

Optimising Anti-Doping Control System in Cycling in France

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Executive summary

Doping occurs in a complex and dynamic environment. Often, the sporting system in which doping occurs comprises multiple hierarchical levels that is challenging to fully elucidate. To date, research in doping has typically focused on athletes and athlete support personnel at the sharp end of this hierarchy rather than the broader systemic factors that contribute to doping. To understand and optimise the behaviour of complex systems (i.e., the anti-doping system), the application of contemporary systems thinking-based methods has been recommended. Such methods allow for analytical modelling to be conducted to understand and identify the numerous interacting factors that influence system behaviour. This enables the identification of opportunities to intervene and optimise the overall system rather than its component parts.

The World Anti-Doping Agency (WADA), through their Social Science Research (SSR) Grants scheme have funded systems thinking-based investigations into doping in sport. In a previous WADA SSR funded project which applied systems thinking-based methods to anti-doping in the football codes in Australia, doping was identified as an emergent property of the broader sports system and leverage points were identified that can exert positive influence and change within the system. The current project was funded as an extension of the Australian football code investigation to apply systems thinking-based methods to understand and optimise the anti-doping system in elite cycling in France. This will enable a direct comparison of anti-doping systems across different sports and different countries and continents. The project was conducted in two phases. In the first phase, a control structure model of the current anti-doping system for cycling in France was developed. This involved adapting a previous control structure for anti-doping in Australian football codes to the French cycling system, using subject matter experts. The second phase applied a risk assessment of the control structure for cycling in France to identify potential control and feedback mechanism failures or inadequacies that may exist within the French anti-doping system.

This research was undertaken to answer the following research questions:

1. Who are the actors (people) and organisations (international organisations, governments) involved in implementing control or anti-doping in elite cycling in France?
2. What are the systemic doping controls currently used in elite cycling in France?
3. What feedback mechanisms enable us to judge how well existing doping controls are working in elite cycling in France?
4. How can we predict failures that will prevent controls from being effective in elite cycling in France?
5. What are stakeholders' perceptions of optimal interventions to address control failures in elite cycling in France?

Summary of key findings

- The control structure currently in place for anti-doping in French cycling contains numerous actors across various hierarchical levels within the system, indicating doping prevention is a shared responsibility for all anti-doping stakeholders.
- Membership of the European Union, dictates the necessity of more stakeholders at higher levels of the control structure that exert influence on the French cycling system, compared to the Australian anti-doping system. For example, organisations such as Union Cycliste Internationale, Union Européenne de Cyclisme, Council of Europe, European College of Sport Science, and European Medicines Agency are present and influence the French cycling system.
- Similar stakeholders were identified at the lower levels of the French cycling STAMP control structure and the Australian football codes STAMP, including athletes, athlete support personnel, coaches, doctors, officials, anti-doping educations, and doping control officers.
- Interventions may be more effective at reducing anti-doping rule violations if targeted at behaviour change across a combination of stakeholders from all levels in the system.
- Education is a key strategy for doping prevention in French cycling, and also Australian football codes, however, there are not currently sufficient mechanisms in place to assess the effectiveness or reach of anti-doping education in both countries.
- A comprehensive risk assessment identified a total of 734 potential failures in the French cycling structure, which included 448 control failures and 286 feedback failures.
- Potential new controls that could strengthen the elite French cycling anti-doping system include broader awareness/education programmes, funding for broader awareness, implementing school education programmes, and the development of an integrated data collection system.
- New feedback mechanisms identified to strengthen the elite French cycling anti-doping system include the development and implementation of an athlete feedback system and mechanisms to assist in understanding the effectiveness and reach of anti-doping education.

Project: Overview

Doping as a complex system

The use of performance enhancing substances (PES) in sport poses risks to athlete health and wellbeing, and violates the spirit of sport (1). The use of prohibited substances or methods, often referred to as ‘doping’ includes the administration, use, or manipulation of substances, synthetic or autologous, with the intention of altering sports performance (1). The effects of doping on performance and subsequent physiological adaptations of taking PES have been well documented (1). Further, the consequences and punishments of doping in sport (2), doping prevention strategies (3), sports management in relation to doping (4), and the perceptions of athletes who have doped (5) have all been reported. Arguments to legalise blood doping have been put forward, with the position that allowing doping to occur would enhance athlete safety (6), a sentiment echoed by the proposed ‘Enhanced Games’ (www.enhanced.org) where athletes are encouraged and provided guidance to take PES and compete.

Doping in sport persists, despite advances in PES detection methods, stringent testing protocols, deterrents, and severe punishments for anti-doping rule violations (ADRV). Education is an important component of anti-doping prevention programmes, moving beyond traditional deterrence and detection-based models (7-9). The WADA review of progress in removing doping from sport revealed that human, wider-environmental, and political factors have a considerable influence on doping in sport (10). Consequently, doping in sport represents a complex and dynamic issue. Further, it is important to acknowledge that prevention programmes should be aimed at changing broader societal norms around doping (11). There is a clear need for novel research practices that aim to understand the wider systemic factors that influence individual athlete behaviours.

The need for a complex systems approach in the anti-doping research context

Given the complexity of doping in sport (12), a ‘complex systems approach’ to understanding a range of systemic issues is required. Traditional research approaches that attempt to understand the intrapersonal determinants of doping behaviours will invariably fall short if the end goal is to prevent athletic malpractices from a population-level perspective. It is critical that lessons learnt from the wider epidemiological, public health, and safety science domains are translated effectively to a sports doping research context. For instance, chronic disease and mental health, once viewed solely as a problem of the individual, are now considered ‘complex systems problems’ requiring consideration of a broader set of societal, organisational, and environmental factors that necessitate alternative scientific approaches. Similarly, the same logic and reasoning should now be applied to doping in sport, an area of sport science research that has been dominated by research applications that reduce down complexity to explicate and justify the beliefs and actions of individual athletes (1). A complex systems approach allows for the mapping of latent factors and systemic determinants of the ‘sports doping system’ whilst also striving to conceptualise and interrogate the dynamic relationships across levels of the sports doping hierarchy. This includes investigating the political and legislative structures and services that enable or inhibit the more salient athletic behaviours observed at the sharp end of the doping system (e.g., the actions of the athletes that are expressive of the symptoms of a deeper underlying cause). It can be concluded that a complex systems approach is needed to take doping prevention further.

Systems ergonomics and the Systems Theoretic Accident Model Processes (STAMP) model

Systems ergonomics refers to the study of ‘sociotechnical systems’, which examines the interactions between people, and a range of organisational, societal, and technological factors that influence their beliefs, decisions, and behaviours (13). Systems ergonomics methods are purpose-built to understand complexity and are gaining popularity in sport (9, 14-16). Specific applications of systems ergonomics methods include domains such as performance (17, 18), injury (19, 20), decision-

making (21), and sport system design and re-design (22, 23). Using systems ergonomics methods to understand the inherent complexity within sport requires a detailed understanding of the interacting and interdependent relationships that exist between system components that shape the overall behaviour of a system (24).

One method that has been applied in sport and anti-doping (9) is the Systems Theoretic Accident Model and Processes (STAMP) method (25). The theoretical basis of STAMP is derived from systems and control theory, and promotes the view that adverse events result from inadequate control structures and deficiencies surrounding the enforcement of safety-related constraints (25). In a sporting context, doping is an emergent and irreducible property that is directly controlled and influenced by policies, procedures, culture, people, and products. STAMP is a suitable approach for mapping systemic factors and processes that underpin doping behaviours and has been applied to doping control structures of Australian football codes (9). Further, STAMP has been used to model the control structures in place to manage concussion in rugby union (26) and running injury (19).

Prospective risk assessment using Systems Theoretic Process Analysis (STPA)

Modelling the control structure of the elite French cycling system allows for a prospective risk analysis to be conducted. The STPA is a proactive risk analysis method that was developed to be used in conjunction with the STAMP control structure to prospectively examine failures in the control and feedback mechanisms present within a system. By applying the STPA risk assessment tool (27) to the modelled French anti-doping control structure, existing controls and feedback mechanisms can be strengthened and new controls and feedback mechanisms can be identified to improve the anti-doping system in elite French cycling.

Project aims and scope

The overarching research aim comprises the following specific questions:

1. Who are the actors and organisations involved in implementing controls for anti-doping in elite cycling in France?
2. What are the systemic controls to doping that are currently in place?
3. What feedback mechanisms enable us to judge how well existing controls are working?
4. How can we predict failures that will prevent controls from being effective?
5. What are the optimal interventions to address control failures?

Project phases

The project included the following two phases:

1. In the first phase, a control structure model of the current anti-doping system for cycling in France was developed using STAMP. This involved adapting a previous control structure for anti-doping in Australian football codes to the French cycling system, using subject matter experts.
2. The second phase applied an STPA to the STAMP control structure for cycling in France to identify potential control and feedback mechanism failures or inadequacies that may exist within the system.

