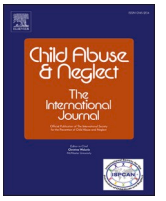
Child Abuse & Neglect 165 (2025) 107488

Contents lists available at ScienceDirect

Child Abuse & Neglect

journal homepage: www.elsevier.com/locate/chiabuneg



Applying a systems thinking lens to child sexual abuse in sport: an analysis of investigative report findings and recommendations

Karl Dodd [a,*], Paul M. Salmon [a], Colin Solomon [a,b], Scott McLean [a]

[a] Centre for Human Factors and Sociotechnical Systems, University of the Sunshine Coast, Australia
[b] School of Health and Behavioural Sciences, University of the Sunshine Coast, Australia

ARTICLE INFO

Keywords:
Child sexual abuse
Sport
Prevention
Policy
Procedures
Systems thinking

ABSTRACT

Background: Sporting organisations and governing bodies are facing increased pressure to prevent child sexual abuse (CSA) in sport. This has led to an increase in investigative reports into CSA that include recommendations on how sporting organisations could improve child safeguarding. Current peer reviewed literature on the prevention of CSA in sport, indicates that the majority of research has been on interventions at the levels of the victim and perpetrator, rather than on broader components of the sports system. However, it is not clear whether this is the case in investigative reports.

Objective: The aim of this study was to analyse investigative reports into CSA in five Australian sports (Swimming, Cricket, Gymnastics, Football, and Tennis), to evaluate the extent to which a systems thinking approach was adopted to understand the broader systemic factors enabling CSA in sport.

Method: Factors enabling CSA detailed in the reports, as well as their accompanying recommendations, were mapped to a systems thinking-based framework. The identified enabling factors and recommendations were then evaluated to determine the extent to which a whole of systems focus had been adopted in the investigative reports.

Results: In total, 30 enabling factors to CSA were identified, with the majority focused at the higher levels of the sports system (e.g., Governance, Policy, Reporting/Handling issues etc.). This contrasts with the peer reviewed literature.

Conclusions: The findings indicate that the identified enabling factors to CSA align with a systems thinking approach, whereas the recommendations to safeguarding partially adhere to the tenets of system thinking.

1. Child sexual abuse in sport: report findings and recommendations

Child sexual abuse (CSA) in sport is a complex issue (Dodd et al., 2023). Sport systems include numerous actors and organisations (e.g., governing bodies, associations, coaches, athletes etc.), along with multiple control (e.g., policy, laws, procedures) and feedback (e.g., CSA reporting, compliance, audits) mechanisms, which all interact (McLean et al., 2023) to influence CSA in sport (Dodd et al., 2023). The prevalence of CSA in Australian sport is alarming, with one study finding 38 % of participants surveyed (n = 886) had experienced sexual violence within a sporting environment (Pankowiak et al., 2022). Victims of CSA experience many adverse effects,

* Corresponding author at: University of the Sunshine Coast, 90 Sippy Downs Drive, Sippy Downs, Queensland 4556, Australia.
E-mail address: Karl.Dodd@Research.usc.edu.au (K. Dodd).

https://doi.org/10.1016/j.chiabu.2025.107488
Received 20 August 2024; Received in revised form 8 January 2025; Accepted 30 April 2025
Available online 14 May 2025

including negative developmental effects from their formative years (Sanderson & Weathers, 2019), burden of living with the trauma of CSA (Johnson et al., 2020), psychological disorders and/or substance abuse issues (Fletcher, 2021; Timon et al., 2022), lack of credibility in any legal action (Sheldon, 2021), and in the most severe circumstance, suicide (O'Brien & Sher, 2013). There is also a substantial economic cost to governments including the costs of counselling, psychological treatment, medical services and compensation (McCarthy et al., 2016). For example, the estimated life time financial cost in Australia associated with CSA cases in 2012–13 was $9.3 billion, and estimated lifetime costs of CSA per child at $500,000 (McCarthy et al., 2016).

In addition to the perpetrator's motivations to offend (Finkelhor, 1984), multiple factors are likely to facilitate CSA in sport, including institutional maltreatment (Johansson, 2022; Nite & Nauright, 2020), silencing of victims; patriarchal master narratives, trauma-related shame, and systemic power (Sanderson & Weathers, 2019), reporting issues (e.g., fear of retribution, lack of appropriate reporting processes) (Everley, 2020; Solstad, 2019), bystander inaction (Hartill, 2013), and media perpetuation of the narrative of perpetrator type (Hartill, 2013). Financial and human resources to support child safeguarding are also scarce, which could influence the prevalence rates of CSA in sport (McClellan et al., 2016; Rom et al., 2021). Furthermore, Nite and Nauright (2020) reported that institutional structures, processes, and individual attitudes contribute to the harbouring, perpetuation, and legitimisation of maltreatment of children in sport. Given this complexity, the occurrence of CSA in sport has been characterised as a systems problem (Dodd et al., 2023).

Whilst there has been much research conducted on CSA prevention, there has been little consideration of the broader sociotechnical system when seeking to understand the causes or to optimise prevention (Dodd et al., 2023). Instead, the focus has typically been at the 'sharp-end' of the system (e.g., victim and perpetrator), and much of this research has focused on male coach perpetrator type and female athlete victim, rather than taking a wider lens to investigate the influences from across the entire sport system, and a more representative set of perpetrator and victim types (Dodd et al., 2023).

CSA in sport garners substantial media attention and public concern which increases pressure on sporting organisations and governing bodies to address the problem (Lonne & Parton, 2014; Mathews, 2017). The mismanagement of CSA in sport has prompted some sporting organisations to conduct internal reviews (Rom et al., 2021), and more powerfully, the government to conduct Royal Commissions into institutional responses to CSA (McClellan et al., 2015; McClellan et al., 2016). These investigative reports produce findings and recommendations which can be then used to attempt to improve upon current handling and prevention strategies. However, no evaluation of the potential impact of investigative reports into CSA in sport has been conducted. It is argued that to elicit large scale change within complex systems, a whole of systems focus is required (Meadows, 2008; Naughton et al., 2024) This view is in direct contrast with peer reviewed research on CSA in sport, which has largely been focused at the lower levels (athletes, coaches etc.) of the CSA in sport system (Dodd et al., 2023). Further, a review by Kaufman et al. (2019) on the recommendations from these Royal Commissions (McClellan et al., 2015; McClellan et al., 2016), has suggested that future approaches should consider the "broader picture" and include wider factors into CSA in sport.

The application of systems thinking methods allow for a whole of system approach in identifying the influences on CSA in sport, the actors involved, and the control and feedback mechanisms that fail. As such, a systems thinking-based approach is required to advance child safeguarding in sport, rather than solutions implemented in isolation from one another (Brackenridge & Rhind, 2014; Owusu-Sekyere et al., 2022). Rasmussen's (1997) Risk Management Framework (RMF), and the associated AcciMap (accident mapping) method have been used extensively in safety critical domains to understand system behaviour, the contribution of multiple stakeholders to adverse events and preventative activities, and to support the design of preventative interventions in a range of contexts (Hulme et al., 2019; Salmon et al., 2020; Salmon, Coventon, & Read, 2022; Waterson et al., 2017). For example, the RMF and AcciMap method has been used to understand CSA enabling factors in sport (Dodd et al., 2023), doping in sport (Naughton et al., 2024), cycling crashes (Cox et al., 2024; Salmon, Naughton, et al., 2022), food supply contamination (Cassano-Piche et al., 2009; Nayak & Waterson, 2016), and outdoor activity incidents (McLean et al., 2022; Salmon et al., 2017). As such, both are appropriate for evaluating the extent to which investigative reports into CSA in sport are system focused.

