

Burden of Participation, Open Science, and Collaborative Innovation: Addressing Research Ethics and Knowledge Gaps in Esports Health

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Abstract

Current esports health research practices create unsustainable burden on limited participant pools whilst failing to advance knowledge efficiently. This analysis examines three interconnected problems: excessive research participation burden on esports communities, limited adoption of open science practices, and fragmented research efforts that perpetuate redundant investigations. Small, accessible competitive esports populations amplify these concerns, particularly when researchers misinterpret non-significant results as evidence of absent effects, leading to unnecessary replication attempts. Open science approaches including data sharing, preregistration, and collaborative networks offer solutions that could reduce participant burden whilst improving research quality. However, critics question whether the field is ready to implement such changes given resource constraints and the early-career status of many researchers. Practical frameworks for operationalising these recommendations remain underdeveloped. Implementation faces technological, cultural, and commercial barriers requiring coordinated action from researchers, institutions, and funding agencies. Establishing collaborative frameworks and proper statistical approaches could transform esports health research into a model for ethical, efficient investigation of rapidly evolving phenomena.

Keywords: esports health research, participant burden, open science, collaborative networks, research ethics

Introduction

Research into the health and wellbeing of esports players has expanded rapidly as competitive gaming has grown into a global phenomenon with millions of participants across diverse skill levels and age groups (Baker et al., 2024; Leis et al., 2024; Pedraza-Ramirez et al., 2025). This growing body of work has identified important health considerations including musculoskeletal pain, sleep disruption, and mental health challenges, whilst also exploring potential benefits such as cognitive engagement and social connection (DiFrancisco et al., 2019; Schary et al., 2022; Sharpe & Birch, 2025). Recent initiatives, including the Journal of Electronic Gaming and Esports special issue "Press Start on Health," reflect increasing recognition that understanding player health is essential for supporting sustainable participation in competitive gaming.

However, as this research field develops, certain methodological and ethical challenges have emerged that warrant careful consideration. The unique characteristics of esports communities, particularly the relatively small population of competitive players who are both accessible to researchers and representative of elite gaming, create specific challenges for conducting research that serves both scientific goals and participant welfare. For instance, a professional League of Legends team might be approached by five different research groups within a single competitive season, each requesting similar health assessments and time commitments, creating cumulative burden that may reduce willingness to participate in future studies. This analysis examines three interconnected aspects of current research practices: the burden experienced by participants who may be approached for multiple similar studies, the potential for open science approaches to enhance research efficiency, and opportunities for collaborative frameworks that could strengthen the evidence base whilst respecting participant contributions.

The Growing Burden of Research Participation in Esports Health

The esports health research field presents a unique paradox: whilst the community remains relatively small compared to traditional sports populations, the enthusiasm for understanding player wellbeing has resulted in an increasing number of studies targeting the same accessible participant pools. This concentration of research activity creates substantial burden for esports players, teams, and organisations who find themselves repeatedly solicited for participation in similar investigations. The problem is particularly acute given that much of the existing research focuses on readily observable phenomena such as physical activity patterns and sedentary behaviour (Schary et al., 2022).

Research ethics frameworks recognise that participation burden encompasses multiple dimensions beyond simple time commitment, including physical discomfort, psychological

stress, and social inconvenience that can accumulate across multiple study experiences (Ulrich et al., 2012). This burden becomes more problematic when researchers incorrectly interpret non-significant results as evidence that effects are absent, a practice that is widespread in psychological research (Lakens, 2017). When researchers make this interpretation error, they may believe their studies demonstrate no health effects in esports, potentially leading to redundant investigations that attempt to confirm null findings through additional data collection rather than employing appropriate statistical methods for demonstrating equivalence or absence of meaningful effects.

Understanding participant burden is particularly critical when working with vulnerable populations, as children and adolescents in esports may be less equipped to understand the full implications of research participation or to advocate for their own interests when approached by multiple research teams (Barned et al., 2018). Research with young people has demonstrated that participation burden is experienced differently by children compared to adults, with unique considerations including feelings of obligation to researchers or parents, discomfort with procedures, and the cumulative effect of repeated requests for participation (Barned et al., 2018).

The burden is intensified by inadequate sample size justifications that fail to consider the informational value of the data being collected. Many esports health studies rely on convenience samples or heuristic-based sample sizes without clear justification for how the chosen sample size will address their research questions. This approach not only wastes participant time but also perpetuates a cycle where studies fail to provide definitive answers, leading to calls for additional research that places further burden on the same limited participant pools. Research has shown clear associations between burden and key performance metrics including dropout rates, recruitment success, and study completion (Getz et al., 2019).

The limited size of competitive esports communities amplifies this burden disproportionately. Unlike traditional sports where research can draw from vast populations of athletes across multiple levels, esports research often relies on the same high-level players and teams who are both accessible and represent the most relevant competitive population. This creates a situation where the most valuable research participants face repeated requests for their time and data, potentially leading to research fatigue and decreased willingness to participate in future studies.

Research in clinical settings has shown that when participants are repeatedly approached for similar studies, they may develop feelings of obligation that compromise truly voluntary

participation, particularly when they perceive their contributions as helping others or advancing important research goals (Barned et al., 2018). This situation becomes more complex when considering that many esports players are young adults who may be less equipped to understand the full implications of research participation or to advocate for their own interests when approached by multiple research teams (Jenny & Sharpe, 2025). Additionally, research with paediatric populations has demonstrated that burden often extends beyond the individual participant to include family members who must provide transportation, miss work, or themselves participate in research activities, creating shared burden that affects willingness to participate in future studies (Barned et al., 2018). In esports research, this family burden may be particularly relevant given the young age of many competitive players.

The ethical implications extend beyond simple inconvenience. Repeated data collection on similar topics raises questions about the respect for persons principle in research ethics, particularly when participants are asked to provide the same types of information across multiple studies that could potentially be addressing similar research questions. The lack of coordination among researchers means that participants may undergo multiple assessments of physical fitness, complete similar surveys about gaming habits and health behaviours, or participate in comparable intervention studies without clear justification for why their previous contributions to similar research were insufficient. As burden perception is subjective, what constitutes a significant burden varies among individuals based on factors including their health status, previous research experience, and personal circumstances, requiring researchers to carefully consider both objective measures of burden and participants' subjective experiences (Getz et al., 2019).

Research burden becomes particularly problematic in research-intensive environments where participants may be approached for multiple studies during single visits or over short time periods. Clinical research has shown that when research becomes normalised within healthcare settings, participants may develop feelings of obligation to participate that compromise the voluntariness of their consent, even when they experience significant burden from research activities (Barned et al., 2018).