Development of a STAMP Control Structure and STPA prospective risk analysis

Methods

Design

The study included a multi-phase approach to develop and validate a control structure model (for an example, see Figure 1) of anti-doping in French cycling using STAMP. As shown in Figure 2, the control structure model was developed based on data derived from multiple sources, including a previous STAMP analysis of the anti-doping system in football codes in Australia, anti-doping stakeholder websites, policy documents, anti-doping strategies, peer reviewed literature, and subject matter expert (SME) review. A comprehensive risk assessment using the Systems Theoretic Process Analysis (STPA) was applied to identify the range of STAMP control and feedback failures that could occur within the current doping prevention system in cycling in France.

Participants

In this project, nine participants (7 female, 2 male) with experience in anti-doping (9.09 ± 7.05 years) contributed as subject matter experts to develop the STAMP control structure of French cycling. Participants held positions at the French Anti-doping Agency (AFLD) and the National Institute of Sport, Expertise, and Performance (INSEP). Participants held various current and previous roles in anti-doping and sports performance, including leadership roles (Director, Manager), education and prevention, WADA accredited laboratory, WADA communications, research, elite cycling, sport psychology. Two participants declined to provide descriptive demographic data but consented to participate in the study.

STAMP model development

A draft control structure model of the French anti-doping system was developed by the research team based on a previous control structure model of football codes in Australia (9). This included modifying the control structure from an Australian to a French context and including or removing stakeholders, controls and feedbacks. In addition, publicly available sources, including anti-doping stakeholder websites, anti-doping policy documents, anti-doping strategies, media, and peer reviewed literature were used to develop the draft control structure. To accurately reflect the anti-doping system, the STAMP model was adapted to include an international level, which is commonplace in other STAMP analyses (9). Three separate in-person SME workshops were conducted to review and refine the control structure model. The workshops were facilitated by the research team who have extensive experience in conducting workshops for complex system model development and validation purposes (9, 28). The draft control structure model and instructions on how to interpret the model were sent to the participants two weeks prior to the workshops. During the workshop, participants were asked to review each of the hierarchical levels of the control structure model to determine the accuracy of the actors and organisations included in the model, and to identify any missing stakeholders. This involved starting at the international level of the control structure and working down through the levels. Participants were then asked to review each of the controls and feedback mechanisms included in the model to determine their accuracy and to identify any missing control and feedback mechanisms. This involved first starting at the top of the control structure and working down through the control mechanisms, and then back up through the feedback mechanisms. Two members of the research team (MM, SM) then refined the model based on the feedback from the SME reviews. The refined model was sent back out to the workshop participants via email for additional comments, and further revisions were made resulting in a final validated control structure model of anti-doping in French cycling.

The final component of the workshops was obtaining feedback on how the French anti-doping system could be strengthened from a systems thinking perspective. Participants were prompted by the

research team to think about areas of weakness in the current system and devise potential intervention strategies. Participant responses were collected through notetaking during the workshops from the research team.

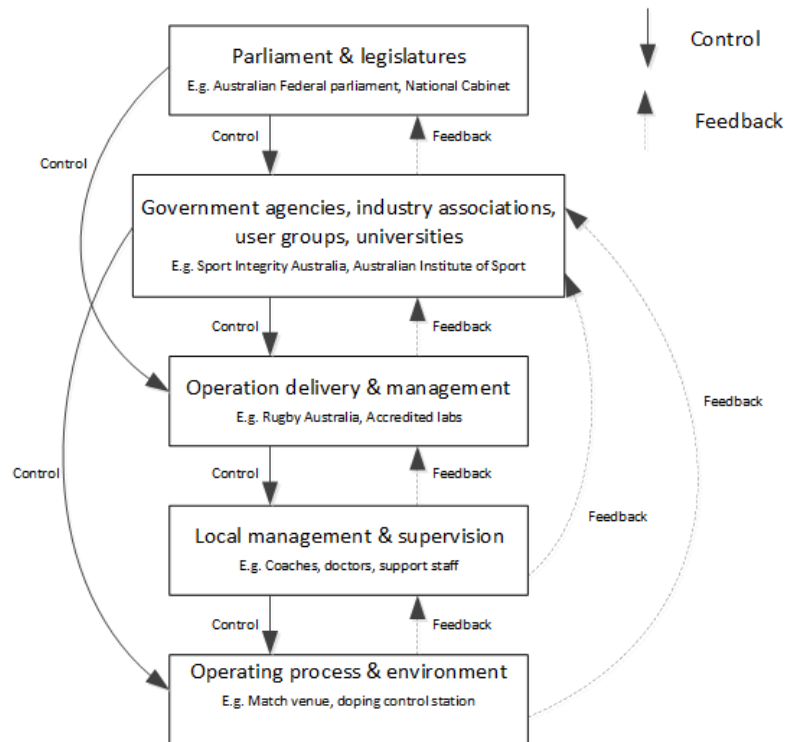


Figure 1. Conceptual control structure of the Australian football codes anti-doping system adopted from Leveson (25) and McLean et al (9). Controls are represented by solid arrows which are enforced down through the system. Feedback, represented by broken arrows represents information being communicated back up the system. Control and feedback mechanisms are passed between levels and across levels. Therefore, each level includes a description of the relevant actors that play a role in system design or operation. Control and feedback mechanisms demonstrate what controls are present in the system and where they are enacted down the system hierarchy and what information about the status of the system is sent back up the hierarchy.

Systems Theoretic Process Analysis (STPA) application

A member of the research team (MM) conducted the STPA, which was subsequently reviewed by two senior researchers on the project (SM & PS). The STPA was adapted from previous anti-doping STPA of Australian Football Codes (9). The STPA involved assessing each control and feedback mechanism from the STAMP control structure for credible risks associated with four failure modes. The STPA considers each control and feedback mechanism identified in the control structure along with an unsafe control actions taxonomy that comprises four failure modes (29):

- 1) Control of feedback action is not provided or followed.
- 2) An unsafe (incorrect) control or feedback action is provided.
- 3) Control or feedback action is provided too early or too late (wrong time or sequence).
- 4) Control or feedback action is stopped too soon or applied too long (for continuous control actions, not discrete ones).

An example of a control and feedback risk identified is provided below:

For the control, ‘compliance reports’ is enacted from the international influence level onto the parliament and legislatures level, and the potential control failures could include:

- 1) Action required but not provided. No compliance reports provided resulting in inability to determine if countries are compliant with WADA code resulting in deterioration of the anti-doping system.
- 2) Unsafe action provided. Inappropriate compliance reports provided meaning incorrect international guidance for anti-doping.
- 3) Wrong timing and/or sequence. Compliance reports provided too late resulting in delayed reporting of compliance activities to inform KPIs, risks, and challenges.
- 4) Control stopped too soon or applied too long. Compliance reports are provided too early, prior to identifying new risks and challenges

For the feedback ‘education attendance data & statistics’ potential failures for the feedback mechanism from the operating equipment, environment, and processes level to the local management and supervision level could include:

- 1) Action required but not provided. No education attendance data provided resulting in an inability to determine who is attending education and compliant with current education requirements.
- 2) Unsafe action provided. Inaccurate education attendance data provided leading to an inaccurate understanding of who has been attending education.
- 3) Wrong timing and/or sequence. Education attendance data provided too late to accurately capture stakeholders who attended.
- 4) Feedback stopped too soon or applied too long. Education attendance data recording stopped too soon, and attendees are not recorded leading to them being viewed as having not received anti-doping education.

Results

Validation of the STAMP Control Structure model

The STAMP model validation process is presented in Figure 2. Subject matter expert feedback was used to refine the model by adding or removing actors, controls, and feedback mechanisms.

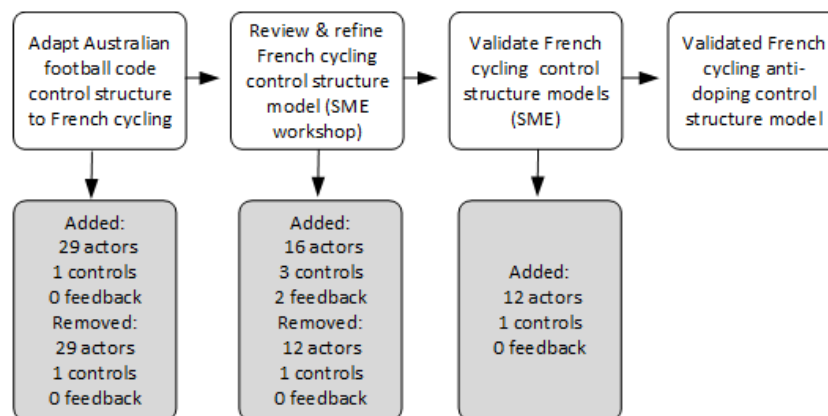


Figure 2. The STAMP model validation process showing the development and refinement of actors, controls, and feedback mechanisms identified by the SMEs at each review phase.

STAMP model

The validated control structure of French cycling is presented in Figure 3. The model presents the actors involved at each level, as well as the control and feedback mechanisms. The control mechanisms are indicated by the labels shown adjacent to the solid arrows propagating down through the hierarchy whereas the feedback mechanisms are represented by the labels adjacent to the dashed arrows propagating up through the hierarchy. A total of 132 actors, 115 control mechanisms, and 77 feedback mechanisms that are responsible for the performance of the anti-doping system in elite French cycling were identified.