The purpose of this study was to evaluate the extent to which a systems thinking approach was adopted within investigative reports, on five Australian sports (Swimming, Cricket, Gymnastics, Football, and Tennis). The aims were to identify enabling factors and recommendations from the reports, and to map them to their respective RMF levels within the sport system. A further aim was to determine the extent to which a systems thinking approach had been adopted by evaluating the identified enabling factors and recommendations against the tenets of system thinking (Rasmussen, 1997).

2. Materials and methods

2.1. Design

An analysis was conducted on three investigative reports on CSA in sport for Swimming, Cricket, Gymnastics, Football, and Tennis. The enabling factors to CSA in sport and recommendations from the reports were identified and mapped to the RMF using the accompanying AcciMap method (Rasmussen, 1997). An evaluation of the tenets of systems thinking against the enabling factors and accompanying recommendations from the investigative reports was then undertaken to determine whether a systems thinking approach was being utilised in practice.

2.2. Reports

Three independent CSA in sport investigation reports analysed in this study. The reports were publicly available, encompassing

different sport classifications (individual and team sports), age groups, gender, status (amateur, semi-elite, and elite) and incident types (Table 1).

2.3. Risk management framework, AcciMap, and Assertions

According to Rasmussen's RMF, the overall behaviour of a complex systems is influenced by the decisions and actions made (or not made) by actors at all levels of the system hierarchy (e.g., governments, regulators, company, management, staff, and work) (Ottino, 2003; Rasmussen, 1997). In the present study, the RMF was modified to include an international level to align with the context of CSA in sport, where influences can shape how a particular country manages the risks of CSA in sport. These influences would exemplify international organisations or committees such as the Federation Internationale de football association (FIFA) which presides over all football organisations in the world, and the United Nations Convention on the Rights of the Child (CRC) in which enforcement of these prohibitions lies with both member states and sports bodies (Aine et al., 2022). The inclusion of an international level has been used in previous analyses using the RMF and AcciMap, including road safety (McIlroy et al., 2019), healthcare (Salmon et al., 2021), and running injury (Hulme et al., 2017). A truncated RMF example is presented in Fig. 1, along with examples of actors at each of the hierarchical levels involved in the CSA in sport system.

According to Rasmussen (1997), a system is governed by vertical integration which influences behaviour and safety of that system. Vertical integration is driven by the enactment of control mechanisms at each level in the system promulgating down, and by informative feedback transferring back up the hierarchy (see Fig. 1 (Rasmussen, 1997). These control and feedback mechanisms are used in the system to retain control (Cassano-Piché et al., 2006). For example, Article 3 from the United Nations Convention on the Rights of the Child (CRC) (UNICEF UK, 1989) states:

> Parties ensure that the institutions, services and facilities responsible for the care or protection of children shall conform with the standards established by competent authorities, particularly in the areas of safety, health, in the number and suitability of their staff, as well as competent supervision. (UNICEF UK, 1989, p. 2)

This policy stems from the International influence level, which would then be passed on and incorporated at the Governments and governing bodies level into law or regulation within countries, disseminated at the Regulatory bodies and associations level by sporting organisations to their state/regional bodies, which should then be implemented at the lower levels of the hierarchy. One outcome from the promulgation of this policy should be that coaches are not left unsupervised with athletes or allowing isolation to occur. Both of these enabling factors are commonly identified in CSA incidents (Dodd et al., 2023). If sporting clubs do not have the resources (human or financial) to implement this policy, then this feedback should transfer back up the hierarchy. Whilst this example is purposefully minimalistic to describe vertical integration simply, there would be numerous other enabling factors influencing the effectiveness of this policy, e.g., the governance and leadership in the implementation of this policy.

The AcciMap method is used to support analysts in identifying and presenting the network of contributory factors involved in adverse incidents across the levels of the RMF (see Fig. 2). This method involves the production of a multi-layered diagram in which the identified contributory factors are mapped across their respective level of hierarchy (Branford et al., 2009). It is specifically of use for establishing how factors across sociotechnical systems interact to create an adverse event (Branford et al., 2009).

Rasmussen's RMF attests that there are multiple contributing factors involved in an adverse event (Salmon et al., 2020). This opposes accident-causation theories which focus on reducing the adverse event to a singular cause (Grant et al., 2018). Rather, to fully understand the adverse event, it is in fact the interaction between all system components that contribute to the adverse event, that are of interest (Rasmussen, 1997).

Rasmussen's RMF makes a series of assertions regarding safety and adverse events. These have been adapted for this study to fit the

Table 1
Summary of Investigative reports analysed in the current study.

Title	Authors	Sport	Focus	Investigative process
Change the routine: Report on the Independent Review into Gymnastics in Australia	Rom et al. (2021)	Gymnastics	The culture and practice of Gymnastics in Australia at all levels.	Independent review. Members and former members across the gymnastics community in Australia were engaged, and a high-level evaluation of policy and procedures was undertaken.
Report of Case Study No. 39: The response of football (soccer), cricket and tennis organisations to allegations of child sexual abuse	McClellan et al. (2016)	Football (Soccer), Cricket, and Tennis	To investigate the prevalence of systemic issues in these sports.	Australian Royal Commission held public hearings. Members and former members across these sports were engaged, and an evaluation of organisational responses, policy, practices and procedures was undertaken.
Report of Case Study No. 15: Response of swimming institutions, the Queensland and NSW Offices of the DPP and the Queensland Commission for Children and Young People and Child Guardian to allegations of child sexual abuse by swimming coaches	McClellan et al. (2015)	Swimming	To investigate the prevalence of systemic issues.	Australia Royal Commission held public hearings. Members and former members across swimming were engaged, and an evaluation of organisational responses, policy, practices and procedures was undertaken.

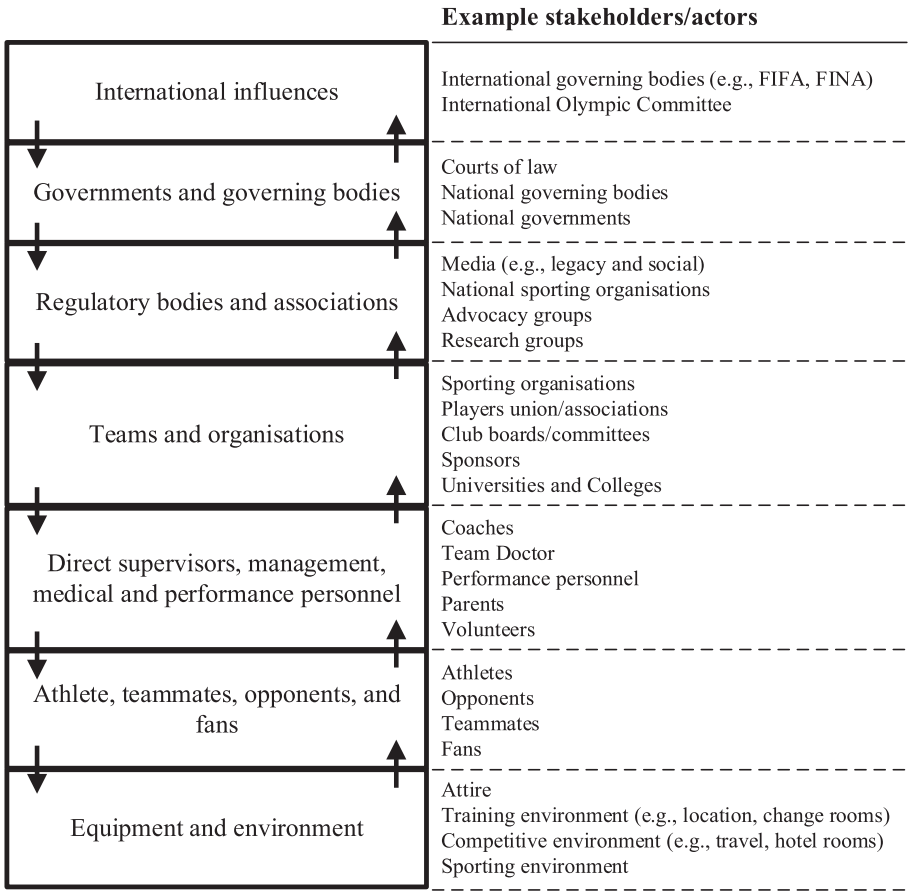


Fig. 1. Adapted Rasmussen's Risk Management Framework (RMF) to Represent the Child Sexual Abuse (CSA) in Sport Context (Dodd et al., 2023). Arrows indicate vertical integration through control and feedback mechanisms.

