

CASES Expert Statement on Guidance for Reporting of Physiological Assessments: Sport Testing

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INDEX	VAR	HIGH	LOW	OPEN	CLOSE
HDR4G	1.23	033	-001	14.2	15.3
FOSLR	48.5	14	002	36.2	2.1
DFFOSQ	647	85.662	0.4	12.3	306
SPOE-A	37.5	45	025	63.0	065
LPSO	57.5	4.14	-500	1.66	3.1
GTG	24.3	625	-021	2.35	326
SPLF	14.8	17.8	-10	023	1.65
XTZ	365	20.24	087	067	3.25
SRMS	589	32.15	-653	33	065
CCAN	059	148	-112	1.62	1.98
DRGS	36.2	536	012	1.03	2.66
HTLV	47.0	142	045	053	1.2
WRK	24.3	390	086	1.23	3.66
SHT	59.6	354	-754	065	3.1
FOKT	016	3.3	013	3.32	2.65

CASES EXPERT STATEMENT

GUIDANCE FOR REPORTING OF PHYSIOLOGICAL ASSESSMENTS: SPORT PERFORMANCE TESTING

Produced on behalf of the Chartered Association of Sport and Exercise Sciences by Dr Alan Ruddock FCASES, Dr Andy Galbraith, Dr David Green MCASES, and Amelia Dingley MCASES.

Physiological assessments are fundamental within sport and exercise science. They provide benchmarks, help identify individual strengths and areas for development, and inform training recommendations that support optimal performance (Mann, Lamberts & Lambert, 2013). Despite their importance, the design, delivery, and reporting of these assessments present challenges for practitioners. These challenges stem from the wide variety of available tests, diverse analytical approaches, and differing philosophies around training prescription (Jamnick *et al.*, 2020). The assessment process is inherently complex and context-dependent. There is no single 'correct' way to conduct or interpret physiological tests. This complexity underscores the importance of effective reporting without which critical information could be miscommunicated or lost.

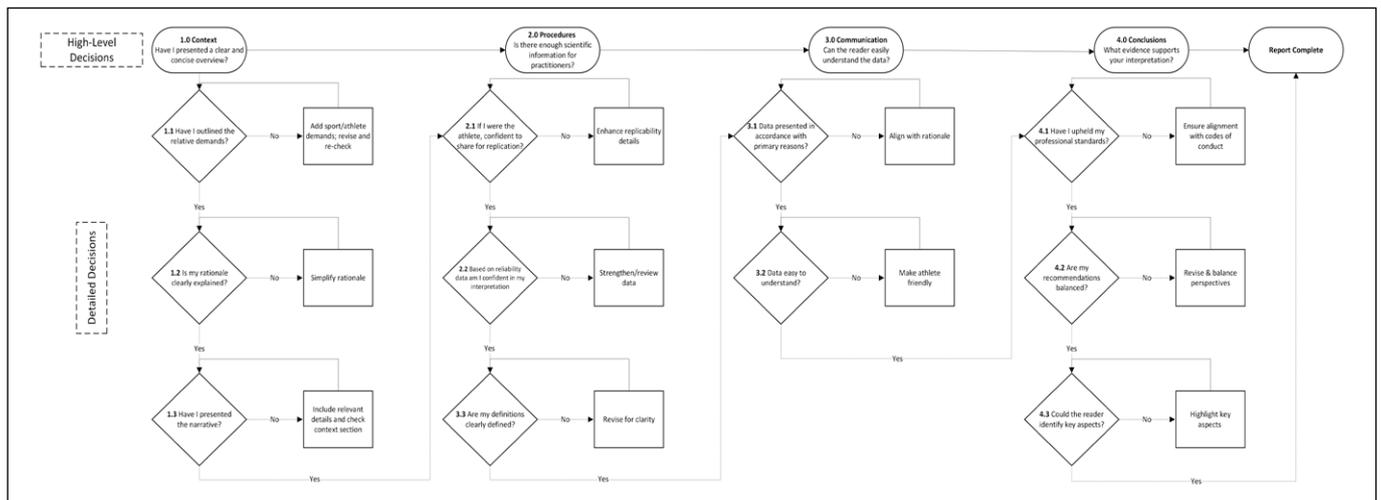
Importantly, reporting should not be limited to traditional paper-based formats. Online platforms and other novel methods enable rapid communication, interactive data visualisation, and collaborative workflows. We encourage practitioners to explore and adopt tools that best suit their operational context. However, regardless of the format, the principles outlined in this statement remain relevant and valuable. Practitioners are advised to take a human-centred, holistic approach to reporting, drawing on and tailoring elements of the framework to meet their specific needs.

The purpose of this expert statement is not to suggest rigid standardisation, specific protocols, or analytical methods. Instead, it serves as a flexible framework for purposeful reporting of physiological assessments (figure 1). Therefore, the aim of this expert statement is to promote transparency, consistency, and

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▲ **Figure 1:** Flow chart of the physiological assessment reporting process with high-level stages at the top and detailed decisions below. Diamonds = decisions, dashed lines = optional path; rectangles = actions; solid lines = flow.

contextual clarity in reporting; enabling practitioners to tailor their approach to the needs of their sport, environment, and athlete. This framework is centred around four sections; context, procedures, communication, and conclusions.

CONTEXT

Executive summary

A clear, concise overview of the report, enables readers to understand its essence without further reading. It should highlight the goals of the report, summarise the steps and methods taken to achieve these and outline major findings and recommendations, whilst avoiding technical jargon.