At the international level, there were 28 actors identified that exert influence on actors at all levels of the elite French cycling anti-doping system hierarchy through several control mechanisms, such as Union Cycliste Internationale, WADA, and European Medicines Agency. Control mechanisms ($n = 37$) included WADA International Standards, Reasoned Decisions (Court of Arbitration for Sport), compliance reports, the WADA code, WADA ethics, and WADA policy and procedures, among others (Figure 3). Feedback mechanisms used in the French cycling anti-doping system to provide information to the international actors ($n = 20$) include auditing, research reports and findings, and investigation reporting, among others (Figure 3).

At the parliamentary level, there were eight actors identified who impose seven controls on level two actors (e.g., Government agencies, industry associations), including Congress of the French Parliament, Sports Ministry, and State councils. Control mechanisms included advocacy, accreditation, testing and collection, substance information, among others. Feedback mechanisms provided to level one actors ($n = 13$) from lower levels in the system included advocacy, research reports and findings, and sanction data and statistics, among others (Figure 3).

At the Government agencies, industry associations, user groups, courts, and universities level, 26 actors including French National Olympic and Paralympic Sports Committee, French Accreditation Committee (COFRAC), and the French sports code, among others, were identified who impose 36 controls across level three, level four, and level five actors. Controls identified include the French national anti-doping policy, memorandums of understanding, and compliance monitoring, among others. Feedback mechanisms that provide information to the level two actors ($n = 23$) include audit results, therapeutic use exemption (TUE) applications, and compliance activities, among others (Figure 3).

At the operational delivery and management level, 20 actors including Medical Antennas for the Prevention of Doping, Maison Regionale de la Performance, and local government, among others, who exert 25 controls across level four and level five actors were identified. Controls identified include training policies and procedures, funding / resource allocation, and ADRV information, among others (Figure 3). Feedback mechanisms responsible for providing information to the level three actors ($n = 17$) include the controlled treatment register, policy complaints, and education auditing, among others (Figure 3).

At the local management and supervision level, 25 actors were identified, including *soigneur*, director sportif, and race officials, among others, who impose 10 controls over level five actors. Controls identified include doping control, education resources, and surveillance, among others. Feedback mechanisms that provide information to the level four actors ($n = 4$) include integrity complaints, education attendance data and statistics, evaluation, and social controls (Figure 3).

At the operating equipment, environment, and processes level there were 25 actors/equipment/environmental components identified, including chaperones, doping control stations, and athletes. Feedback mechanisms from this level propagate up to actors at level four, level

three, level two, level one, and international influences and include international governing association's whereabouts, auditing, and whistleblowing (Figure 3).

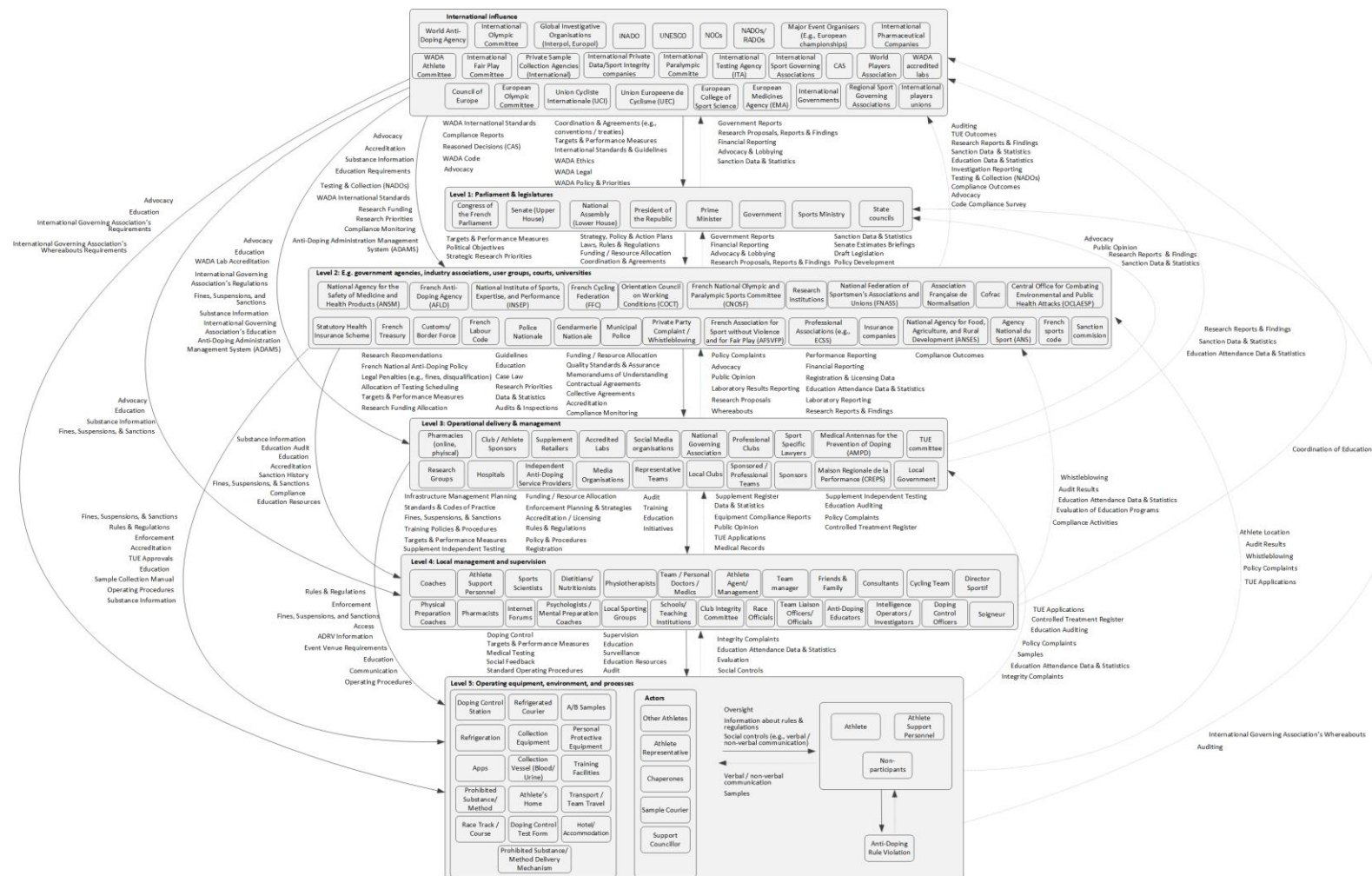


Figure 3. STAMP Control Structure of doping prevention in French Cycling

Systems Theoretic Process Analysis (STPA)

A total of 734 risks were identified from the STPA, consisting of 448 control risks (Appendix 1) and 286 feedback risks (Appendix 2). The 448 control risks originated from each of the four failure modes, with 112 risks identified per failure mode. In contrast, 73 feedback risks originated from the failure modes '1: Feedback action is not provided or followed' and '3: Feedback action is provided too early or too late (wrong time or sequence)', respectively, while 70 risks originated from the failure modes '2: An unsafe (incorrect) feedback action was provided', and '4: Feedback action is stopped too soon or applied too long', respectively. Example control and feedback failures taken from various levels of the STAMP control structure are presented in Table 1 and Table 2.

Identification of new control and feedback mechanisms

Six new control and feedback mechanisms were identified by SME for improving the anti-doping system in elite French cycling. The new controls identified include:

- 1) broader awareness/education programmes that reach beyond the typical focus of athlete and athlete support personnel to broader systemic stakeholders such as media, sponsors, and police, among more,
- 2) funding for broader awareness to provide broader anti-doping efforts to enable new programmes beyond the current clean sport initiatives, a key strategy could be to collaborate with sporting and commercial partners around their roles in clean sport,
- 3) school education programmes to begin educating regarding anti-doping and clean sport at school levels across France, which would target students, coaches, and sports administrators in schools to engage and educate at different age levels and stages of athletic development,
- 4) integrated data collection system that gathers, manages, and analyses data from various sources to support anti-doping efforts, which would streamline communication, testing, and intelligence-sharing to enhance efficiency and effectiveness of anti-doping programmes.

The two feedback mechanisms identified were:

- 1) an athlete feedback system which enables continuous communication between athletes and stakeholders at every step to increase the awareness of stakeholders and enable timely feedback from athletes,
- 2) education effectiveness providing an understanding of the impact that current anti-doping education has on clean sport behaviours.