context of CSA in sport:

1. CSA in sport is an emergent property impacted by the decision and actions of all sport system actors, not just perpetrators, victims, and parents, alone;
2. CSA in sport is a result of multiple enabling factors from across the sport system, not just a single decision or action at the sharp-end (occurrence of CSA);
3. CSA in sport can result from poor vertical integration across levels of sport systems, not just from deficiencies at one level alone;
4. Lack of vertical integration is caused, in part, by a lack of feedback across levels of sport systems;
5. Behaviours within sport systems are not static, they migrate over time and under the influence of various pressures such as workload, financial, societal, and psychological pressures;
6. Migration of behaviour occurs at multiple levels of sport systems;
7. Migration of practices cause sport system defences to degrade and erode gradually over time, not all at once. CSA in sport incidents is caused by a combination of this migration and a triggering event(s).

3. Procedure

3.1. Identifying and mapping enabling factors

Enabling factors were defined as individual, situational, environmental, or systemic antecedent factors that influenced the occurrence of CSA in sport (Supplementary Table 1). The lead author (KD) identified the CSA enabling factors described within each report, and then mapped them onto the appropriate level of the RMF (Dodd et al., 2023). For example, from the report by Rom et al. (2021) the enabling factor *Isolation* was identified as it was created by the perpetrator and in line with its classification; "refers to the victim being isolated with the perpetrator resulting from the training or competitive environment (e.g., individual training, hotel room etc.), or from the perpetrator creating isolation with the victim" (Supplementary Table 1). The isolation factor was then mapped to the RMF level in which it was identified in the reports. For example, Isolation was identified at three levels and as such was mapped to the

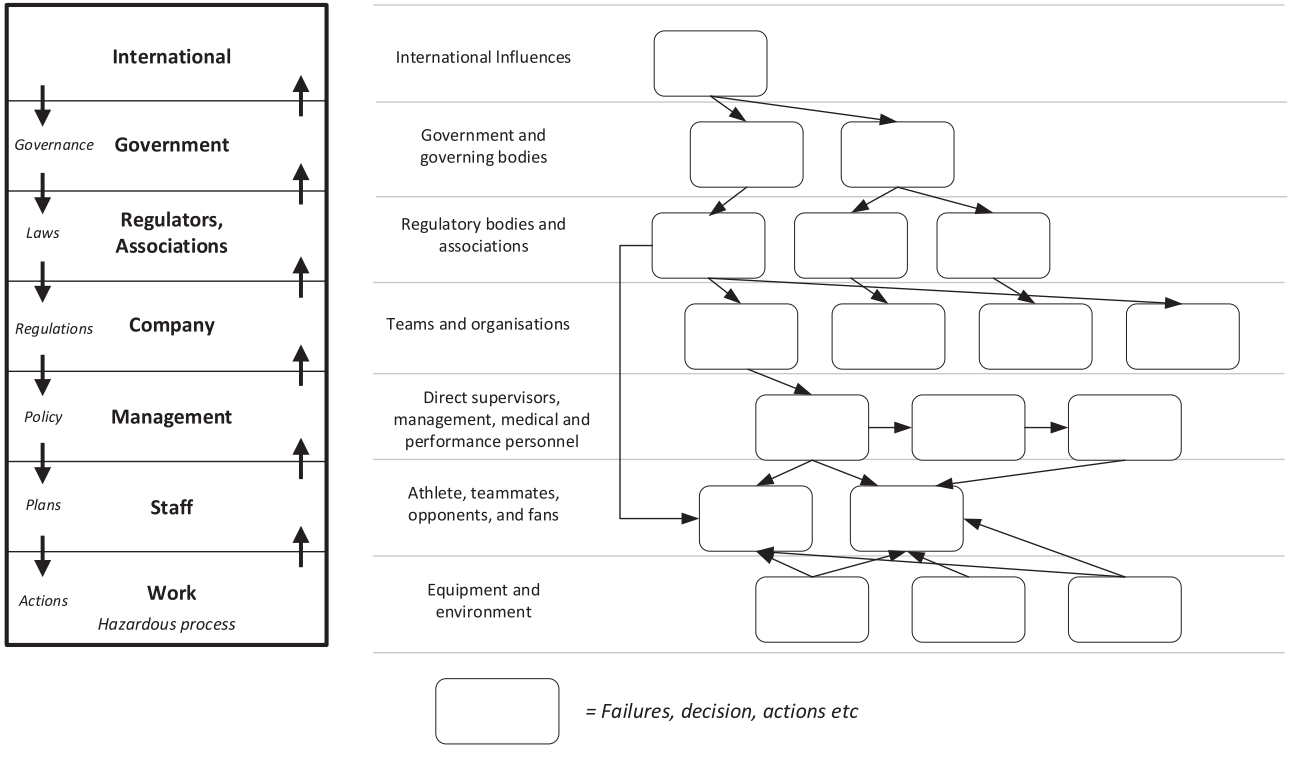


Fig. 2. Rasmussen's Risk Management Framework (RMF) and the Associated AcciMap Technique from Rasmussen (1997) and adapted by Dodd et al. (2023).

Direct supervisors, management, medical and performance personnel, and volunteers; and the Athlete, teammates, opponents, and fans, and Equipment, and environment levels of the RMF.

3.2. Extracting, theming, and mapping report recommendations

The lead author (KD) extracted the recommendations from all reports, assigned them to a theme, and then mapped the recommendation themes onto the level of the RMF at which they will be targeted for implementation For example, the Final Report Recommendations from the Royal Commission (Commonwealth of Australia, 2017) includes the recommendation 6.5 "Child safe standards", subsection (j) "Policies and procedures document how the institution is child safe", was extracted and assigned to the Policy and Procedure theme, as it is in line with its classification; "a set of rules and methods that guide the actions, decisions, and principles of a company or organisation. Policies are general guidelines that align with the company's mission, vision, and values, and outline its plan for tackling an issue" (Supplementary Table 2). This theme was then mapped to the RMF levels in which it was identified at in the reports: Governments and governing bodies, Regulatory bodies and associations, and Teams and organisations. Additionally, the sport in which the recommendation was identified in, was represented via shading on the AcciMap (Fig. 4). A data dictionary describing each of the theme categories for the recommendations is included in Supplementary Table 2.

3.3. Evaluating enabling factors and recommendations

The assertions presented earlier were compared with the findings of the two AcciMaps from the investigative reports. This involved reviewing each enabling factor to determine whether they represented any of the assertions and reviewing each recommendation to determine if they were designed in line with the assertions. For example, Assertion 4 regarding a lack of vertical integration and feedback across the system was assessed against the enabling factors identified.

3.4. Reliability

Inter-rater reliability was assessed through percentage agreement between the first analyst (KD), and a co-author (SM) who independently analysed two randomly selected chapters from the three reports. Initial agreement levels for the identified enabling factors were 100 % for the first chapter, and 77.8 % for the second chapter. In the second chapter, SM identified two enabling factors that were not identified by KD. The two authors met to discuss and agree upon which level of the RMF the identified enabling factors should be allocated to. The recommendations from the reports were explicit and all authors agreed on the identified themes of the report recommendations through discussions. Therefore, inter-rate reliability was not assessed for the recommendations.

