PERFORMANCE SCIENCE

SEFYDLIAD GWYDDORAU
PERFFORMIO CYMRU