Table 1. Example control failures taken from various levels of the STAMP control structure of elite French cycling

From	To	Control	Action required but not provided	Unsafe action provided	Incorrect/timing order	Stopped too soon/applied too long
International influence	Parliament and legislatures	WADA Code	No unified approach to anti-doping provided resulting in a lack of guidance to countries and a weaker anti-doping system	Inappropriate code provided resulting in the wrong anti-doping policy, rules and regulations for anti-doping	Wada code provided too late meaning that it is not followed prior to communicating it	WADA code applied too long without updates resulting in outdated content
Parliament and legislatures	Government agencies	Funding/resource allocation	Funding and resources not allocated to anti-doping practices and detection methods aren't implemented	Funding/resource allocation is not adequate to sufficiently address ADRVs	Funding provided too late resulting in a lack of funding for testing to address ADRVs during a set period	Funding and resource allocation stopped too soon resulting in the cessation of work
Government agencies	Operational deliv & management	Compliance monitoring	No compliance monitoring undertaken resulting in a lack of ability to determine compliance	Insufficient compliance monitoring provided resulting in inability to detect non-compliance	Compliance monitoring provided too late resulting in delayed monitoring of compliance activities to inform KPIs, risks, and challenges	Compliance monitoring is provided too early prior to identifying new risks and challenges
Local management & supervision	Operating process & environment	Medical testing	No medical testing provided resulting in no knowledge of athlete medical status	Inappropriate medical testing provided resulting in incorrect knowledge of athlete medical status	Medical testing being undertaken too late resulting in missing a medical condition that would otherwise have been captured	Medical testing is stopped too early and medical issues are missed resulting in worsening outcomes

Table 2. Example feedback failures taken from various levels of the STAMP control structure of elite French cycling

From	To	Feedback	Action required but not provided	Unsafe action provided	Incorrect/timing order	Stopped too soon/applied too long
Operating process & environment	Local management & supervision	Integrity complaints	No integrity complaints provided resulting in an inability to determine if stakeholders are acting with integrity	Inappropriate integrity complaints provisions resulting in an inability to detect integrity issues	Integrity complaints provided too late to detect and resolve integrity issues leading to worsening outcomes	Integrity complaints applied for too long that they are no longer valid
Local management & supervision	Operational delivery & management	Medical records	No medical records provided resulting in a lack of information being provided as to the current health state of the athlete	Inaccurate medical records provided resulting in a poor understanding of athletes current and past medical needs and poorer health outcomes	Medical records provided too late resulting in an inaccurate medical history and current medical needs	Medical records are applied too long resulting in out-of-date records and guidance used to make medical decisions
Operational delivery & management	Government agencies	Education attendance data	No education attendance data provided resulting in an inability to determine who is attending education and compliant with current education requirements	Inaccurate education attendance data provided leading to an inaccurate understanding of who has been attending education	Education attendance data provided too late to accurately capture stakeholders who attended	Education attendance data recording stopped too soon, and attendees are not recorded leading to them being viewed as uneducated
Government agencies	Parliament & legislatures	Research proposals, reports, and findings	No research proposals, reports, and findings provided so new research is not undertaken, research findings are not communicated, and new ideas aren't introduced and tested	Inaccurate research proposals, reports and findings provided leading to stakeholders not being able to determine changing trends or conditions	Research proposals, reports, and findings are provided too late to influence policy changes and outcomes for stakeholders	Research proposals, reports, and findings stopped too soon leading to an inability to influence current practice and a gap in capacity

Discussion

The French cycling anti-doping control structure demonstrates the complexity of the current anti-doping system through the identification of numerous actors that share responsibility for anti-doping and multiple control and feedback mechanisms. Further, the control structure may be used as an investigatory tool to facilitate the identification of interacting networks of control and feedback mechanism inadequacies, and the network of actors involved in an ADRV within elite cycling in France.

The French cycling anti-doping control structure shares similarities with the previously modelled control structure for Australian football codes (9). For example, the operating process and environment level of the model include similar actors and tasks in the operating environment, with the primary differences being from sport-specific actors and processes, such as racetrack / course for cycling and match venues for football codes. The parallels between the two control structure models demonstrate that regardless of the country and sport, doping is complex, and that preventing doping requires coordination across numerous stakeholders. Furthermore, the similarities between the lower levels of the two control structures, highlight that despite the current approach of targeting actors at the sharp end of the system (e.g., education; detect and deterrence), doping in sport remains. Consequently, adopting a wider view of the system may be beneficial and targeting interventions at stakeholders who are positioned higher in the system (e.g., governing bodies; policy makers) to enact systemic change in behaviours that propagate down through the elite French cycling system may be warranted. For example, developing targeted educational materials to assist stakeholders that are at higher levels (e.g., executives, directors) in the system may result in changes in regulation and policy that influence lower levels (e.g., athletes, coaches) of the anti-doping system.

The elite cycling in France control structure identified many actors at the international level who exert influence throughout the system. Actors at the international influence level may introduce additional complexity to the system, including the introduction of siloes between stakeholders. For example, athletes are required to navigate the requirements of global, international governing bodies such as Union Cycliste Internationale (UCI) whilst also conforming to the European governing body, Union Européenne de Cyclisme (UEC). Further, a function of more actors present at the international level is an increase in respective controls and feedback mechanisms that propagate throughout the anti-doping system. The increased information flow throughout the system highlights the need to ensure appropriate control and feedback mechanisms are developed to enable the optimal functioning of the system. The international influence level of the French cycling control structure contrasts with the Australian Football Codes control structure, which consists of far fewer stakeholders due to the absence of the European-based influences. Thus, highlighting the need for improved coordination of intra-stakeholder information sharing to allow for effective transfer of pertinent information related to anti-doping between stakeholders in European countries.

Opportunities to strengthen the control structure were identified. Currently, education targeted towards athletes and athlete support personnel is used as a prominent strategy in reducing ADRVs (30, 31). However, in the elite cycling in France system, it appears stakeholders are largely unaware of how education interventions are working and whether the educational packages being delivered are translating to reductions in ADRVs. By improving the controls and feedback mechanisms pertinent to anti-doping education, the information gathered may inform stakeholders' ability to refine and optimise anti-doping materials, delivery, and strategies that are currently being employed. For example, developing an athlete feedback system which enables continuous communication between athletes and stakeholders at every step within the system to increase the awareness of stakeholders and enable timely feedback from athletes would be prudent. Consequently, a function of increased control and feedback mechanisms may be greater awareness of education efforts and an increased ability to avoid ADRVs by individuals and organisations. Therefore, targeting anti-doping education and awareness campaigns at a broader range of stakeholders, often from higher levels of the elite French

cycling system, such as media, sponsors, and police should be prioritised to create more system-wide awareness and culture of clean sport.

The increase in feedback and controls within the French cycling control structure will result in the generation of better information and data being communicated through the system. Consequently, developing a centralised, integrated data collection system that gathers, manages, and analyses data from various sources to support anti-doping efforts would be beneficial. By streamlining communication, data pertaining to testing, and intelligence-sharing into a centralised system, evaluating the efficiency and effectiveness of anti-doping programmes may be possible. A centralised database would allow for critical evaluation of data pertaining to anti-doping to guide and inform decision-making regarding future education materials and policy. For example, introducing a feedback mechanism within the system to capture education effectiveness could help to provide an understanding of the impact that current anti-doping education has on clean sport behaviours.

The SMEs suggested that the French anti-doping system could be further strengthened by funding the extension of anti-doping education to target younger athletes and students across France. For example, the introduction of school-based anti-doping education and clean sport programmes may equip young and emerging athletes, as well as the general population, with a greater understanding of how their behaviour can foster clean sport. By raising awareness and providing education earlier in an athlete's career, there may be an opportunity to equip athletes with knowledge to avoid instances of unintentional doping and position athletes to be resilient if exposed to doping or unsafe sporting behaviours in the future. Furthermore, a function of providing anti-doping awareness and education to school students, not just athletes and relevant coaches and support staff, may allow for a shift in attitudes towards doping in sport, from a broader, societal view.

In safety science, there has been a recent shift on the views of safety and adverse events. The traditional view was focussed on what went wrong, whereas the new view has shifted to an additional focus of what went right (32). A similar paradigm shift in the way anti-doping is viewed may allow for the identification of what interactions and adjustments facilitate clean sport and not committing an ADRV, rather than focusing on what behaviours were undertaken that led to an ADRV. An example of this shift in thinking would be that the previous definition of doping suggests that there are as few ADRVs committed as possible, whereas the new perspective would envision as many actors in the anti-doping system as possible doing the right thing. The view of how doping is managed could also be adapted, from a reactive model that responds to incidents of doping to a proactive model, that continuously anticipates developments and events which prevent and enable doping. A shift in how the human factor in doping management is viewed could also be beneficial, progressing from the lens that athletes and support personnel are predominantly seen as the liability or hazard towards a view that identifies actors in the anti-doping system as a resource necessary for system flexibility and resilience. The approach to doping investigations could also evolve from the standpoint of investigating ADRVs to identify the failures and malfunctions that caused the incident, to investigating how things usually go right, and using the identified factors as a basis for explaining how things occasionally go wrong. Finally, the approach to conducting risk assessments could also evolve, from the retrospective investigation of identifying contributory factors to proactively assessing risk and understanding the conditions where individual performance variability can become difficult or impossible to monitor and control.

Analysis of the control and feedback mechanisms within the current French and Australian anti-doping systems indicates a reactive rather than proactive structure (9, 33). Currently, much of the control structure is geared towards detecting doping once it occurs and punishing athletes as a deterrent to future ADRVs. Within safety science, 'leading indicators' are often used to help understand and predict adverse events, allowing proactive intervention to prevent the events from occurring (34). Adopting an approach that uses leading indicators in a doping context will allow for

the proactive identification of issues before they arise and in turn, enhanced prevention of ADRVs. Currently, leading indicators are prominent at lower levels in the system, with instances of injury, career instability, and form slumps all being recognised as potential pre-cursors to doping (5, 15). However, the identification of leading indicators that are systemic in nature and higher in the system should be encouraged. For instance, a change in the funding model for a particular sport based on success/performance may be a prominent indicator for doping, as stakeholders within the system may be drawn to performance enhancement. By developing and implementing a leading set of indicators for doping in French cycling, additional feedback mechanisms could be gathered to provide useful information and enable proactive action to be taken. However, challenges associated with the implementation of leading indicators would arise when considering who in the system would be responsible for their monitoring and reporting. Nonetheless, taking a proactive approach to identifying and deterring doping behaviours is a prudent next step.