4. Results

4.1. Enabling factors

A total of 30 enabling factors were identified from the three reports, mapped to the appropriate levels, and shaded to represent the sport identified in to produce an AcciMap (Fig. 3). Enabling factors were identified at six out of the seven AcciMap levels used in the present study. A data dictionary describing each of the identified enabling factors in Fig. 3 is included in Supplementary Table 1.

There were 13 (21 %) enabling factors identified at the Direct supervisors, management, medical and performance personnel, and volunteers' level, and 12 (19.4 %) enabling factors at the Teams and organisations level. The Regulatory bodies and associations level, and Athlete, teammates, opponents, and fans level each had 11 (17.7 %) enabling factors, with the Governments and governing bodies level containing 10 (16.1 %) enabling factors, and the Equipment, and environment level with 5 (8.1 %). No enabling factors were identified at the International influence level.

A selection of enabling factors was identified across multiple levels of the AcciMap. These included, Reporting/Handling issues (six levels), Awareness (five levels), Isolation, Organisational culture, Organisational recruitment procedures, Governance, Leadership, and Funding (three levels). The enabling factors that were identified in all five sports were Governance, and Policy at the Regulatory bodies and associations level, and Authority and power, Grooming or Coercion, and Isolation at the Direct supervisors, management, medical and performance personnel, and volunteers level. In a further four out of the five sports enabling factors were identified at the Governance, and Policy at the Governments and governing bodies level, and the Organisational recruitment procedures, and Leadership at the Regulatory bodies and associations level.

4.2. Recommendations

The recommendations provided across the three reports were categorised into eleven themes: Education, training, and development; Policy and procedure; Awareness; Representation; Governance; Personnel management; Oversight; Information/reporting services; Cooperation; Compliance; and Legal. A total of 331 recommendations were classified into the 11 themes and mapped to the appropriate level on the AcciMap (see Fig. 4). The AcciMap (Fig. 4) shows the total number of recommendations for each theme, percentage within level, and percentage overall.

The most frequently identified recommendations all reside at the Governments and governing bodies level; Policy and procedures ($n = 42$ representing 12.9 % of all recommendations), Governance ($n = 29$, 8.90 %), and Cooperation ($n = 23$, 7.06 %).

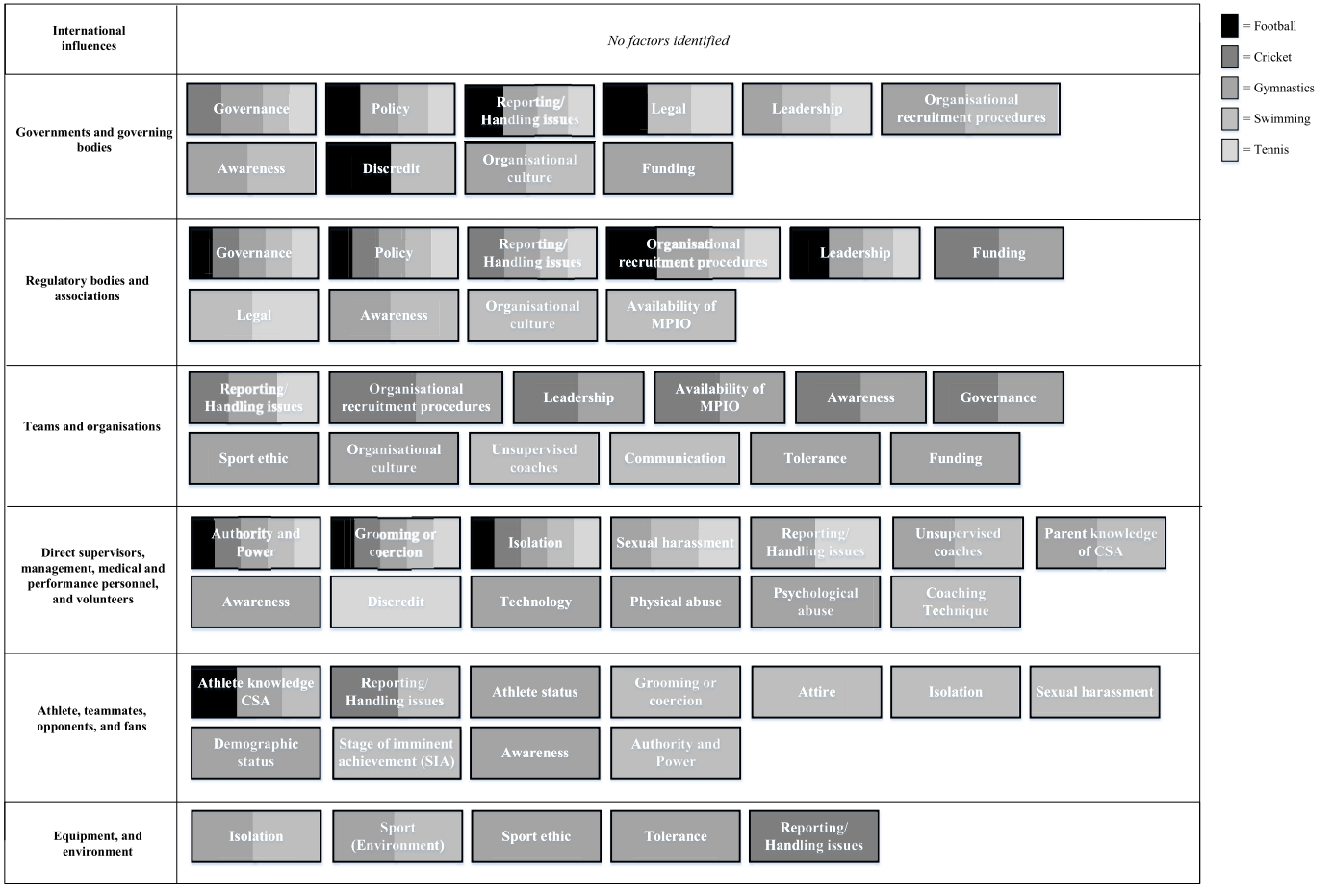


Fig. 3. Identification of enabling factors across AcciMap levels in different sport contexts (from left to right in order of number of sports).