The problem is particularly evident in areas where research has already established baseline understanding. For instance, multiple studies have documented the prevalence of musculoskeletal pain in esports players, with remarkably consistent findings across different populations (Khan & Chaikumarn, 2024; Lam et al., 2022; Lindberg et al., 2020; Sand Hensen et al., 2024). Despite this consistency, researchers continue to conduct descriptive studies documenting similar patterns of neck, back, and wrist pain without building meaningfully upon

existing knowledge or advancing towards preventive interventions. This redundancy demonstrates the fundamental limitation of traditional significance testing: the absence of an effect can be rejected, but not statistically supported. Rather than continuing to collect new samples to document the same pain patterns, researchers could employ statistical approaches that allow them to demonstrate when interventions produce effects small enough to be considered practically equivalent to no effect, thereby providing meaningful evidence for intervention effectiveness without requiring repeated data collection from the same limited participant pools.

The misinterpretation of non-significant results as evidence of no effect creates a particularly problematic cycle in esports health research. When studies fail to find significant effects of interventions or fail to detect expected relationships, researchers often conclude that effects are absent rather than recognising that their studies may have lacked sufficient power to detect meaningful effects. This leads to calls for replication studies or larger samples to confirm these null findings, placing additional burden on participants when appropriate statistical techniques and better sample size planning could provide the necessary evidence.

The burden extends to organisational stakeholders within the esports ecosystem who may feel obligated to support research initiatives even when the potential benefits are unclear or duplicative. Esports teams, tournament organisers, and gaming companies often receive multiple requests for access to players or data, creating administrative burden and potential conflicts when multiple research groups seek access to the same populations. This organisational burden can ultimately limit access for researchers conducting novel investigations whilst favouring those who are able to establish relationships early or who represent institutions with greater perceived prestige. The situation is worsened by poor sample size justifications based on heuristics or convenience rather than clear inferential goals (Lakens, 2022). When researchers justify sample sizes by stating they will collect the same number of observations as were collected in a previous study or rely on arbitrary rules of thumb, they perpetuate a cycle of inadequately powered studies that cannot provide definitive answers to research questions. This approach not only wastes participant time but also creates false impressions of scientific rigour when studies may lack sufficient informational value to address their stated objectives.

The Promise and Challenges of Open Science in Esports Health Research

The principles of open science offer a potential solution to many of the ethical and efficiency concerns plaguing esports health research. Open data sharing, transparent methodologies,

and collaborative research practices could substantially reduce the burden on research participants whilst accelerating scientific progress in understanding player health and wellbeing. However, the current state of data availability and sharing practices in esports health research falls short of these ideals, minus some outstanding examples (Behnke et al., 2025), perpetuating the cycle of redundant data collection and missed opportunities for advancing knowledge.

Open science practices encompass a range of approaches aimed at making science more reliable, including wider sharing and reanalysis of code, data, and research materials (Munafò et al., 2017); valuing replications and reanalyses (Errington et al., 2014; Nosek & Errington, 2017); changes in statistical approaches with regards to power (Button et al., 2013) and how evidence is assessed (Dienes, 2008); interactive and more transparent ways of presenting data graphically; potentially the use of double-blind peer review (Tomkins et al., 2017); and the use of formats such as preprints (McKiernan et al., 2016) and open access publishing. The adoption of study preregistration and registered reports represents the change that most affects how science is conducted, requiring hypotheses and analysis pipelines to be declared publicly before data collection (Chambers, 2013; Nosek et al., 2018).

The movement towards open science is a consequence of seemingly pervasive failures to replicate previous research (Allen & Mehler, 2019), which some have gone so far as to call a 'crisis' (Chambers, 2017; Baker, 2016). The potential causes are numerous and well documented, requiring a substantive change in how science is conducted (Munafò et al., 2017; Button et al., 2013). This transition comes with great benefits but also significant challenges that are likely to affect those who carry out the research, particularly early career researchers who comprise much of the esports health research community.

The benefits of open science practices for esports health research are particularly compelling given the field's current limitations. Small sample sizes, often cited as a constraint in existing studies, could be effectively addressed through data sharing and meta-analytic approaches that combine findings across multiple investigations. For example, the consistency of musculoskeletal pain reporting across different populations and geographic regions suggests that pooled analyses could provide much more robust estimates of prevalence and risk factors than individual studies with limited sample sizes (DiFrancisco-Donoghue et al., 2019; Hwu, 2020; Lindberg et al., 2020). Such approaches would not only enhance statistical power but could also reveal patterns that are not apparent in smaller individual studies.

Open science methods such as registered reports can improve the quality and reliability of scientific work by preventing hypothesising after the results are known (HARKing) (Kerr, 1998)

and guarding against manipulation of researcher degrees of freedom or p-hacking (Chambers, 2017). However, some question whether certain open science mechanisms retain their effectiveness in small fields like esports health research. For example, whilst double-blind peer review aims to reduce bias (Tomkins et al., 2017), the esports research community remains small enough that author identity may often be inferred from topic, sample location, or writing style, particularly when combined with preprints and preregistration. This raises questions about which open science practices provide the greatest benefit in emerging fields with limited researcher populations.

Nevertheless, preregistration forces researchers to gain a more complete understanding of analyses (including stopping plans and smallest effect sizes of interest) and to attempt to anticipate all potential outcomes of an experiment (Dienes, 2008). This is particularly relevant for esports health research where early career researchers, who may be at higher risk of committing such errors due to lack of experience (Fanelli et al., 2017), represent a significant portion of the research community. Registered reports not only guard against questionable practices but can also increase the chances of publication because they offer a path to publication irrespective of null findings. Analysis of published biomedical and psychological science registered reports found that 60.5% of hypotheses were not supported by the experimental data, which is in stark contrast to the estimated 5% to 20% of null findings in the traditional literature (Allen & Mehler, 2019). This suggests that registered reports substantially increase the chances for publishing null findings, which could be particularly beneficial for esports health research where intervention studies may not always show significant effects.

Meta-analytic approaches become especially relevant when considering how researchers currently handle non-significant findings in esports health research. Rather than repeatedly collecting new data to investigate whether interventions work, researchers could employ more sophisticated statistical approaches within meta-analytic frameworks (Lakens, 2017). This approach would be particularly valuable for evaluating intervention effectiveness in esports health research (Sharpe et al., 2024; 2025), where traditional approaches to meta-analytic testing could allow researchers to conclude that interventions produce effects that are practically equivalent to no effect without requiring additional primary data collection. Furthermore, the adoption of better sample size justification practices could address a critical gap regarding the need for more robust evaluation of health-promoting strategies in esports (Yin et al., 2020). Rather than conducting multiple underpowered studies that fail to detect effects and then concluding interventions are ineffective, researchers could specify meaningful effect sizes a priori (Lakens, 2022) and design studies with sufficient power to provide definitive answers. This approach would provide the evidence-based guidelines and

intervention strategies that are needed whilst minimising the burden on research participants through more efficient study designs.