Despite the strengths of STAMP modelling and STPA, this project was not without limitations. First, the STPA enables the proactive identification of control and feedback failures across the French cycling system however, STPA does not account for emergent risks or failures that may occur when control failures interact with one another. Second, the small sample size of SMEs that participated in the model building process, and the subjectivity of the analysis relies on the participants insights. However, the number of participants within this project is similar to other STAMP analyses (9, 35). Finally, the grouping of actors at the various levels does not account for the weighting or level of influence of the actors, or the identification of which controls and feedbacks relate to specific actors, which must be acknowledged. Although the model was agreed upon by the SMEs, it remains difficult to capture the true complexity inherent within the system. Nonetheless, the validated STAMP model is applicable and provides valuable insights into the structure and functioning of the anti-doping system for elite cycling in France.

Conclusion

The control structure model demonstrates the inherent complexity of the French cycling anti-doping system. The international level of the model highlights that there are many actors exerting influencing throughout the system and in order to effectively manage the coordination of anti-doping information, the development of appropriate communication channels may help intra- and inter-organisational communication. Education has been identified as a prominent strategy to deter doping in sport, yet there are not sufficient controls and mechanisms in place to evaluate the effectiveness of anti-doping education. Thus, improving control and feedback mechanisms throughout the system may help to evaluate how education is influencing anti-doping behaviours as well as guiding future education efforts. A paradigm shift in how doping and approaches to doping are viewed, similar to the approaches taken in safety science, may be a prudent next step to start elucidating more information around what is going right in the current anti-doping system.

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Appendices

Appendix 1. STPA of the controls identified in the STAMP control structure model						
From	To	Control	Action required but not provided	Unsafe action provided	Incorrect/timing order	Stopped too soon/applied too long
International influence	Parliament & legislatures	Compliance reports	No compliance reports provided resulting in inability to determine if countries are compliant with WADA code resulting in deterioration of the anti-doping system	Inappropriate compliance reports provided meaning incorrect international guidance for anti-doping	Compliance reports provided too late resulting in delayed reporting of compliance activities to inform KPIs, risks, and challenges	Compliance reports are provided too early prior to identifying new risks and challenges
International influence	Parliament & legislatures	Coordination & agreements	No regulations for anti-doping being able to be developed based on agreement with WADA	Inappropriate agreements provided on anti-doping, meaning a lack of international guidance	Unified or coordinated approach to anti-doping is communicated too late meaning there is no unified approach	Coordination's and agreements are applied too long resulting in outdated approaches
International influence	Parliament & legislatures	International standards & guidelines	No standards provided meaning a lack of congruency with international best practice resulting in a weaker anti-doping system	Inappropriate international standards and guideline meaning incorrect guidance provided	Standards and guidelines communicated too late meaning they are not initially followed	Standards and guidelines applied too long resulting in outdated guidance
International influence	Parliament & legislatures	Reasoned decisions (CAS)	Reasoned decisions are not provided leaving the rationale for anti-doping sanctions unclear and weakening deterrence	Inappropriate reasoned decision made meaning incorrect decisions	Reasoned decisions provided too soon before appropriate evidence is collected	Reasoned decisions are applied too long resulting in outdated approaches
International influence	Parliament & legislatures	Targets & performance measures	No clear guidance on if performance against the code is being met resulting in poor performance	Inappropriate targets and performance measures provided resulting in incorrect guidance on acceptable international standards	Targets and performance measures are provided too late meaning they are not followed initially	Targets and performance measures are stopped too soon and performance declines
International influence	Parliament & legislatures	WADA Code	No unified approach to anti-doping provided resulting in a lack of guidance to countries and a weaker anti-doping system	Inappropriate code provided resulting in the wrong anti-doping policy, rules and	Wada code provided too late meaning that it is not followed prior to communicating it	WADA code applied too long without updates resulting in outdated content

				regulations for anti-doping		
International influence	Parliament & legislatures	WADA Ethics	No ethical framework with which to guide decision-making resulting in poorer decisions	Inappropriate ethics provided resulting in incorrect international guidance for ethical standards	WADA ethics are provided too late meaning that they are not followed prior to communicating them	WADA ethics applied too long resulting in outdated ethical procedures
International influence	Parliament & legislatures	WADA International standards	No unified approach to anti-doping provided resulting in a lack of guidance to countries and a weaker anti-doping system	Inappropriate standards provided meaning incorrect international guidance for anti-doping	Standards are provided too early	Standards applied too long resulting in outdated guidance
International influence	Parliament & legislatures	WADA Legal	No legal framework with which to guide decision-making resulting in poorer decisions	Laws, rules, and regulations are inappropriate for ADRVs in France	Laws, rules, and regulations are provided too late resulting in organisations not following up-to-date legal guidance	Laws are applied too long resulting in the application of unlawful guidance
International influence	Parliament & legislatures	WADA Policy & procedures	No unified approach to anti-doping provided resulting in a lack of guidance to countries and a weaker anti-doping system	Incorrect policy and procedures provided resulting in the wrong guidance for ADRVs	Policy and procedures provided too late resulting in them being out-of-date when they are applied	Policies and procedures are stopped too soon resulting in the following of inappropriate policies and procedures
International influence	Parliament & legislatures	Advocacy	No advocacy for athletes occurs resulting in decisions and legislation made that do not consider the needs of the athlete	No advocacy for athletes results in inappropriate decisions made regarding the needs of the athlete	Advocacy for athletes does not occur until decisions and legislation is already made resulting in the needs of the athlete not being considered or met	Advocacy for athletes finishes before relevant policy and legislation is developed
Parliament & legislatures	Government agencies	Coordination & agreements	No coordination or agreements provided meaning no unified approach to anti-doping	Inappropriate agreements provided on anti-doping a meaning a lack of parliamentary guidance	Agreements provided too late resulting in older agreements being relied on which may be out-of-date	Agreements applied for too long resulting in outdated guidance
Parliament & legislatures	Government agencies	Funding/resource allocation	Funding and resources not allocated to anti-doping practices and detection methods aren't implemented	Funding/resource allocation is not adequate to sufficiently address ADRVs	Funding provided too late resulting in a lack of funding for testing to address ADRVs during a set period	Funding and resource allocation stopped too soon resulting in the cessation of work

Parliament & legislatures	Government agencies	Laws, rules, & regulations	Legal frameworks not in place for government anti-doping agencies resulting in illegal practices	Laws, rules, and regulations inappropriate for ADRVs	Laws, rules, and regulations are provided too late resulting in organisations not following up-to-date legal guidance	Laws, rules, and regulations are applied for too long resulting in the application of unlawful guidance
Parliament & legislatures	Government agencies	Political objectives	No political objectives provided resulting in a lack of policy on anti-doping	Inappropriate political objectives provided resulting in the incorrect policy development for anti-doping	Political objectives being provided too late resulting in inappropriate policy development that meets the current political objectives	Political objectives are stopped too soon resulting in misguided approaches that don't meet the current objectives
Parliament & legislatures	Government agencies	Strategic research priorities	No strategic research priorities provided resulting in lack of guidance for research that is required	Incorrect research priorities provided regarding anti-doping	Research priorities being prioritised too late, resulting in a lack of appropriate policy provided that meets required current political objectives	Research priorities are applied too long and are no longer current, resulting in outdated approaches being implemented
Parliament & legislatures	Government agencies	Strategy, policy, actions plans	No strategy, policy, procedures, and action plans provided meaning no guidance for governmental agencies	Inappropriate strategy, policy, and action plans provided, resulting in incorrect guidance for anti-doping agencies	Delayed strategy, policy, action plans resulting in out-of-date guidance being followed by anti-doping agencies	Strategy, policy, and action plans are stopped too soon and there is a lack of guidance in decision-making
Parliament & legislatures	Government agencies	Targets & performance measures	No targets and performance measures provided meaning that targets and performance are unknown	Inappropriate targets and performance measures provided, resulting in incorrect guidance on acceptable standards	Targets and performance measures are provided too late meaning they are not followed initially	Targets and performance measures are stopped too soon and performance declines
Government agencies	Operational delivery & management	Accreditation	No accreditation provided resulting in no standardised qualifications to perform activities	Inappropriate accreditation provided meaning incorrect qualifications to perform activities	Accreditation being provided too late resulting in out-of-date qualifications being relied upon to perform activities	Accreditation stopped too short resulting in operational delivery ceasing before it should have