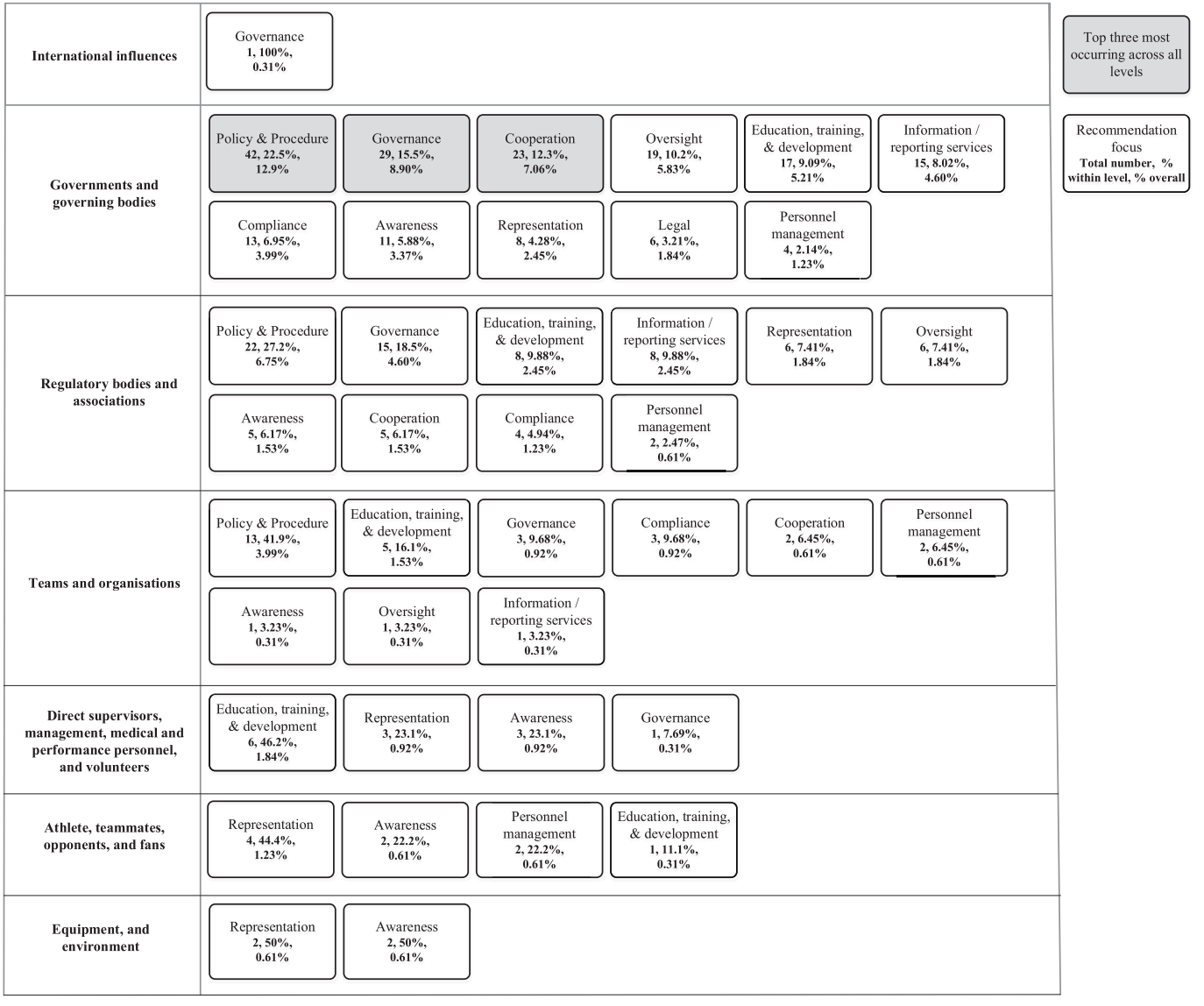


Fig. 4. Frequency and percentage of recommendations across different AcciMap levels (from left to right in order of frequency).

The majority of recommendations were identified at the upper levels of the RMF with 187 (57.4 %) recommendations identified at the Governments and governing bodies level, 81 (24.9 %) recommendations at the Regulatory bodies and associations level, and 31 (9.51 %) recommendations at the Teams and organisations level. At the lower levels of the RMF, 13 (3.99 %) recommendations were identified at the Direct supervisors, management, medical and performance personnel, and volunteers level, 9 (2.76 %) recommendations at the Athlete, teammates, opponents, and fans level, and 4 (1.23 %) recommendations at the Equipment, and environment level. Only 1 (0.31 %) recommendation was identified at the International influence level.

The sole intervention recommended at the International influence level was Governance, Policy and procedure. The most frequently reported recommendations were at the Governments and governing bodies level ($n = 42$, 22.5 %), Regulatory bodies and associations level ($n = 22$, 27.2 %), and Teams and organisations level ($n = 13$, 41.9 %). Education, training, and development ($n = 6$, 46.2 %) was the most reported at the Direct supervisors, management, medical and performance personnel, and volunteers level, with Representation the most reported recommendation at the Athlete, teammates, opponents, and fans level ($n = 4$, 44.4 %) and Representation ($n = 2$, 50 %) and Awareness ($n = 2$, 50 %) equally reported at the Equipment and environment level.

Table 2
Evaluation of Rasmussen's assertions in Child Sexual Abuse (CSA) in sport.

Assertions	Support for assertions: Enabling factors	Support for assertions: Recommendations
1. CSA in sport is an emergent property impacted by the decision and actions of all sport system actors, not just perpetrators, victims, parents, and organisations alone;	Yes, involvement of multiple actors, organisations, and enabling factors across all levels of the safeguarding system were identified.	Yes. Recommendations targeted most actors and organisations across the sport system except in the level of funding required to further increase the effectiveness and reach of implementation of safeguarding policy. The funding focus was post-incident (treatment and cultural gaps).
2. CSA in sport is a result of multiple enabling factors from across the sport system, not just a single decision or action at the sharp-end (incident of CSA);	Yes, multiple enabling factors identified across all levels of the sport system except at the International influence level.	Yes. Recommendations were heavily focused at the levels distal to CSA in sport, with a wide scope of recommendations targeting the identified enabling factors from across the sport system.
3. CSA in sport can result from poor vertical integration across levels of sport systems, not just from deficiencies at one level alone;	Yes, a lack of vertical integration was found to influence operations at the lower levels of the system. For example, no working with children checks allowed perpetrators to operate within the sport system.	Yes. There is a evidence to suggest that vertical integration across the levels of the sport system is in motion with these recommendations targeting higher levels for the implementation of these changes for the lower levels of the system. For example, 90.3 % ($n = 299$) of all recommendations resided at the four levels distal to CSA in sport, with 7.85 % ($n = 26$) located at the levels proximal to CSA in sport.
4. Lack of vertical integration is caused, in part, by lack of feedback across levels of sport systems;	Yes, multiple examples of poor feedback across the levels of the sport system were identified. For example, inadequate CSA Reporting and Handling was identified as a factor to continued CSA by perpetrators.	No. There was a heavy focus on higher level controls with minimal evidence of feedback up through the system. For example, Policy and procedure recommendations accounted for 25.6 % ($n = 84$) of the entire sport system recommendations with Governance recommendations totalling 14.8 % ($n = 49$). Contrarily, feedback mechanisms amounting to 7.25 % ($n = 24$) for Information/reporting services, 6.95 % ($n = 23$) for Representation, and 3.02 % ($n = 10$) for Personnel management, from across the entire sport system.
5. Behaviours within sport systems are not static, they migrate over time and under the influence of various pressures such as workload, financial, societal, and psychological pressures;	Yes, multiple pressures identified. For example, societal pressures were identified in factors such as Authority and power, Unsupervised coaches, Isolation, Grooming or Coercion, Technology, Organisational culture, and Tolerance. For instance, the status of the coach at times afforded the coach opportunity to sexually abuse athletes as the coach's status overrode the public belief that they could offend.	No. The recommendations were not designed to track migration over time, nor where they designed to limit funding, workload, and societal pressures.
6. Migration of behaviour occurs at multiple levels of sport systems;	Yes, migration of Governance from people operating in key Leadership roles, and the relationships / status of perpetrators allowed for an Organisational culture of Tolerance of CSA and coaches to continue working Unsupervised which allowed Grooming or Coercion and Isolation of victim, resulting in CSA.	No. Lack of evidence to suggest alignment of recommendations to address migration of work practices. Majority of recommendations identified focus on managing static factors in the system such as Policy and procedure, and Governance at the levels distal to CSA in sport.
7. Migration of practices cause sport system defences to degrade and erode gradually over time, not all at once. CSA in sport incidents are caused by a combination of this migration and a triggering event(s).	Yes. Reports identified systemic conditions and how they related to CSA. Enabling factors such as funding, reporting/handling issues, human resource availability, leadership, governance, tolerance, legal, discredit, organisational culture, and awareness all influence the degradation of defences.	Recommendations do not fully account for a degrade in system defences over time or the dynamic and evolving methods perpetrators utilise to offend. Recommendations are primarily focused on Policy and procedure, Governance, and Education, training and development.