The structures developed around open and reproducible science are designed to help researchers and promote collaboration (Moshontz et al., 2018). These structures include a range of software tools, publishing mechanisms, incentives, and international organisations that can help researchers in documenting their work, improving workflows, supporting collaborations, and ultimately progressing their training. For the emerging field of esports health research, early adoption of these tools could provide significant advantages in establishing rigorous methodological foundations. Open science software such as web-based, version-controlled repositories can help with storing and sharing code (Biecek & Kosinski, 2017). In combination with scripting formats for reproducible analysis (Baumer et al., 2014; Kluyver et al., 2016), esports health researchers can develop well-documented and robust code libraries that may be reused for future projects and teaching purposes, though we must recognise that esports education remains in its early stages of development (Leis et al., 2025). This could be particularly valuable in establishing standardised analytical approaches across the diverse disciplinary backgrounds represented in esports health research. New open tools can aid robust and reproducible data analysis in a user-friendly way. For instance, open software has been developed to facilitate estimating publication bias within research areas (Simonsohn et al., 2013) and to scan documents for inconsistencies in reported statistical values (Nuijten et al., 2016). These tools could help esports health researchers maintain higher standards of scientific rigour and identify potential issues in the emerging literature.

Open data sharing could also address one of the most pressing needs: the need for longitudinal studies that track health outcomes over time (Yin et al., 2020). Rather than expecting individual research groups to conduct lengthy longitudinal studies with limited resources, collaborative approaches could enable researchers to follow players across multiple time points and contexts. This could be particularly valuable for understanding career trajectories, injury development, and the long-term effectiveness of health interventions in ways that would be prohibitively expensive and time-consuming for individual research teams. An increasingly obvious benefit of open data is not simply that a single database can be used more widely; it is that these data can be leveraged, shared and combined with other data sets. This creates novel opportunities for scientific collaboration and partnership. In public health contexts, surveillance data have been successfully paired with data from social media messaging to assess intervention effectiveness, and environmental monitoring data have been combined with health databases to predict and inform risk mitigation efforts (Huston et al., 2019). Similar approaches could be applied in esports health research as an extension to

the scoping reviews and systematic reviews that are currently in abundance (e.g., Leis et al., 2024; Poulus et al., 2024), potentially combining player health data with gaming performance metrics, environmental factors, or intervention uptake data to develop more nuanced understanding of player wellbeing. The open science movement also provides opportunities to access free high-quality, often standardised data from various repositories and international collaborative networks (Kamens, 2014; Jones et al., 2009; Van Essen et al., 2012; Sudlow et al., 2015; Moshontz et al., 2018; Thompson et al., 2014). These resources may be particularly useful for esports health researchers who often have limited funds and could benefit from access to comparative datasets or the ability to participate in large-scale collaborative studies.

Open science has clear potential to reduce participant burden whilst improving research quality across several specific areas of esports health research. Sleep research, for instance, has been identified as a critical area where esports players face significant challenges related to irregular schedules and blue light exposure (Bonnar et al., 2019; Yin et al., 2020). Rather than multiple research groups independently collecting sleep data from similar populations, coordinated efforts could establish shared databases that enable more sophisticated analyses of sleep patterns, their relationships to performance, and the effectiveness of various interventions. Such approaches could also facilitate the development and validation of esports-specific assessment tools rather than repeatedly adapting measures developed for other populations.

Similarly, research on physical fitness and body composition in esports players could benefit substantially from data sharing practices. Multiple studies have documented differences between esports players and control populations in terms of body fat, muscle mass, and cardiovascular fitness, but the interpretation of these findings remains limited by small sample sizes and varying methodological approaches (DiFrancisco-Donoghue et al., 2020; Yin et al., 2020). Shared datasets could enable more robust analyses that account for factors such as game type, training volume, and demographic characteristics that may influence these relationships.

However, the implementation of open science practices in esports health research faces several significant challenges that must be addressed to realise these benefits. Whilst the possibilities of open data are vast and promising, there are numerous challenges that need to be addressed to truly reap the benefits. They can be grouped into three key areas: making the technological shift; making the social and cultural shift that includes not only social norms, but also legal and ethical issues; and avoiding the pitfalls (Huston et al., 2019).

Open data requires significant resources to set up databases for public use and combinability. Appropriate technological infrastructure is necessary, including software programmes, high-capacity computers and cloud-based solutions to store and analyse large amounts of data. Open data also requires clear standards to ensure transparency regarding the source, how the data are generated, its combinability with other data and its limitations. Finally, there is a need for training to develop different types of expertise in systems and analytics. For the relatively new field of esports health research, establishing this infrastructure from the outset could provide significant long-term benefits.

The additional requirements of open and reproducible sciences often consume more time: archiving, documenting, and quality controlling of code and data takes time. Considerably more time consuming is the adoption of preregistrations or registered reports, because full analysis pipelines, piloting, manuscripts, and peer review must occur prior to data collection, which is only then followed by the more traditional stages involved in publication (Allen & Mehler, 2019). In researchers' experience, these additional requirements can easily double the duration of a project. This time cost presents a challenge in conducting open science and acutely affects early career researchers who comprise much of the esports health research community.

Privacy concerns are particularly acute given the often-public nature of esports competition and the potential for participant identification even in supposedly anonymised datasets. Many esports players compete under recognisable usernames and participate in highly visible tournaments, making traditional anonymisation techniques potentially insufficient for protecting participant privacy. This challenge requires innovative approaches to data sharing that balance transparency with privacy protection.

Although the call for open data began as a popular movement, there is still hesitancy in making some databases freely available. Not everyone wants to, or is able to, share their data. Developing excellent databases take a lot of time, work, resources and skill. If people share their hard-earned databases, will they get appropriate recognition? There has to be some motivation to spend time developing databases without the worry that its use will only enable others to get credit for the analysis and publication of those data (Huston et al., 2019). This concern may be particularly relevant in the competitive academic environment surrounding the emerging field of esports health research.

The hesitancy to share data is also often linked to legal and ethical issues. Who owns these data? Is there legislative support for data sharing? Especially with healthcare and public health databases, there are concerns about safeguarding privacy and confidentiality. There is a

recognition that the call for openness and transparency needs to be tempered by the need to respect privacy and confidentiality. Generally, there are careful protocols for ensuring non-identifiability, but what if this is not done adequately, or the efforts to ensure confidentiality can be circumvented? These concerns may be heightened in esports research given the public nature of competitive gaming.