Government agencies	Operational delivery & management	Allocation of testing scheduling	No testing schedule allocated meaning no testing takes place	Inappropriate testing schedule allocated provided meaning testing is insufficient	Testing schedule being provided too late resulting in athletes not being tested and testing being insufficient	Testing schedule allocation being stopped too soon resulting in athletes not being tested and testing being insufficient
Government agencies	Operational delivery & management	Audits & inspections	No audits and inspections carried out resulting in doping practices	Inappropriate audits and inspections provided resulting in doping practices	Audits and inspections not being undertaken on time resulting in inefficient anti-doping practices and testing	Audits and inspections stopped too soon resulting in inappropriate practices not being detected and inefficient anti-doping
Government agencies	Operational delivery & management	French National Anti-doping Policy	No anti-doping policy provided resulting in no policy for anti-doping	Inappropriate policy provided resulting in incorrect policy for anti-doping	Anti-doping policy provided too late resulting in it being out-of-date when applied	Anti-doping policy being applied for too long resulting in outdated guidance
Government agencies	Operational delivery & management	Case law	No case law provided meaning no basis on precedents communicated	Inappropriate case law provided meaning incorrect basis on precedents communicated	Case law provided too late resulting in incorrect precedents being relied upon for decisions	Case law are applied too long resulting in the application of outdated and potentially unlawful guidance
Government agencies	Operational delivery & management	Collective agreements	No collective agreements provided resulting in no outlines of conditions between stakeholders	Inappropriate collective agreements provided resulting in the wrong outlining of conditions	Collective agreements being provided too late resulting in reliance on out-of-date agreements for decision-making	Collective agreements stopped too early resulting in practice which isn't covered under an agreement
Government agencies	Operational delivery & management	Compliance monitoring	No compliance monitoring undertaken resulting in a lack of ability to determine compliance	Insufficient compliance monitoring provided resulting in inability to detect non-compliance	Compliance monitoring provided too late resulting in delayed monitoring of compliance activities to inform KPIs, risks, and challenges	Compliance monitoring is provided too early prior to identifying new risks and challenges

Government agencies	Operational delivery & management	Contractual agreements	No contracts written up resulting in no enforceable agreements	Incorrect contracts written up resulting in the wrong enforceable agreements	Contractual agreements being written up too late resulting in a reliance on out-of-date agreements for decisions	Contractual agreements being provided too late resulting in reliance on outdated agreements and guidance
Government agencies	Operational delivery & management	Data & statistics	No data provided resulting in an inability to measure performance	Incorrect data provided resulting in misleading data	Data and statistics being provided too late resulting in decisions being made on incorrect and misleading information	Data and statistics stopped too early resulting in up-to-date information not being collected and used in decision-making
Government agencies	Operational delivery & management	Education	No education provided resulting in athletes uneducated in anti-doping	Inappropriate education provided resulting in uneducated stakeholders	Education being provided too late resulting in stakeholders who are relying on out-of-date education information	Education stopped too early resulting in outdated approaches being used
Government agencies	Operational delivery & management	Funding/resource allocation	Funding and resources not allocated to anti-doping practices and detection methods aren't implemented	Funding/resource allocation not adequate to sufficiently address ADRVs	Funding provided too late resulting in a lack of funding for testing to address ADRVs	Funding and resources allocation stopped too soon resulting in the cessation of work
Government agencies	Operational delivery & management	Guidelines	No guidelines provided resulting in anti-doping procedures that are not appropriate or substandard	Inappropriate guideline provided resulting in wrong course of action	Guidelines provided too late resulting in a reliance on out-of-date information for guidance	Guidelines applied too early resulting in outdated guidelines being used
Government agencies	Operational delivery & management	Legal penalties (fines, disqualification, etc)	No legal penalties resulting in illegal or substandard practices	Inappropriate legal penalties provided resulting in illegal practices	Legal penalties provided too late resulting in athletes who have an ADRV performing for longer than they otherwise would have	Fines, disqualifications, and sanctions are stopped too early and athletes return to sport before they otherwise would have
Government agencies	Operational delivery & management	Memorandums of understanding (MoU)	No MoU agreed to, resulting in a lack of consistency in application	Inappropriate MoU provided resulting in incorrect outlines of agreements	MoU provided too late resulting in reliance on out-of-date outlines of agreements	MoU applied too long resulting in them being outdated and irrelevant

Government agencies	Operational delivery & management	Quality Standards & Assurance	No quality standards and assurance provided resulting in lack of guidance for what is required	Inappropriate standards and assurances provided, resulting in incorrect guidance	Standards are provided too late meaning reliance on out-of-date guidance negatively influencing decision-making	Quality standards and assurance is stopped too early and quality of decision-making deteriorates
Government agencies	Operational delivery & management	Research funding allocation	No research funding allocated, resulting in no research into anti-doping or doping	Funding allocated to outside of priority research areas, resulting in lack of information on doping	Funding provided too late, resulting in a lack of research funding to investigate doping and anti-doping activities to address ADRVs	Research funding allocation is stopped too soon, resulting in the cessation of research work
Government agencies	Operational delivery & management	Research priorities	Research priorities not provided, resulting in a lack of guidance for required research	Incorrect research priorities provided, resulting in irrelevant research	Research priorities being prioritised too late, resulting in lack of policy that meets current objectives	Research priorities are applied too long and are no longer current resulting in outdated approaches
Government agencies	Operational delivery & management	Research recommendations	No recommendations available to guide operational delivery resulting in substandard anti-doping practices	Incorrect research recommendations provided meaning wrong guidance for research projects on anti-doping	Research recommendations being given too late resulting in policy that doesn't meet current objectives	Research recommendations are applied too long resulting in the use of outdated research recommendations
Government agencies	Operational delivery & management	Targets & performance measures	No targets and performance measure provided meaning that targets and performance are unknown	Inappropriate targets and performance measures provided resulting in incorrect guidance on acceptable standards	Targets and performance measures are provided too late meaning they are not followed initially	Targets and performance measures are stopped too soon and performance declines
Operational delivery & management	Local management & supervision	Accreditation/licensing	No accreditation or licensing provided meaning practitioners are undertaking tasks without accreditation for the respective tasks they are doing	Inappropriate accreditation/licensing provided, resulting in incorrect standardised qualifications	Accreditation being provided too late resulting in out-of-date qualifications being relied upon to perform activities	Accreditation stopped too short resulting in operational delivery ceasing before it should have
Operational delivery & management	Local management & supervision	Audit	No audits and inspections carried out resulting in practices against the code occurring	Inappropriate audits provided resulting in unknown practices occurring	Audits not being undertaken on time resulting in inefficient anti-doping practices and testing	Audits stopped too soon resulting in inappropriate practices not being detected and

						inefficient anti-doping
Operational delivery & management	Local management & supervision	Education	No education provided resulting in ineffective education provided and an increase in athlete doping	Inappropriate education provided resulting in uneducated stakeholders	Education being provided too late resulting in stakeholders who are relying on out-of-date education information	Education stopped too early resulting in outdated approaches being used
Operational delivery & management	Local management & supervision	Enforcement planning & strategies	No enforcement of fines, suspensions, or sanctions resulting in athletes who are doping continuing to dope and compete	Inappropriate enforcement planning and strategies provided meaning incorrect direction on how to enforce penalties	Enforcement planning and strategies are implemented too late, meaning they are not followed initially	Enforcement planning and strategies stopped too soon resulting in a lack of enforcement for penalties, and athletes doping as a result
Operational delivery & management	Local management & supervision	Fines, suspensions, & sanctions	No fines, suspensions, or sanctions handed down resulting in athletes who are doping continuing to dope and compete	Inappropriate fines, suspensions, or sanctions resulting in continuation of doping	Fines, suspensions, and sanctions being provided late resulting in the continuation of doping	Fines, suspensions, and sanctions are stopped too early and athletes return to sport before they otherwise would have
Operational delivery & management	Local management & supervision	Funding/resource allocation	Funding and resources are not allocated to anti-doping practices and detection methods aren't implemented	Funding/resource allocation is not adequate to sufficiently address ADRVs	Funding provided too late resulting in a lack of funding for testing to address ADRVs	Funding and resources allocation stopped too soon resulting in the cessation of work
Operational delivery & management	Local management & supervision	Infrastructure management planning	No planning around management of infrastructure and facilities, resulting in an inability to facilitate testing and consequently, minimised testing capacity	Inappropriate planning provided meaning incorrect guidance for infrastructure management	Infrastructure planning being provided too late resulting in lack of appropriate infrastructure available and mismanagement	Infrastructure management planning is stopped too soon resulting in poorer infrastructure and declining performance
Operational delivery & management	Local management & supervision	Initiatives	No special anti-doping initiatives undertaken resulting in less anti-doping interventions being implemented	Inappropriate initiatives provided meaning limited opportunity to solve problems and be rewarded	Initiatives being provided too late meaning there is limited opportunities to problem solve	Initiatives are stopped too soon resulting in worsening practice and decision-making