4.3. Alignment of findings with Rasmussen's Assertions

The evaluation of the report recommendations to the alignment of Rasmussen's assertions on safety and adverse events are presented in Table 2.

5. Discussion

The aim of this study was to assess the extent to which a systems thinking approach has been adopted in CSA in sport investigation reports. The AcciMap method was used to map reported enabling factors to CSA and the recommendations for safeguarding to the relevant levels of the CSA in sport system. The results of this study show enabling factors were identified at all levels of the sport system hierarchy, except the International influence level, and that recommendations were found at all levels of the RMF. Further analysis into the alignment the enabling factors and recommendations with Rasmussen's assertions found that the identified enabling factors are representative of a systems thinking approach, whereas the recommendations only partially represent a systems thinking approach. This suggests that although investigations appear to be adopting a systems thinking lens when identifying enabling factors, the development of recommendations could benefit from guidance around key principles of adverse event causation.

5.1. Enabling Factors to CSA in sport

The findings regarding the enabling factors for CSA in sport are in contrast to the peer-reviewed literature (Dodd et al., 2023). Specifically, in the present study the majority of enabling factors were found at higher levels of the AcciMap, whereas a recent systematic review identified the majority of enabling factors at the perpetrator and victim levels (Dodd et al., 2023). This would suggest that there is a potential reverse research-practice gap whereby systems thinking are being applied in the real world, yet less so in peer reviewed research. This is in contrast to the research practice gap in other scientific disciplines where researchers are applying state-of-the-art theories and methods and practitioners are using older outdated approaches (e.g., Salmon, Coventon, & Read, 2022).

A potential explanation for this finding is that investigators of reports potentially have better access to stakeholders, and may be better resourced with heightened authority to undertake detailed investigations. Academic researchers on the other hand may be working under resource constraints and research ethics conditions may limit their access to relevant stakeholders. The current findings could also be a result of the narrow research focus targeted towards the lower levels of the system in the peer-reviewed literature (Dodd et al., 2023). The identification of enabling factors to CSA in sport across multiple levels suggests that it is an emergent phenomenon influenced by the interactions of the multiple actors and organisations from across the sport system.

The current findings identified a set of common enabling factors that span the investigative reports e.g., Governance, Policy, Authority and power, Grooming or coercion, and Isolation. This suggests that despite the sport, the level played, gender of athletes, whether it is a team or individual sport, several common factors were identified that enable CSA. The presence of a common set of enabling factors across sports, is similar to that found in accident causation across multiple different safety domains (e.g., road transport, hospital settings). For example, Salmon et al. (2020) identified a common causal network based on a meta-analysis of over 5000 contributory factors in accidents. The realisation of a common set of enabling factors to CSA warrants further investigation and suggests that sports could learn from each another when investigating and attempting to prevent CSA. Potential collaborations between sports could initiate a unified approach to incident reporting and analysis for CSA in sport, which has been suggested in other sports integrity areas such as anti-doping (McLean et al., 2023).

Enabling factors including governance, leadership, reporting / handling issues, funding, awareness, policy, legal, organisational recruitment procedures, and organisational culture, where found across the levels distal to CSA in sport (Governments and governing bodies, and Regulatory bodies and associations). For instance, if factors such as governance and leadership are ineffectual at the higher levels then this will influence the effectiveness of policy implementation and reporting processes at the lower levels of the CSA in sport system. The identification of these higher system level enabling factors also provides insight into potential strategies for prevention. The identification of leverage points – places in the system where small change could lead to a large shift in behaviour (Meadows, 2008) would seem critical when attempting to prevent CSA in sport. The analysis suggests that developing prevention interventions for the high-systems level enabling factors would be leverage points that could result in considerable change in the prevalence of CSA in sport. For example, the targeting of Organisational culture at higher levels would impact on other factors such as Report/Handling issues, Tolerance, Authority and power, Awareness etc., at the levels below it.

The current analyses indicate a lack of vertical integration across the levels of the sport system. This is one potentially explanation as to why CSA in sport continues to occur. Enabling factors such as awareness, athlete knowledge of CSA, parent knowledge of CSA, and reporting/handling issues identified at the levels proximal to CSA in sport would suggest that there is a potential failure in informative feedback transferring across the sport system hierarchy (Rasmussen, 1997). An example of this could be an athlete being sexually abused who lacks the knowledge of what constitutes CSA, therefore, does not report the incident and actors at higher levels of the system are unaware of the occurrence. The current results would also suggest that there are inimical barriers at play in this feedback loop, with enabling factors such as organisational culture, tolerance, discrediting, reporting/handling issues, governance, and leadership found throughout the system. These factors would perpetuate the occurrence of CSA in sport and is in line with previous research findings in CSA in sport regarding cultures of silence, and the contriving of its visibility (Johansson, 2022; Nite & Nauright, 2020). Together, these findings suggest that interventions, such as better reporting and learning systems as mentioned already, should focus on the development and implementation of feedback mechanisms for all relevant stakeholders.

Furthermore, the analysis indicates that migration of behaviour and practices could influence the prevalence of CSA in sport. The

concept of migration describes how attitudes and behaviours, operations, and practices shift from safe to unsafe over time due to influences such as financial constraints, human resource availability, leadership, governance, tolerance, sporting success etc. The challenge in the sporting context is ongoing, with the continual mitigation of evolving opportunities and motivations of the perpetrator to offend (Finkelhor, 1984; Sanderson & Weathers, 2020) versus the prevailing preventative programs, accompanied by the already stressed boundaries of the provision of a safe environment (Rasmussen, 1997; Waterson et al., 2017).

The identified enabling factors of Funding, Availability of member protection information officers (MPIO), Policy, Leadership, Governance, Tolerance, and Organisational culture could be influencing systemic practices, behaviours, and operations by surpassing or moving the limits of a safe environment (Rasmussen, 1997; Waterson et al., 2017). For example, many organisations lack the funds and human resources to provide child safe environments which would lead to a failure to implement policy, an unsafe organisational culture, and a potential societal tolerance of CSA incidents due to a lack of leadership and incapacity to govern properly. This creates an extremely complex problem, with not only the boundaries of the safeguarding system being stressed due to an incapacity to implement and govern safeguarding policy, but also in association with the evolving strategies and motivations employed by perpetrators (Cale et al., 2021).

5.2. Recommendations

The findings from the analysis of the recommendations suggest that most were targeted at safeguarding (control) and feedback failures. With 90.3 % of recommendations being mapped to the four highest levels (International influence; Governments and governing bodies; Regulatory bodies and associations; and Teams and organisations) indicates that currently there may be ineffective safeguarding (control) mechanisms preventing CSA in sport. The large distribution of recommendations at the higher levels of the sport system is also in contrast to previous studies that have found a lack of higher-level recommendations in investigative reports (Newnam et al., 2017).

The analysis of report recommendations found a lack of items aiming to enhance feedback and vertical integration in sport systems. In particular, there was a low proportion (17.22 %) of recommendations targeting feedback mechanisms such as, Information/reporting services, Representation, and Personnel management. In addition, there was a lack of recommendations targeting the migration of behaviour, with majority of the recommendations focusing on static factors such as Policy and procedure, and Governance at the levels distal to CSA in sport. These recommendations are not designed to track migration over time or limit the funding, workload, and societal pressures commonly found within the sport system. As such, it can be concluded that the recommendations identified did not fully account for the degradation in defences over time or the dynamic and evolving methods used by perpetrators to offend. This presents an opportunity for new or strengthened recommendations that consider poor feedback, vertical integration, and migration. There also appears to be an opportunity to educate stakeholders on the importance of appropriate feedback mechanisms to support the prevention of CSA.