The commercial interests surrounding esports also complicate open science implementation. Unlike traditional sports research, which often focuses on amateur or semi-professional athletes, esports research frequently involves professional players whose performance and health data may have commercial value to teams, sponsors, and gaming companies. However, this focus on elite players may also reflect an underdeveloped grassroots esports infrastructure. A strategic shift towards lower competition levels could serve multiple purposes: reducing burden on professional players, supporting broader industry growth, and accessing larger participant pools. Youth leagues, university esports programmes, and amateur tournaments represent largely untapped populations for health research. Whilst these groups may present different health profiles than professional players, research at grassroots levels could identify early intervention opportunities and inform sustainable competitive practices before players reach professional status. The challenge lies in balancing research across competitive levels to understand the full spectrum of esports participation whilst avoiding the creation of new burden concentrations at lower levels.

This creates potential conflicts between research transparency and proprietary interests that may limit researchers' ability to share data openly. Additionally, the involvement of gaming companies in funding research raises questions about data ownership and control that must be carefully navigated to ensure that open science principles can be maintained.

Building Collaborative Networks to Advance Knowledge and Prevent Redundancy

The fragmented nature of current esports health research reflects broader challenges in establishing collaborative networks across institutions, disciplines, and geographic regions. The field would benefit substantially from coordinated efforts to identify research priorities, share methodological expertise, and prevent redundant investigations that burden participants without advancing knowledge. However, building such collaborative networks requires addressing several structural and cultural barriers that currently limit cooperation among researchers.

Collaborative networks (CNs) represent a paradigm shift in how research can be conducted, defined as networks constituted by a variety of entities that are largely autonomous,

geographically distributed, and heterogeneous in terms of their operating environment, culture, social capital, and goals, yet collaborate to better achieve common or compatible goals with interactions supported by computer networks (Camarinha-Matos & Afsarmanesh, 2005). Unlike other networks, in collaborative networks, collaboration is an intentional property that derives from the shared belief that together the network members can achieve goals that would not be possible or would have a higher cost if attempted individually. This fundamental principle is particularly relevant to esports health research, where the limited participant pools and complex interdisciplinary nature of research questions make collaborative approaches essential for sustainable progress.

The establishment of collaborative networks in esports health research would benefit from understanding how such networks have emerged in other scientific domains. Various manifestations of collaborative networks have been successfully implemented, including virtual organisations, professional virtual communities, and collaborative virtual laboratories (Camarinha-Matos & Afsarmanesh, 2005). Of particular relevance to esports health research is the concept of e-Science, which focuses on global networked collaboration in key areas of science, enabling flexible, secure, coordinated resource-sharing among dynamic collections of individuals, institutions, and resources. Collaborative virtual laboratories represent heterogeneous and distributed problem-solving environments that enable groups of researchers located in different geographically spread centres to work together, sharing resources including equipment, tools, data, and information related to experiments.

The interdisciplinary nature of esports health research presents both opportunities and challenges for collaboration, as the field draws from exercise physiology, sports medicine, psychology, ergonomics, computer science, and other disciplines, each bringing valuable perspectives but also different research traditions, methodological approaches, and publication norms. This diversity can lead to parallel investigations of similar phenomena using different theoretical frameworks and measurement approaches, making it difficult to synthesise findings and build cumulative knowledge. For example, research on the cognitive demands of esports has been approached from sports psychology, cognitive science, and human factors perspectives, each providing insights but often without meaningful integration across disciplinary boundaries.

The geographic distribution of esports research also presents coordination challenges. Whilst esports is a global phenomenon, research has been concentrated in certain regions, particularly North America, Europe, and East Asia, with limited representation from other areas. This geographic concentration can lead to cultural biases in research questions and

populations studied, whilst also creating barriers to collaboration across time zones and institutional systems. The lack of global coordination also means that researchers may be unaware of similar work being conducted in other regions, leading to redundant efforts and missed opportunities for cross-cultural validation of findings.

The development of collaborative networks requires addressing both technological and social challenges. From a technological perspective, successful collaborative networks require significant infrastructure including software programmes, high-capacity computers, and cloud-based solutions to store and analyse large amounts of data, along with clear standards to ensure transparency regarding data sources, generation methods, combinability with other data, and limitations (Huston et al., 2019). However, the technological shift represents only one component of the challenge facing collaborative network development. The broader transformation towards open science practices requires substantial changes in how research is conceptualised and conducted, with implications that extend far beyond simple technology adoption (Munafò et al., 2017).

One of the most significant barriers to collaboration in esports health research is the competitive academic environment that incentivises individual achievement over collective progress. The pressure to produce publications, secure funding, and establish independent research programmes can discourage researchers from participating in collaborative efforts that may require sharing credit, resources, and decision-making authority. This is particularly problematic in a small field like esports health research, where there are limited opportunities for establishing independent research programmes and where collaboration could provide substantial benefits for all participants.

The acceptance of collaborative networks as a new research paradigm is not always straightforward, as established sciences and paradigms tend to resist the introduction of approaches that might compete with traditional disciplinary boundaries (Camarinha-Matos & Afsarmanesh, 2005). This tension is further increased by the multi-disciplinary nature of collaborative research, particularly when multiple traditional disciplines compete to claim and master new research areas. In esports health research, this is evident in how different disciplines have attempted to extend their existing models and approaches to explain collaborative research phenomena, rather than embracing truly integrative collaborative frameworks. The historical development of scientific disciplines suggests that such resistance is natural during paradigm shifts, as described by Kuhn's analysis of scientific revolutions, where preparadigmatic phases involve multiple competing interpretations before consensus emerges (Kuhn, 1975).

Building effective collaborative networks requires the establishment of what can be termed "breeding environments," which are associations or pools of organisations and their related supporting institutions that have both the potential and the will to cooperate with each other through the establishment of base long-term cooperation agreements and interoperable infrastructure (Camarinha-Matos & Afsarmanesh, 2005). When research opportunities are identified, subsets of these organisations can be selected to form specific collaborative projects. This concept of breeding environments could be particularly valuable in esports health research, where establishing trust and interoperability among diverse research groups before specific projects emerge could facilitate more efficient and effective collaboration when opportunities arise.