Operational delivery & management	Local management & supervision	Policy & procedures	No policy and procedures provided meaning no guidance provided for local management and supervision	Incorrect policy and procedures provided, resulting in the wrong guidance for anti-doping	Policy and procedures provided too late resulting in them being out-of-date when they are applied	Policies and procedures are stopped too soon resulting in the following of inappropriate policies and procedures
Operational delivery & management	Local management & supervision	Registration	No registrations provided meaning no official record of information	Inappropriate registrations provided meaning incorrect official recording of information	Registration is provided too late meaning that information is out-of-date when recorded and used for decision-making	Registration is stopped too soon and stakeholders may be working unregistered
Operational delivery & management	Local management & supervision	Rules & regulations	No rules and regulations provided resulting in ineffective rules and regulations application and an increase in athlete doping	Inappropriate rules and regulations provided resulting in wrong guidance and/or instructions	Rules and regulations are provided too late resulting in inadequate guidance and instructions used	Rules and regulations are applied for too long resulting in the application of inappropriate or unlawful guidance
Operational delivery & management	Local management & supervision	Standards & codes of practice	No standards and codes of practice provided, resulting in an inability to detect doping practices	Incorrect standards and codes of practice provided resulting in doping practices	Standards and codes of practice are communicated too late meaning they are not initially followed	Standards and codes of practice are applied for too long and become outdated resulting in declining performance
Operational delivery & management	Local management & supervision	Supplement Independent Testing	Lack of independent testing of supplements result in potentially tainted supplements being consumed knowingly or unknowingly	Inappropriate independent supplement testing resulting in tainted supplements being consumed knowingly or unknowingly	Supplement independent testing is delayed, resulting in tainted supplements being consumed knowingly or unknowingly	Supplement independent testing is stopped too soon resulting in tainted supplements not being detected
Operational delivery & management	Local management & supervision	Targets & performance measures	No targets and performance measures provided, meaning that targets and performance are unknown	Inappropriate targets and performance measures provided resulting in incorrect guidance on acceptable standards	Targets and performance measures are provided too late, meaning they are not followed initially	Targets and performance measures are stopped too soon and performance is no longer measured and thereafter declines

Operational delivery & management	Local management & supervision	Training policies & procedures	No training policies and procedures provided, resulting in no guidelines for training	Inappropriate training policies and procedures in testing, resulting in incorrect guidelines for training	Training policies and procedures are provided too late resulting in out-of-date training being used by stakeholders	Training policies and procedures are stopped too soon, resulting in the following of inappropriate training policies and procedures
Local management & supervision	Operating process & environment	Audit	No audits and inspections carried out resulting in practices against the code	Inappropriate audits provided resulting in unknown practices	Audits not being undertaken on time resulting in inefficient anti-doping practices and testing	Audits stopped too soon resulting in inappropriate practices not being detected and inefficient anti-doping efforts
Local management & supervision	Operating process & environment	Doping control	Doping control is not undertaken resulting in athletes continuing to dope	Inappropriate doping controls provided resulting in athletes continuing to dope	Doping control being undertaken too late resulting in players missing their tests and continuing to dope	Doping control is applied too long resulting in outdated practice
Local management & supervision	Operating process & environment	Education	No education provided resulting in ineffective education provided and an increase in athlete doping	Inappropriate education provided resulting in uneducated stakeholders	Education being provided too late resulting in stakeholders who are relying on out-of-date education information	Education stopped too early resulting in outdated approaches being used
Local management & supervision	Operating process & environment	Medical testing	No medical testing provided resulting in no knowledge of athlete medical status	Inappropriate medical testing provided resulting in incorrect knowledge of athlete medical status	Medical testing being undertaken too late resulting in missing a medical condition that would otherwise have been captured	Medical testing is stopped too early and medical issues are missed resulting in worsening outcomes
Local management & supervision	Operating process & environment	Social feedback	No social feedback to players resulting in them not understanding the social norms of the environment and potentially doping	Inappropriate social feedback resulting in incorrect understanding of social norms towards doping	Social feedback regarding doping being provided too late and the athlete is continuing to dope	Social feedback is stopped too early and decision-making declines after it's cessation
Local management & supervision	Operating process & environment	Standard operation procedures (SOP)	No standard operating procedures resulting in no procedural consistency	Inappropriate SOPs resulting in incorrect procedural consistency	Standard operating procedures being provided too late and older and inappropriate procedures are followed as a result	Standard operation procedures are stopped too early and outcomes worsen for stakeholders as they

						follow outdated procedures
Local management & supervision	Operating process & environment	Supervision	No supervision provided resulting in a lack of support, instruction, and feedback to players	Inappropriate supervision provided resulting in a lack of support, instruction for athletes	Supervision being provided too late and the athlete continues to dope	Supervision is stopped too early and decision-making declines in it's absence
Local management & supervision	Operating process & environment	Surveillance	Surveillance of potential dopers is not undertaken so athlete continue to dope	Inappropriate surveillance provided so athletes continue to dope	Surveillance being provided too late and athletes continuing to access elicit substances to dope	Surveillance is stopped too early and decision-making declines in it's absence
Local management & supervision	Operating process & environment	Targets & performance measures	No targets and performance measure provided meaning that targets and performance are unknown	Inappropriate targets and performance measures provided resulting in incorrect guidance on acceptable standards	Targets and performance measures are provided too late meaning they are not followed initially	Targets and performance measures are stopped too soon and performance is no longer measured and thereafter declines
Local management & supervision	Operating process & environment	Education resources	No educational resources provided to stakeholders resulting in doping violations due to ineffective education	Educational resources provided are not correct and cause increased doping via uneducated stakeholders	Educational resources are provided too late and stakeholders are relying on outdated materials	Educational resources were not continually developed or disseminated appropriately and resulted in outdated approaches being used
International influence	Government agencies	Anti-Doping Administration Management Systems (ADAMS)	The ADAMS system not being in place resulting in a lack of consistency of record keeping and a weaker anti-doping system	ADAMs put in place incorrectly resulting in incorrect record keeping	ADAMs being undertaken too late resulting in incorrect and out-of-date information being collected and used for decision-making	ADAMs being stopped too soon resulting in up-to-date information not being collected and reliance on out-of-date information for decision-making
International influence	Government agencies	Compliance monitoring	No compliance monitoring undertaken resulting in the	Inappropriate compliance monitoring provided	Compliance monitoring provided too late resulting in	Compliance monitoring is

			lack of ability to determine compliance		delayed monitoring of compliance activities to inform KPIs, risks, and challenges	provided too early prior to identifying new risks and challenges
International influence	Government agencies	Education requirements	No information as to the education requirements necessary, resulting in no education provided	Inappropriate education requirements provided resulting in the wrong education provided	Education requirements being provided too late resulting in stakeholders not having education provided which is appropriate	Education requirements being stopped too early resulting in an inability to identify who is receiving education
International influence	Government agencies	Research funding	No research funding allocated resulting in no research into anti-doping or doping	Research funding not adequate to appropriately address anti-doping research	Funding provided too late resulting in a lack of research funding to investigate doping and anti-doping activities to address ADRVs	Research funding is stopped too soon resulting in the cessation of research work
International influence	Government agencies	Research recommendations	No recommendations available to guide operational delivery resulting in substandard anti-doping practices	Incorrect research recommendations provided meaning wrong guidance for research projects on anti-doping	Research recommendations being given too late resulting in policy that incorrectly meets current objectives	Research recommendations are applied too long resulting in the use of outdated research recommendations
International influence	Government agencies	Substance information	No information provided as to new and existing substances which are banned resulting in players consuming substances to dope (intentionally or unintentionally)	Incorrect information provided on substances which are banned resulting in players consuming substances to dope (intentionally or unintentionally)	Substance information being provided too late resulting in out-of-date information being relied on for decision-making by stakeholders	Substance information is stopped too soon resulting in incorrect information being provided to stakeholders for decision-making
International influence	Government agencies	Testing and collection (NADOs)	Testing and collection of samples is not undertaken in foreign countries by the relevant NADO, resulting in athletes not being tested and continuing to dope	Testing and collection performed incorrectly resulting in invalid tests	Testing and collection being provided too late resulting in athletes not being tested and testing being insufficient	Testing and collection being stopped too soon resulting in athletes not being tested and testing being insufficient

International influence	Government agencies	WADA International standards	No unified approach to anti-doping provided, resulting in a lack of guidance to countries and a weaker anti-doping system	Inappropriate standards provided resulting in incorrect international guidance	Standards are provided too late meaning reliance on out-of-date guidance negatively influencing decision-making	WADA International standards applied too long resulting in outdated guidance
International influence	Government agencies	Advocacy	No advocacy for athletes occurs resulting in governmental decisions made that do not consider the needs of the athlete	No advocacy for athletes results in inappropriate decisions made regarding the needs of the athlete	Advocacy for athletes does not occur to until governmental decisions are already made resulting in the needs of the athlete not being considered or met	Advocacy for athletes finishes before relevant government decisions are made
International influence	Operational delivery & management	Anti-Doping Administration Management Systems (ADAMS)	The ADAMS system not being in place resulting in a lack of consistency of record keeping and a weaker anti-doping system	ADAMs put in place incorrectly resulting in incorrect record keeping	ADAMs being undertaken too late resulting in incorrect and out-of-date information being collected and used for decision-making	ADAMs being stopped too soon resulting in up-to-date information not being collected and reliance on out-of-date information for decision-making
International influence	Operational delivery & management	Fines, suspensions, & sanctions	No fines, suspensions, or sanctions handed down resulting in athletes who are doping continuing to dope and compete	Inappropriate fines, suspensions, or sanctions resulting in the continuation of doping	Fines, suspensions, and sanctions being provided late resulting in the continuation of doping	Fines, suspensions, and sanctions are stopped too early and athletes return to sport before they otherwise would have
International influence	Operational delivery & management	International governing associations education	No education provided resulting in increased athlete doping	Incorrect education provided, resulting in increased athlete doping	Education being provided too late resulting in stakeholders who are relying on out-of-date education information	International governing associations education stopped too early resulting in outdated approaches being used
International influence	Operational delivery & management	International governing associations regulations	No regulation provided, resulting in no rules or directives for anti-doping	Inappropriate regulation provided resulting in incorrect rules or directives for anti-doping	Rules and regulations are provided too late resulting in inadequate guidance and instructions used	International governing bodies regulations are applied for too long, resulting in the