The most commonly found recommendations were Policy and procedure, Governance, and Cooperation, all of which were mapped to the Government and governing bodies level. This finding suggests that these recommendations targeted the higher levels of the system. In particular, the responsibility of the National Office for Child Safety to oversee the development and implementation of a national strategy to prevent CSA, reporting directly to parliament (Commonwealth of Australia, 2017). This identification of a high leverage point (Meadows, 2008) when creating recommendations would allow for a greater impact and spread of the recommendation across the system. For example, with majority of stakeholders at the lower levels of the sport system are volunteers, time poor, or lacking the capability to implement the recommendations, it would be salient to say that a key leverage point would be in making the implementation process more efficient. This could be through the creation of materials for distribution, more time effective training content and modalities for safeguarding, which do not become a deterrent to stakeholders' continuation in volunteer positions. Based on the current findings, it is the authors contention that the application of a systems thinking approach to child safeguarding is necessary to reduce the occurrence of CSA in sport.

6. Limitations

The current study has potential limitations. First, the small number of investigative reports analysed in the current study is a potential limitation. An issue encountered in the current study was the limited accessibility to investigative reports across sports in Australia. For the small number of organisations that had conducted investigative reports into their handling of CSA in their sport, often did not make these findings public. A second limitation of the study is the specificity of the Australian context, further research will be required to understand the enabling factors and recommendations to CSA in sport within different geographical locations, and cultures. Third, the AcciMap models allows for a static depiction of the current system. CSA in sport is a complex and dynamic system which is constantly changing. For example, perpetrators are evolving their methods in which they can commit CSA in the sporting system, which surpass the preventative mechanisms in place at that point in time. Nonetheless, the AcciMap model is applicable and has provided valuable insights into the enabling factors and report recommendations. In addition, the inclusion of relationships between enabling factors would provide more detailed AcciMaps. However, in the reports, relationships were typically not made explicit as the recommendations incorporated the findings of multiple reports across various sports. Fourth, the authors acknowledge potential sampling bias with the extraction of the enabling factors and recommendations from the investigative reports. Whilst this is prevalent with all secondary data analysis, the authors attempted to mitigated any bias by following criteria for identification of enabling factors with the use of a data dictionary, and inter-rater reliability checks from co-authors against the first authors' extraction of these enabling factors and recommendations from the three investigative reports.

7. Conclusion

This study involved the development of two AcciMaps from three independent investigative reports to identify and present the enabling factors to CSA in sport and the recommendations for CSA prevention from these reports. An examination of the extent to which a systems thinking approach was also undertaken by comparing Rasmussen's assertions against findings of the analysis. In total, 30 enabling factors were mapped across the seven levels of the sport system, which indicates that a systems thinking approach has been adopted when attempting to understand the causes of CSA. The distribution of these enabling factors was in contrast to the peer reviewed literature, where previous research has focused at the levels proximal to CSA in sport. Analysis of the recommendations made in each report indicates that a systems thinking approach has not been applied when developing recommendations to prevent CSA in sport. In particular, the lack of system-based recommendations would suggest that research is critical to assist in developing more effective preventative programs. Future research direction should focus on cross-country comparative studies on differing sporting contexts (male, female, mixed) and type (individual v team) to provide pertinent information for recommendations to influence preventative mechanisms specific to the differing sporting contexts and types. Additionally, analysis on the relationships between enabling factors and the recommendations and whether feedback mechanisms are in place to ascertain the effectiveness of such recommendations and prevention mechanisms. Safeguarding children in sport could be strengthened by a unified reporting, analysis, and learning systems based on systems thinking theory and methods that span sports to improved feedback and subsequently strengthen child safeguarding in sport.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.chiabu.2025.107488.

CRediT authorship contribution statement

Karl Dodd: Writing – original draft, Visualization, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Paul M. Salmon:** Writing – review & editing, Supervision, Conceptualization. **Colin Solomon:** Writing – review & editing, Supervision. **Scott McLean:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization.

Geolocation

The independent investigative reports used in this study are from Australia.

Funding

Karl Dodd was supported by an Australian Government Research Training Program Scholarship.

Declaration of competing interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this study.

Acknowledgements

Nil.

Data availability

Data will be made available on request.

References

Aine, A., Muhonen, J., & Toivonen, V. (2022). Children's right to play sports in a safe and healthy environment. *The International Sports Law Journal.*. https://doi.org/10.1007/s40318-022-00217-2

Brackenridge, C. H., & Rhind, D. (2014). Child protection in sport: Reflections on thirty years of science and activism. *Social Sciences, 3*(3), 326–340. https://doi.org/10.3390/socsci3030326

Branford, K., Hopkins, A., & Naikar, N. (2009). Guidelines for AcciMap analysis. In *Learning from high reliability organisations* (pp. 193–212). CCH Australia Ltd.

Cale, J., Holt, T., Leclerc, B., Singh, S., & Drew, J. (2021). Crime commission processes in child sexual abuse material production and distribution: A systematic review. *Trends and Issues in Crime and Criminal Justice, 617*, 1–22.

Cassano-Piché, A., Vicente, K. J., & Jamieson, G. A. (2006). A sociotechnical systems analysis of the Bse epidemic in the Uk through case study. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 50*(3), 386–390. https://doi.org/10.1177/154193120605000337

Cassano-Piche, A. L., Vicente, K. J., & Jamieson, G. A. (2009). A test of Rasmussen's risk management framework in the food safety domain: BSE in the UK. *Theoretical Issues in Ergonomics Science, 10*(4), 283–304.

Commonwealth of Australia. (2017). Final report recommendations. https://www.childabuseroyalcommission.gov.au/final-report.

Cox, J. A., McLean, S., Hulme, A., Read, G. J., & Salmon, P. M. (2024). An incident reporting and learning system to understand cycling incident causation in Australia: A 12-month implementation of CRIT. *J Safety Science, 171*, Article 106392.

Dodd, K., Solomon, C., Naughton, M., Salmon, P. M., & McLean, S. (2023). What enables child sexual abuse in sport? A systematic review. *Trauma, Violence, & Abuse, 0*(0), 1–15. https://doi.org/10.1177/15248380231190666

Everley, S. (2020). The Child Protection in Sport Unit–Supporting national governing bodies in hearing the voices of children: An evaluation of current practice. *Child Abuse Review, 29*(2), 114–129. https://doi.org/10.1002/car.2615