The development of collaborative networks must also address the human and social aspects of collaboration. Professional virtual communities provide environments for professionals to share the body of knowledge of their professions, including similar working cultures, problem perceptions, problem-solving techniques, professional values, and behaviour (Camarinha-Matos & Afsarmanesh, 2005). In esports health research, the establishment of professional virtual communities could facilitate knowledge sharing across disciplinary boundaries whilst maintaining the specialised expertise that different disciplines bring to collaborative efforts. These communities could also benefit from established frameworks for supporting large-scale collaborative research, such as those developed by initiatives like the Psychological Science Accelerator, which demonstrates how distributed collaborative networks can advance psychological science through coordinated multi-site studies (Moshontz et al., 2018).

Building effective collaborative networks in esports health research requires addressing both practical and cultural barriers to cooperation through the development of shared research platforms that enable multi-site studies, standardised protocols that facilitate comparison across studies, and funding mechanisms that incentivise collaborative rather than competitive approaches. Initiatives such as the international mental health guidelines for esports (Poulus & Sharpe, 2025) exemplify how coordinated multi-site collaboration can establish shared frameworks and protocols across research groups. For example, funding agencies could prioritise proposals that demonstrate coordination with existing research efforts or that build upon previously collected data rather than duplicating data collection activities. This approach aligns with the emphasis on justifying sample sizes based on the value of information, where researchers must demonstrate that their data collection will provide meaningful insights given available resources and existing knowledge (Lakens, 2022).

The development of standardised approaches to sample size justification could also facilitate collaboration whilst reducing participant burden. Currently, many esports health studies employ traditional null hypothesis significance testing with inadequate power analysis that provides little guidance for interpreting non-significant results. The adoption of more rigorous sample size justification protocols could enable researchers to make stronger inferences about intervention effectiveness and health relationships whilst requiring smaller total sample sizes than repeated attempts to replicate ambiguous findings. Proper sample size justification considers multiple factors including the smallest effect size of interest, the expected effect size, and the width of the confidence interval around the effect size, enabling researchers to design studies that can provide definitive answers to research questions (Lakens, 2022).

Successful collaborative networks also require attention to the evolving dynamics of collaboration over time. Unlike static organisational structures, collaborative networks must be designed to accommodate changing membership, evolving research priorities, and shifting technological capabilities (Camarinha-Matos & Afsarmanesh, 2005). This dynamic nature is particularly important in the rapidly evolving field of esports health research, where new technologies, gaming platforms, and competitive formats continuously emerge, requiring collaborative networks to adapt their research approaches and priorities accordingly.

Cultural changes within the research community are also necessary to support collaboration. This might involve recognising collaborative contributions in academic evaluation and promotion processes, providing training in collaborative research methods, and developing norms around data sharing and credit allocation that make participation in collaborative efforts attractive to individual researchers. Professional organisations could play a crucial role in promoting these cultural changes by establishing best practices for collaboration and recognising exemplary collaborative efforts.

The establishment of collaborative networks also requires attention to governance structures and coordination mechanisms. Successful collaborative networks need clear roles and responsibilities, including coordinators who can facilitate communication and coordination among network members, brokers who can identify collaboration opportunities, and cluster managers who can oversee the overall network operations (Camarinha-Matos & Afsarmanesh, 2005). These governance structures must balance the autonomy of individual research groups with the coordination necessary for effective collaboration. The academic reward system also plays a crucial role, as current promotion and evaluation practices that primarily value individual achievement over collaborative contributions can undermine network sustainability (Moher et al., 2018).

The development of collaborative networks could also benefit from engagement with stakeholders outside the academic research community. Esports teams, tournament organisers, gaming companies, and player organisations all have interests in understanding player health and could contribute resources and expertise to research efforts. However, engaging these stakeholders requires careful attention to potential conflicts of interest and ensuring that research independence is maintained even when industry partners provide support.

The integration of industry stakeholders into collaborative research networks presents both opportunities and challenges. Industry partners can provide access to larger participant populations, real-world gaming environments, and financial resources that might not otherwise be available to academic researchers. However, this integration requires careful consideration of how commercial interests might influence research priorities and outcomes. Collaborative networks must establish clear principles for maintaining research integrity whilst benefiting from industry partnerships (Camarinha-Matos & Afsarmanesh, 2005). The development of data sharing agreements that protect both research independence and commercial interests becomes particularly important when industry partners contribute proprietary data or access to competitive gaming environments.

Specific areas of esports health research would benefit particularly from collaborative approaches. Injury prevention research, for instance, requires long-term follow-up of large populations to identify risk factors and evaluate preventive interventions. No single research group is likely to have access to sufficient participants or resources to conduct such studies independently, making collaboration essential for progress in this area. Similarly, research on mental health and gaming disorder requires careful attention to diverse populations and cultural contexts that would benefit from international collaborative efforts.

The development of standardised assessment tools and protocols represents another area where collaboration could provide substantial benefits. Currently, esports health research employs a wide variety of assessment methods, making it difficult to compare findings across studies or conduct meta-analyses. Collaborative efforts to develop and validate standardised measures could enhance the quality and comparability of research whilst reducing the burden on participants who currently may be asked to complete multiple different assessments of similar constructs. Such standardisation efforts could benefit from approaches used in other fields, such as the development of consensus measurement tools through international collaborative initiatives that have proven successful in medical and psychological research (Sudlow et al., 2015).

The development of standardised tools and protocols within collaborative networks requires careful attention to interoperability and compatibility across different research contexts. This includes not only technical interoperability of data collection and analysis tools, but also semantic interoperability to ensure that concepts and measures have consistent meanings across different research groups and cultural contexts (Camarinha-Matos & Afsarmanesh, 2005). The establishment of common ontologies and collaborative languages could facilitate this standardisation whilst respecting the diverse perspectives and expertise that different disciplines bring to esports health research.

Collaborative approaches could also address some of the ethical concerns about research burden by ensuring that data collection serves multiple research purposes rather than addressing only narrow questions of interest to individual research teams. Multi-purpose studies that collect data relevant to multiple research questions could provide more value to participants whilst reducing the total number of research contacts required to address the field's research priorities.

The implementation of multi-purpose collaborative studies requires careful coordination of research objectives and methodologies across participating groups. This coordination must balance the specific interests of individual research teams with the broader goals of the collaborative network, ensuring that all participants benefit from the collaboration whilst contributing to the collective research agenda (Camarinha-Matos & Afsarmanesh, 2005). Such coordination mechanisms become particularly important when collaborative networks span multiple institutions, countries, and disciplinary traditions. The success of such approaches can be seen in large-scale biomedical collaborations that have successfully combined multiple research objectives whilst maintaining scientific rigour and participant protection (Thompson et al., 2014).