Rationale

Begin the main report with a brief overview of the physiological demands of the sport. If possible, relate this to the standard of the athlete. Importantly this will provide the basis for the choice of assessments and structure for normative data/benchmarks for comparison. Where possible, identify the physiological determinants of performance using peer-reviewed scientific literature and provide a consideration of the basic physiological mechanisms that underpin performance.

Consider the inclusion of:

- Demands of sport and needs analysis
- Physiological determinants of performance
- Basic physiological/mechanistic variables that underpin performance

There might be circumstances when there are no data available or the practitioner might be investigating

a novel aspect. In this situation the practitioner should consider presenting their rationale for assessment based on contextual factors and the understanding of the athlete. For example, the choice of assessment might be based on the phase of the season, or around a training phase targeting a specific physiological adaptation (e.g. heat acclimation). This part of the report should conclude with an explanation for the assessment in plain-language for the benefit of all readers.

Key Questions:

- Have I outlined the demands of the sport relative to athlete(s)?
- Is my rationale for the assessment clearly explained in plain language?
- Have I presented the narrative underpinning the assessment? (did any injuries/illness influence decision making on the day?)

PROCEDURES

Methods of assessment and scientific equipment

Whilst the report will primarily be aimed at athletes and coaches it often serves as a basis for future assessments. Therefore, this section might be an appendix or accompanying technical note. Service users should be made aware of this information but this section should not be a requirement to understand the outcomes report.

The purpose of this part of the report is to present the methods used in the assessment; where possible, we recommend practitioners reference key texts such as the BASES/CASES Physiological Testing Guidelines. For example, if aerobic capacity is identified

as a determinant of performance, this section should detail the method to assess this. Key areas might include: Details of the warm-up, starting speed/power, equipment make/model, environmental conditions as well as less common information such as calibration/verification procedures and finger/ear blood sampling techniques.

It is recommended that practitioners reference the most recent validity and reliability data from their laboratory; where this is not possible, consensus from scientific literature is appropriate. This information should be used in the communication section to aid data interpretation by highlighting measurement-error.

Definition of variables and analysis

Definitions are critical to the integrity of sport and exercise science. Consideration for the definition of key variables along with their references is encouraged. Key variables in a physiological report might include lactate and ventilatory derived metrics, and aerobic capacity. Practitioners might wish to complement this with explanations of how they determine training related recommendations, for example energy expenditure and training zone models.

Key Questions:

- If I were the athlete, would I be confident enough to give this report to another practitioner to enable replication?
- Based on reliability data, how confident am I in my interpretation of the athlete data?
- Are my definitions ambiguous or are they transparent and clearly defined?

COMMUNICATION

Presenting athlete data

Practitioners should use the determinants of performance and training recommendations section to make an informed decision regarding appropriate data presentation. Data should be presented in the most efficient way to aid the reader's interpretation. Visual presentation of the data (e.g. scatterplots to illustrate response over time) is recommended over tabulated figures and prose. We encourage practitioners to make use of emerging platforms that enable the creation of infographics or online-dashboards that depict data changing over time, heat-maps that indicate strengths and areas for improvement and raincloud plots for group data that depict data points and distributions. Where appropriate practitioners might wish to characterise data in relation to reliability data, this might take the form of a 'data-variation corridor' to demonstrate potential day-to-day variation.

Comparative standards

Linked to the rationale section and training recommendations, practitioners should place athlete data in context with available data. These data could originate from a trusted source, or previous tests. The integrity of the benchmark data (e.g. small sample size) should be explained. Within the report, but separate from athlete/coach focused sections, practitioners might consider the statistical basis for comparison (e.g. Z-score, % difference) and define thresholds for comparison (e.g. 'Excellent' > 0.8 standard deviations). The presentation should be thoughtful and appropriate and might include Red, Amber, Green (RAG) scores, radar plots, or integrated within other figures. The challenge for the practitioner is to ensure the reader is not overwhelmed by the amount of data and is why there must be a strong guiding narrative throughout.

Interpretation

In this section of the report, data should be explained simply, clearly and in context. Typically, this will take the form of a written overview and solidify the links between the sections. This section also acts as a consolidation of the report so far and a bridge to the next section on recommendations.

Key Questions:

- If I look back to the context for the assessment, have I presented the data in accordance with the primary reasons for the tests?
- Have I tried to present the data in a way that enables coach/athlete interpretation?

CONCLUSIONS

Recommendations

Practitioners should use this section to provide athlete specific recommendations, whilst acknowledging any limitations to the scope of their expertise. This might be related to specific training sessions, recommendations for fuelling strategies, or general concepts such as training-intensity distribution. It is important these are provided with context; in most cases this should be based on a balance of evidence derived from scientific literature. There will be circumstances where evidence is limited due to novelty or lack of sport specific research, and the depth and breadth of the knowledgebase should be acknowledged at this point. It is important that practitioners are aware of their bias towards a philosophy, and where possible acknowledge this.

Summary of the report

Use this section to provide a succinct statement of the report, at a minimum, it should re-state the main purpose and the main outcomes. Practical recommendations should be highlighted, whilst acknowledging limitations and assumptions in the approach or data analysis to demonstrate honesty and rigour.

Key Questions:

- Have I upheld professional standards and provided this report in accordance with the CASES code of conduct?
- Have I provided a balanced report and made informed decisions within the scope of my expertise?
- Does this section enable the reader to determine the key aspects of the report?

Expert statement conclusion

The purpose of this expert statement is to provide a framework to act as a guide for physiological reporting. Ultimately, practitioners should answer one final question. Are you happy with your answers to the questions above? If so, then you will have a strong backbone for your report. ■



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