Finkelhor, D. (1984). *Child sexual abuse: New theory and research*. Free Press.
Fletcher, K. (2021). A systematic review of the relationship between child sexual abuse and substance use issues. *Journal of Child Sexual Abuse, 30*(3), 258–277.
Grant, E., Salmon, P. M., Stevens, N. J., Goode, N., & Read, G. (2018). Back to the future: What do accident causation models tell us about accident prediction? *J Safety Science, 104*, 99–109.
Hartill, M. (2013). Concealment of child sexual abuse in sports [article]. *Quest, 65*(2), 241–254. https://doi.org/10.1080/00336297.2013.773532
Hulme, A., Salmon, P. M., Nielsen, R. O., Read, G. J., & Finch, C. (2017). From control to causation: Validating a 'complex systems model' of running-related injury development and prevention. *Applied Ergonomics, 65*, 345–354.
Hulme, A., Stanton, N. A., Walker, G. H., Waterson, P., & Salmon, P. M. (2019). What do applications of systems thinking accident analysis methods tell us about accident causation? A systematic review of applications between 1990 and 2018. *Safety Science, 117*, 164–183.
Johansson, S. (2022). From policy to practice: Measures against sexual abuse by Swedish sports federations. *Front Sports Act Living, 4*, Article 841653. https://doi.org/10.3389/fspor.2022.841653
Johnson, N., Hanna, K., Novak, J., & Giardino, A. P. (2020). U.S. center for SafeSport: Preventing abuse in sports. *Women in Sport and Physical Activity Journal, 28*(1), 66–71. https://doi.org/10.1123/wspaj.2019-0049
Kaufman, K. L., Erooga, M., Mathews, B., & McConnell, E. (2019). Recommendations for preventing child sexual abuse in youth-serving organizations: Implications from an Australian royal commission review of the literature [article]. *Journal of Interpersonal Violence, 34*(20), 4199–4224. https://doi.org/10.1177/0886260519869239
Lonne, B., & Parton, N. (2014). Portrayals of child abuse scandals in the media in Australia and England: Impacts on practice, policy, and systems. *Child Abuse and Neglect, 38*(5), 822–836.
Mathews, B. (2017). Optimising implementation of reforms to better prevent and respond to child sexual abuse in institutions: Insights from public health, regulatory theory, and Australia's Royal Commission. *Journal of Child Abuse & Neglect, 74*, 86–98. https://doi.org/10.1016/j.chiabu.2017.07.007
McCarthy, M. M., Taylor, P., Norman, R. E., Pezzullo, L., Tucci, J., & Goddard, C. (2016). The lifetime economic and social costs of child maltreatment in Australia. *Children Youth Services Review, 71*, 217–226.
McClellan, P., Fitzgerald, R., & Milroy, H. (2015). *Report of case study no. 15: Response of swimming institutions, the Queensland and NSW offices of the DPP and the Queensland Commission for Children and Young People and Child Guardian to allegations of child sexual abuse by swimming coaches*.
McClellan, P., Milroy, H., & Murray, A. (2016). *Report of case study no. 39: The response of certain football (soccer), cricket and tennis organisations to allegations of child sexual abuse*.
McIlroy, R. C., Plant, K., Hoque, M., Wu, J., Kokwaro, G., Nam, V., & Stanton, N. (2019). Who is responsible for global road safety? A cross-cultural comparison of actor maps. *Accident Analysis & Prevention, 122*, 8–18.
McLean, S., Coventon, L., Finch, C. F., Dallat, C., Carden, T., & Salmon, P. M. (2022). Evaluation of a systems ergonomics-based incident reporting system. *Applied Ergonomics, 100*, Article 103651.
McLean, S., Naughton, M., Kerhervé, H., & Salmon, P. (2023). From anti-doping-I to anti-doping-II: Toward a paradigm shift for doping prevention in sport. *International Journal of Drug Policy, 115*, Article 104019.
Meadows, D. H. (2008). *Thinking in systems: A primer*. Chelsea green publishing.
Naughton, M., Salmon, P. M., Kerherve, H. A., & McLean, S. (2024). Applying a systems thinking lens to anti-doping: A systematic review identifying the contributory factors to doping in sport. *Journal of Sport Sciences*, 1–15.
Nayak, R., & Waterson, P. (2016). 'When food kills': A socio-technical systems analysis of the UK Pennington 1996 and 2005 E. coli O157 outbreak reports. *Safety Science, 86*, 36–47.
Newnam, S., Goode, N., Salmon, P., & Stevenson, M. (2017). Reforming the road freight transportation system using systems thinking: An investigation of coronial inquests in Australia. *Accident Analysis and Prevention, 101*, 28–36.
Nite, C., & Nauright, J. (2020). Examining institutional work that perpetuates abuse in sport organizations. *Sport Management Review, 23*(1), 117–129.
O'Brien, B. S., & Sher, L. (2013). Child sexual abuse and the pathophysiology of suicide in adolescents and adults. *International Journal of Adolescent Medicine and Health, 25*(3), 201–205.
Ottino, J. M. (2003). Complex systems. American Institute of Chemical Engineers. *AICHE Journal, 49*(2), 292.
Owusu-Sekyere, F., Rhind, D., & Hills, L. (2022). Safeguarding culture: Towards a new approach to preventing child maltreatment in sport. *Sport Management Review, 25*(2), 300–322. https://doi.org/10.1080/14413523.2021.1930951
Pankowiak, A., Woessner, M. N., Parent, S., Vertommen, T., Eime, R., Spaaij, R., … Parker, A. G. (2022). Psychological, physical, and sexual violence against children in Australian community sport: Frequency, perpetrator, and victim characteristics. *Journal of Interpersonal Violence, 38*(3–4), Article 8862605221114155. https://doi.org/10.1177/08862605221114155
Rasmussen, J. (1997). Risk management in a dynamic society: A modeling problem. *Safety Science, 27*(2–3), 183–213. https://doi.org/10.1016/S0925-7535(97)00052-0
Rom, N., Aitken, O., & Sanchez, G. (2021). *Change the routine: Report on the independent review into gymnastics in Australia*.
Salmon, P. M., Coventon, L., & Read, G. J. (2022). A systems analysis of work-related violence in hospitals: Stakeholders, contributory factors, and leverage points. *J Safety Science, 156*, Article 105899.
Salmon, P. M., Coventon, L. J., & Read, G. J. (2021). *Understanding and preventing work-related violence in hospital settings: A systems thinking approach. Final report.*.
Salmon, P. M., Goode, N., Taylor, N., Lenné, M. G., Dallat, C. E., & Finch, C. F. (2017). Rasmussen's legacy in the great outdoors: A new incident reporting and learning system for led outdoor activities. *Applied Ergonomics, 59*, 637–648.
Salmon, P. M., Hulme, A., Walker, G. H., Waterson, P., Berber, E., & Stanton, N. A. (2020). The big picture on accident causation: A review, synthesis and meta-analysis of AcciMap studies. *Safety Science, 126*, Article 104650.
Salmon, P. M., Naughton, M., Hulme, A., & McLean, S. (2022). Bicycle crash contributory factors: A systematic review. *Safety Science, 145*, Article 105511. https://doi.org/10.1016/j.ssci.2021.105511
Sanderson, J., & Weathers, M. R. (2019). "Every time someone comes forward, it makes it easier for the next survivor to be heard": Sport as a triggering agent to break the silence of child sexual abuse. *Communication Quarterly, 67*(3), 333–353. https://doi.org/10.1080/01463373.2019.1596141
Sanderson, J., & Weathers, M. R. (2020). Snapchat and child sexual abuse in sport: Protecting child athletes in the social media age [article]. *Sport Management Review, 23*(1), 81–94. https://doi.org/10.1016/j.smr.2019.04.006
Sheldon, C. (2021). Independent review into child sexual abuse in football 1970-2005. https://www.thefa.com/-/media/thefacom-new/files/about-the-fa/sheldon-report/independent-review-into-child-sexual-abuse-in-football-1970-2005.ashx.
Solstad, G. M. (2019). Reporting abuse in sport: A question of power? *European Journal for Sport and Society, 16*(3), 229–246. https://doi.org/10.1080/16138171.2019.1655851
Timon, C. E., Dallam, S. J., Hamilton, M. A., Liu, E., Kang, J. S., Ortiz, A. J., & Gelles, R. J. (2022). Child sexual abuse of elite athletes: Prevalence, perceptions, and mental health. *Journal of Child Sexual Abuse, 31*(6), 672–691. https://doi.org/10.1080/10538712.2022.2100026
UNICEF UK. (1989). United Nations convention on the rights of the child. https://downloads.unicef.org.uk/wp-content/uploads/2010/05/UNCRC_PRESS200910web.pdf?_ga=2.78590034.795419542.1582474737-1972578648.1582474737.
Waterson, P., Jenkins, D. P., Salmon, P. M., & Underwood, P. (2017). 'Remixing Rasmussen': The evolution of Accimaps within systemic accident analysis. *Applied Ergonomics, 59*, 483–503.