The integration of improved statistical approaches into collaborative research designs could further enhance the value obtained from participant contributions. Rather than conducting multiple studies that fail to detect significant effects and leave research questions unanswered, collaborative networks could employ appropriate sample size justification and statistical methods to provide definitive evidence about when effects are too small to be practically meaningful. This approach would address the observation that researchers should be able to demonstrate the value of information they collect, whilst ensuring that participant contributions lead to clear scientific conclusions rather than ambiguous null findings that prompt additional data collection efforts.

For example, in research on physical fitness interventions for esports players, rather than conducting multiple small studies that fail to detect significant improvements and concluding that interventions are ineffective, researchers could collaboratively establish effect sizes of interest based on practical considerations and employ appropriate statistical methods to determine whether interventions consistently produce effects too small to justify their implementation. This approach would provide clearer guidance for practitioners whilst respecting participant contributions and reducing the overall burden of research participation.

The success of collaborative networks in achieving these goals depends on the establishment of trust and shared values among network participants. Trust emerges as a critical factor in collaborative relationships, particularly when network members must share sensitive data, coordinate research activities, and make collective decisions about research priorities (Camarinha-Matos & Afsarmanesh, 2005). Building trust requires time, consistent positive interactions, and the establishment of clear norms and expectations for collaborative behaviour. In esports health research, where commercial interests and competitive academic pressures can create tensions, the deliberate cultivation of trust through structured collaboration activities may be essential for network success.

Implementing Open Science and Collaboration: Practical Frameworks

Whilst the benefits of open science and collaborative networks are theoretically compelling, practical implementation requires concrete strategies tailored to esports research contexts. The following frameworks outline actionable approaches that could be adopted, whilst acknowledging the resource constraints and implementation challenges facing the field.

Establishing Shared Data Infrastructure

A shared esports health data repository could begin modestly rather than attempting large-scale implementation immediately, with a pilot project focusing on a single well-defined area, such as musculoskeletal pain prevalence, to demonstrate feasibility before expansion. For instance, five research groups currently investigating esports-related pain could pool their data (with appropriate ethical approval and data use agreements), creating a dataset of 500+ participants rather than five separate datasets of 100 participants each, enabling more robust subgroup analyses by game type, competition level, and demographic factors whilst reducing the number of times individual players are approached for participation. The technical implementation could utilise existing platforms rather than building custom infrastructure, with the Open Science Framework (OSF), Figshare, or institutional repositories already providing free hosting with version control and Digital Object Identifiers (DOIs) for citation, and the

Esports Research Network (2021) providing existing infrastructure that could coordinate such efforts. Initial implementation could focus on developing standardised data dictionaries defining common variables across studies, creating templates for data use agreements that protect researcher contributions whilst enabling sharing, establishing protocols for ensuring participant anonymity given the public nature of competitive gaming, and defining clear authorship guidelines for secondary analyses of shared data.

Developing Standardised Assessment Protocols

A working group could systematically review existing measures of gaming-related pain, sleep quality, and physical fitness used across esports studies, then conduct validation studies to identify optimal tools for this population, mirroring successful standardisation efforts in clinical psychology, where initiatives like the NIMH Research Domain Criteria have improved measurement consistency. Practical steps include convening a consensus panel of researchers currently active in specific domains (e.g., musculoskeletal health, sleep, mental health), conducting systematic reviews of measurement tools used in existing esports health literature, identifying overlaps and gaps in current assessment approaches, coordinating multi-site validation studies for promising measures, and publishing open-access protocols and scoring guidelines. This standardisation need not eliminate methodological diversity entirely; researchers might identify a core set of measures all studies employ alongside study-specific assessments, enabling both comparability and innovation.

Reforming Funding and Incentive Structures

Funding agencies could implement specific mechanisms to incentivise collaboration over competition, such as requiring that proposals above a certain threshold demonstrate coordination with existing research efforts or justify why new data collection is necessary given available datasets, or offering "collaboration supplements" providing additional funding for research groups that successfully pool resources or share data, with the Wellcome Trust's data sharing requirements offering a potential model (Kiley et al., 2017). However, such reforms require buy-in from funding bodies, and researchers could collectively advocate for these changes by documenting participant burden in current research practices through surveys of esports teams and players, demonstrating proof-of-concept through voluntary data sharing initiatives, publishing analyses showing how meta-analytic approaches using shared data yield stronger conclusions than individual studies, and engaging with funding agency programme officers to propose pilot schemes.

Establishing Preregistration Infrastructure

The field could establish a preregistration platform specifically for esports research, similar to AsPredicted or the Open Science Framework, but with templates tailored to common esports study designs that include prompts for researchers to justify sample sizes based on smallest effect sizes of interest, specify plans for handling non-significant results, identify how their study builds on or differs from existing work, and declare potential conflicts of interest related to industry partnerships. Implementation could begin with journal-supported initiatives, where special issues, like the current "Scholars' Discourse" series, could encourage or require preregistration for submitted empirical work, gradually normalising the practice.

Protecting Early-Career Researchers

Implementing these recommendations requires acknowledging that early-career researchers face publishing pressures that may conflict with the time investment required for collaborative work, as junior researchers may reasonably fear that sharing data before publication could enable senior researchers to publish competing analyses, potentially harming career progression. Structural solutions include developing clear authorship guidelines for collaborative datasets that protect contributions from all researchers, creating mechanisms for early-career researchers to gain recognition for data curation and sharing activities (e.g., "data creator" citations, academic credit for dataset publications), ensuring that promotion and tenure committees value collaborative contributions alongside traditional publication metrics, establishing embargo periods where data creators have exclusive access for specified durations before opening to broader use, and implementing mediation processes for resolving disputes about data use and authorship.

Phased Implementation Strategy

Rather than expecting simultaneous adoption of all proposed practices, the field could pursue phased implementation across three stages. Phase 1 (Years 1-2): Foundation Building would establish a pilot data sharing initiative in one subdomain (e.g., musculoskeletal health), create working groups for assessment standardisation, develop templates and guidelines for preregistration and registered reports, and document current participant burden through systematic assessment. Phase 2 (Years 3-4): Expansion and Evaluation would expand data sharing to additional domains, publish validated standardised assessment protocols, evaluate outcomes from pilot initiatives (e.g., do shared datasets yield more robust findings? do participants report reduced burden?), and refine governance structures based on lessons learned. Phase 3 (Years 5+): Institutionalisation would integrate collaborative practices into standard research training, establish formal collaborative networks with defined governance, implement funding mechanisms that incentivise collaboration, and develop recognition

systems for collaborative contributions in academic evaluation. This phased approach acknowledges that cultural and structural changes require time, allowing the field to adapt practices based on experience rather than implementing untested models wholesale.

Integrating Ethics, Open Science, and Collaboration for Sustainable Research Progress

The challenges facing esports health research regarding participant burden, limited data sharing, and fragmented collaboration are interconnected problems that require coordinated solutions. The ethical imperative to minimise research burden provides compelling justification for adopting open science and collaborative practices, as researchers have an obligation to ensure that participant contributions are used effectively to advance knowledge. The widespread misinterpretation of non-significant results as evidence of no effects exacerbates this ethical problem by creating apparent justification for redundant studies that place unnecessary burden on participants.

Open science practices can directly address these concerns by reducing the need for redundant data collection and enabling more efficient use of participant contributions through shared databases, standardised protocols, and collaborative analyses. The implementation of appropriate statistical approaches and sample size justification methods could help researchers make more efficient use of participant contributions by ensuring studies are designed to answer practically meaningful questions rather than conducting underpowered investigations that yield ambiguous results. Professional organisations and funding agencies play crucial roles in promoting these changes by establishing policies that incentivise collaboration and require researchers to specify inferential goals and statistical approaches for handling null findings, thereby shifting the culture towards more collaborative and efficient approaches that better serve both participants and scientific progress.

Looking towards the future, the upcoming IOC Esports Games in 2027 presents both an opportunity and challenge for the research community. Increased attention and resources could provide opportunities for larger-scale collaborative research efforts whilst potentially creating pressure for research output that might exacerbate current problems with redundancy and participant burden if not managed carefully. The potential for technological innovation through advances in remote monitoring, wearable devices, and digital health platforms may enable new approaches to data collection that are less burdensome for participants whilst providing more detailed longitudinal information, though such technologies must be guided by proper sample size justification and collaborative frameworks.

The ultimate goal is creating a research ecosystem that efficiently and ethically advances understanding of esports player health whilst respecting participant welfare. This requires recognition that the current approach of independent, competitive research efforts is not sustainable given the limited size of the esports community. Success in this endeavour requires commitment from all stakeholders including researchers, institutions, funding agencies, and industry partners. The potential benefits include not only improved research outcomes but also a model for conducting ethical and efficient research in other emerging fields facing similar challenges.

Peer Review Discourse

The editorial and peer review process for this manuscript raised fundamental questions about the gap between identifying research problems and operationalising solutions. This section addresses the substantive critiques whilst acknowledging my position as a cognitive scientist may influence these perspectives.

Operationalising Recommendations: From Theory to Practice

The chief editor's central question, "Can we answer the questions we ourselves raise?" exposes a critical tension in this manuscript. We advocate for coordinated adoption of open science practices, collaborative networks, and improved statistical approaches, calling for "fundamental changes in academic culture, funding mechanisms, and research evaluation practices that reward collaboration over competition." The editor then asks: "what does this look like, and how are the ideas and recommendations operationalised?". This question is both fair and uncomfortable. The manuscript identifies problems more clearly than it provides operational solutions. As a cognitive scientist trained in experimental methods, I initially approached this issue through the lens of research design and statistical inference, areas where individual researchers have direct control. However, implementing open science requires system-level changes that individual researchers cannot achieve alone.

The practical implementation section added above represents an attempt to bridge this gap, proposing concrete steps such as pilot data repositories, standardised assessment working groups, and phased implementation strategies. Yet I acknowledge these remain incomplete answers. Creating shared data infrastructure, reforming funding mechanisms, and changing academic reward systems all require coordination among multiple stakeholders with competing interests. The cognitive scientist in me wants to design experiments testing which implementation strategies prove most effective, but this presupposes resources and infrastructure that may not yet exist in an emerging field. The question "are we ready to begin

answering the questions we ourselves raise?" highlights temporal considerations. Perhaps the field is not yet ready for large-scale collaborative networks but could begin with smaller proof-of-concept initiatives. The phased implementation framework proposes starting with achievable goals (pilot data sharing, assessment standardisation) before attempting more ambitious changes (formal collaborative networks, reformed funding mechanisms). Whether this approach proves feasible remains to be tested.

The Early-Career Researcher Challenge

Multiple aspects of the review process highlighted a critical tension: how do we advocate for practices that disproportionately burden the researchers most likely to adopt them? Early-career researchers, who comprise much of the esports health research community, face a paradox: they often have the technical skills and enthusiasm for open science but lack the job security and resources to absorb the time costs. The manuscript notes that open science requirements "can easily double the duration of a project" and "acutely affect early career researchers." This creates a potential impasse where those most able to implement changes (senior researchers with resources and job security) have least incentive, whilst those most motivated (early-career researchers) face greatest barriers. This is not merely a practical problem but an ethical one. We are asking early-career researchers to solve problems created by current incentive structures whilst simultaneously operating within those structures for their own advancement. This is neither fair nor sustainable. The practical implementation section attempts to address this through structural solutions: authorship guidelines protecting data creators, academic credit for data curation, and embargo periods allowing early-career researchers exclusive access before broader sharing.

However, these solutions remain theoretical until institutions implement them. The manuscript can advocate for such changes, but individual authors cannot enforce them. This raises the question: what is the role of discourse papers like this one? If we cannot directly implement solutions, can we at least catalyse change by articulating problems clearly and proposing specific reforms for stakeholders with authority to implement them? From my position within academia, I observe that we often ask early-career researchers to bear the costs of reform whilst hoping the benefits materialise later in their careers. This requires frank acknowledgement: implementing open science cannot rely primarily on early-career researchers' enthusiasm; it requires senior researchers and institutions to bear implementation costs and take career risks that early-career researchers cannot afford.

The Grassroots Esports Question

The suggestion to shift research focus towards grassroots esports rather than elite professional players raises important strategic questions about research priorities and resource allocation, with the manuscript now acknowledging that "this focus on elite players may also reflect an underdeveloped grassroots esports infrastructure," and that "a strategic shift towards lower competition levels could serve multiple purposes: reducing burden on professional players, supporting broader industry growth, and accessing larger participant pools." However, this recommendation requires careful consideration of potential trade-offs, as research at grassroots levels might access larger participant pools (reducing burden concentration), identify early intervention opportunities before players reach elite levels, support broader industry development, and better represent the diverse participation patterns of the majority of competitive gamers, but it might also produce findings less relevant to elite performance contexts, create new burden concentrations at different competitive levels, require different research methodologies and measures, and face different ethical considerations if studying younger participants. The field likely needs research across the full spectrum of competitive levels to understand esports health holistically, yet the manuscript's central concern about participant burden becomes more complex when considering multiple competitive levels, as rather than solving the burden problem, expanding research to grassroots levels could simply redistribute it, requiring coordination because if multiple research groups independently shift focus to university esports, we recreate the same burden problem at a different level. This highlights why collaborative approaches are essential, since individual researchers cannot coordinate across competitive levels and this requires field-level planning, yet who has authority to establish such coordination remains unclear, as professional organisations like the Esports Research Network could play this role but currently function primarily as information-sharing platforms rather than coordinating bodies, making the development of governance structures with authority to coordinate research priorities across groups an unresolved challenge.

Balancing Ideals with Pragmatic Constraints

The observation that double-blind peer review may lose effectiveness in small fields like esports health research exemplifies how solutions from larger research domains may require adaptation, since when the research community consists of dozens rather than thousands of researchers, author identity may often be inferred from topic, sample location, or writing style, particularly when combined with preprints and preregistration, raising uncomfortable questions about whether we are imposing frameworks designed for mature fields onto an emerging area where they may not fit. Two perspectives merit consideration: first, one might argue that establishing rigorous practices early prevents the accumulation of questionable research

practices that larger fields now struggle to address, as the "replication crisis" in psychology emerged partly because problematic practices became normalised before critical examination, suggesting early adoption of open science in esports health research could prevent similar issues; second, one might counter that resource-intensive open science practices may be impractical for a field with limited funding, researcher numbers, and infrastructure, suggesting perhaps esports research should prioritise achievable improvements (better sample size justification, clearer reporting of methods, sharing code and materials) before attempting comprehensive reforms (large-scale data sharing, registered reports, formal collaborative networks). I lean towards the first perspective, believing that establishing best practices early is easier than reforming entrenched practices later, however I acknowledge the second perspective identifies real constraints, and the phased implementation framework attempts to balance these positions by proposing gradual adoption rather than expecting simultaneous implementation of all practices. The question of whether the field is "ready" may be less important than whether we begin moving in productive directions, as pilot initiatives, even if imperfect, can provide proof-of-concept and identify barriers to address in subsequent iterations, whilst waiting until we are "ready" may simply perpetuate current problems.

Limitations and Bias Acknowledgement

My cognitive science training emphasises empirical evidence and statistical reasoning, potentially leading to over-emphasis on certain methodological concepts whilst under-developing organisational and social aspects of research collaboration, and the manuscript may have benefited from co-authorship including organisational psychology or science policy expertise. The manuscript predominantly advocates for specific solutions (open science, collaboration, improved statistics) whilst giving less attention to potential drawbacks or alternative approaches, as for instance, whilst I emphasise benefits of data sharing, legitimate concerns about privacy, intellectual property, and researcher recognition receive less thorough treatment, and this imbalance may reflect my bias towards open science principles, shaped by training in an experimental tradition that values replication and data transparency. The tension between advocating for changes and acknowledging I cannot implement them alone is perhaps the manuscript's central limitation, as discourse papers can articulate problems and propose solutions but cannot enforce implementation, raising questions about the role of scholarly critique: Is identifying problems valuable even when solutions remain incomplete? Can proposing specific reforms catalyse change even if authors lack authority to implement them? I believe the answer is yes, but with important caveats, as discourse papers serve valuable functions by articulating problems that individual researchers recognise but may not have systematised, proposing specific reforms for stakeholders with implementation

authority, creating language and frameworks for discussing systemic issues, and building consensus around problems requiring collective action. However, discourse alone cannot solve these problems, as moving from critique to implementation requires engagement from stakeholders beyond individual authors: funding agencies, institutional review boards, journal editors, professional organisations, and industry partners.

Towards Actionable Discourse

The editor's vision of "discourse between scholars" is valuable, but discourse must eventually yield to action. What specific steps could various stakeholders take? Funding agencies could pilot collaboration supplements incentivising multi-site studies, require data management plans demonstrating coordination with existing efforts, and recognise data curation activities as fundable research outputs. Journal editors could encourage or require preregistration for empirical submissions, publish datasets as citable scholarly outputs, and adopt authorship guidelines protecting data creators. Professional organisations could convene working groups for assessment standardisation; host shared repositories for esports health data and develop training programmes in collaborative research methods. Individual researchers could begin voluntary data sharing initiatives demonstrating feasibility, participate in multi-site collaborative studies, and mentor early-career researchers in open science practices whilst protecting their career interests. These concrete actions do not require consensus on comprehensive reform packages; stakeholders could begin implementing changes within their authority whilst building momentum for broader reforms. The fundamental question remains: what is the role of a discourse paper in catalysing change? If this manuscript succeeds, it will not be because it provided complete operational solutions, but because it articulated problems clearly enough that stakeholders with implementation authority recognise the need for reform and begin testing specific changes. The practical implementation frameworks proposed above are not definitive solutions but starting points for experimentation, requiring iteration based on what proves feasible in practice. Whether the esports health research field is "ready" to implement these changes remains uncertain. Perhaps readiness is less important than willingness to begin. Pilot initiatives, even if imperfect, provide learning opportunities and build infrastructure for subsequent efforts. The alternative, continuing current fragmented competitive practices whilst participant burden increases, is clearly unsustainable.

Conclusion

Fragmented, competitive research practices in esports health research threaten both participant welfare and scientific progress. The concentration of research burden on limited participant pools, coupled with widespread misinterpretation of null findings and redundant

data collection, creates an unsustainable trajectory that fails to serve research participants or the broader esports community. However, as the peer review process revealed, identifying problems proves easier than operationalising solutions. Coordinated adoption of open science practices, collaborative research networks, and improved statistical approaches must prioritise participant welfare whilst maximising the scientific value of their contributions. Practical implementation requires concrete steps: establishing pilot data repositories, developing standardised assessment protocols, reforming funding mechanisms, and creating incentive structures that support collaborative work. These changes cannot fall primarily on early-career researchers who comprise much of the field; senior researchers and institutions must lead and resource these transitions.

Success demands fundamental changes in academic culture, funding mechanisms, and research evaluation practices that reward collaboration over competition. Yet success also requires acknowledging constraints facing an emerging field with limited infrastructure, resources, and coordination mechanisms. Phased implementation, beginning with achievable goals and building towards more ambitious changes, may prove more realistic than simultaneous adoption of all proposed practices. Establishing these principles now could create a model for ethical and efficient research that benefits other fields facing similar challenges with limited participant populations and rapidly evolving phenomena requiring immediate scientific attention. Whether the field is ready to implement such changes remains an open question, but waiting for perfect readiness may perpetuate current problems. Pilot initiatives, even if imperfect, can provide proof-of-concept and identify barriers to address in subsequent iterations. Moving from discourse to action requires engagement from all stakeholders: researchers, funders, institutions, professional organisations, and industry partners, each implementing changes within their authority whilst building momentum for broader reform.

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