						application of inappropriate or unlawful guidance
International influence	Operational delivery & management	Substance information	No information provided as to new and existing substances, which are banned, resulting in players consuming substances to dope (intentionally or unintentionally)	Incorrect information provided on substances which are banned, resulting in players consuming substances to dope (intentionally or unintentionally)	Substance information being provided too late, resulting in out-of-date information being relied on for decision-making by stakeholders	Substance information is stopped too soon, resulting in incorrect information being provided to stakeholders for decision-making
International influence	Operational delivery & management	WADA Lab Accreditation	No accreditation for the lab from WADA, resulting in a lack of consistency in sample collection and potential to miss identifying ADRVs	Inappropriate accreditation provided meaning incorrect qualifications to perform sample collection and testing	Lab accreditation being provided too late resulting in a labs accreditation lapsing and them operating without accreditation	WADA Lab Accreditation stopped too short resulting in operational delivery ceasing before it should have
International influence	Operational delivery & management	Advocacy	No advocacy for athletes occurs resulting in operational / managerial decisions made that do not consider the needs of the athlete	No advocacy for athletes results in inappropriate operational / managerial decisions made regarding the needs of the athlete	Advocacy for athletes does not occur to until operational / managerial decisions are already made resulting in the needs of the athlete not being considered or met	Advocacy for athletes finishes before relevant operational / managerial decisions are made
International influence	Local management & supervision	Education	No education provided resulting in uneducated stakeholders and an increase in athlete doping	Inappropriate education provided resulting in uneducated stakeholders	Education being provided too late resulting in stakeholders who are relying on out-of-date education information	Education stopped too early resulting in outdated approaches being used
International influence	Local management & supervision	Fines, suspensions, & sanctions	No fines, suspensions, or sanctions handed down resulting in athletes who are doping continuing to dope and compete	Inappropriate fines, suspensions, or sanctions resulting in the continuation of doping	Fines, suspensions, and sanctions being provided late resulting in the continuation of doping	Fines, suspensions, and sanctions are stopped too early and athletes return to sport before they otherwise would have
International influence	Local management	Substance information	No information provided as to new and existing substances which are banned resulting in	Incorrect information provided on substances which are banned	Substance information being provided too late resulting in out-of-date information being	Substance information is stopped too soon

	& supervision		players consuming substances to dope (intentionally or unintentionally)	resulting in players consuming substances to dope (intentionally or unintentionally)	relied on for decision-making by stakeholders	resulting in incorrect information being provided to stakeholders for decision-making
International influence	Local management & supervision	Advocacy	No advocacy for athletes occurs resulting in local managerial / supervisory decisions made that do not consider the needs of the athlete	No advocacy for athletes results in inappropriate local managerial / supervisory decisions made regarding the needs of the athlete	Advocacy for athletes does not occur until local managerial / supervisory decisions are already made resulting in the needs of the athlete not being considered or met	Advocacy for athletes finishes before relevant local managerial / supervisory decisions are made
International influence	Operating process & environment	Education	No education provided, resulting in uneducated stakeholders and an increase in athlete doping	Inappropriate education provided resulting in uneducated stakeholders	Education being provided too late resulting in stakeholders who are relying on out-of-date education information	Education stopped too early resulting in outdated approaches being used
International influence	Operating process & environment	International governing association's requirements	No requirements provided resulting in no understanding of compulsory approaches to anti-doping	Inappropriate requirements provided resulting in an incorrect understanding of compulsory approaches to anti-doping	Requirements are provided too late resulting in an incorrect understanding of the most current approaches to anti-doping	International governing associations requirements stopped too soon resulting in an incorrect understanding of what is required to be compliant with anti-doping
International influence	Operating process & environment	International governing association's whereabouts requirements	No whereabouts requirements provided resulting in no understanding of how to conduct whereabouts procedures	Inappropriate whereabouts requirements provided resulting in an incorrect understanding of how to conduct whereabouts procedures	Whereabouts requirements being provided too late resulting in an incorrect understanding of the athletes whereabouts commitments and inefficient anti-doping practices	International governing associations whereabouts requirements stopped too soon resulting in an inability to find athletes and test them, with inefficient anti-doping practices resulting.

International influence	Operating process & environment	Advocacy	No advocacy for athletes occurs resulting in operational processes that do not consider the needs of the athlete	No advocacy for athletes results in inappropriate operational processes or environments for the needs of the athlete	Advocacy for athletes does not occur to until operating processes are already in place resulting in the needs of the athlete not being considered or met	Advocacy for athletes finishes before relevant operating processes are made
Government agencies	Local management & supervision	Accreditation	No accreditation provided resulting in no standardised qualifications	Inappropriate accreditation provided, meaning incorrect standardised qualifications	Accreditation being provided too late resulting in accreditation lapsing and stakeholders becoming de-accredited	Accreditation stopped too short resulting in operational delivery ceasing before it should have
Government agencies	Local management & supervision	Education	No education provided resulting in ineffective education and an increase in athlete doping	Inappropriate education provided resulting in uneducated stakeholders	Education being provided too late resulting in stakeholders who are relying on out-of-date education information	Education stopped too early resulting in outdated approaches being used
Government agencies	Local management & supervision	Education audit	No education audit undertaken resulting in no knowledge of education being provided	Inappropriate education audit undertaken resulting in incorrect knowledge of education being provided	Education audits not being undertaken on time resulting in out-of-date and inefficient anti-doping education practices being used	Education audits being stopped too early, resulting in an inability to identify who is receiving education
Government agencies	Local management & supervision	Fines, suspensions, & sanctions	No fines, suspensions, or sanctions handed down resulting in athletes who are doping continuing to dope and compete	Inappropriate fines, suspensions, or sanctions resulting in the continuation of doping	Fines, suspensions, and sanctions being provided late resulting in the continuation of doping	Fines, suspensions, and sanctions are stopped too early and athletes return to sport before they otherwise would have
Government agencies	Local management & supervision	Sanction history	No sanction history provided meaning no knowledge of prior sanctions	Incorrect sanction history provided resulting in the wrong knowledge of prior sanctions	Sanction history being provided too late resulting in incorrect knowledge about the athletes current sanctions and them continuing to compete whilst under sanction	Sanction history information stopped too soon resulting in reliance on outdated information for decision-making
Government agencies	Local management	Substance information	No information provided as to new and existing substances	Incorrect information provided on substances	Substance information being provided too late resulting in	Substance information is

	& supervision		which are banned, resulting in players consuming substances to dope (intentionally or unintentionally)	which are banned resulting in players consuming substances to dope (intentionally or unintentionally)	out-of-date information being relied on for decision-making by stakeholders	stopped too soon resulting in incorrect information being provided to stakeholders for decision-making
Government agencies	Local management & supervision	Compliance	No compliance checks undertaken resulting in the lack of ability to determine compliance	Inappropriate compliance checks implemented	Compliance checks provided too late resulting in delayed monitoring of compliance activities to inform KPIs, risks, and challenges	Compliance checks are provided too early prior to identifying new risks and challenges
Government agencies	Local management & supervision	Education resources	No educational resources provided to stakeholders to make informed decisions around compliance to anti-doping policies and code	Educational resources provided are incorrect and following them results in intentional or unintentional doping	Education resources are provided too late and stakeholders are relying on out-of-date or incorrect sources of information	Educational resources were not continually developed or disseminated appropriately and resulted in outdated approaches being used
Government agencies	Operating process & environment	Accreditation	No accreditation provided resulting in no standardised qualifications	Inappropriate accreditation provided meaning incorrect standardised qualifications	Accreditation being provided too late resulting in accreditation lapsing and stakeholders becoming de-accredited	Accreditation stopped too short resulting in operational delivery ceasing before it should have
Government agencies	Operating process & environment	Education	No education provided resulting in ineffective education and an increase in athlete doping	Inappropriate education provided resulting in uneducated stakeholders	Education being provided too late resulting in stakeholders who are relying on out-of-date education information	Education stopped too early resulting in outdated approaches being used
Government agencies	Operating process & environment	Enforcement	No enforcement of fines, suspensions, or sanctions resulting in athletes who are doping continuing to dope and compete	Inappropriate enforcement provided resulting in an incorrectly enforced anti-doping system	Enforcement of fines, suspensions, and sanctions being provided late resulting in the continuation of doping and athletes not being sanctioned appropriately	Enforcement stopped too soon resulting in a lack of enforcement for penalties and athletes doping as a result

Government agencies	Operating process & environment	Fines, suspensions, & sanctions	No fines, suspensions, or sanctions handed down resulting in athletes who are doping continuing to dope and compete	Inappropriate fines, suspensions, or sanctions resulting in the continuation of doping	Fines, suspensions, and sanctions being provided late resulting in the continuation of doping	Fines, suspensions, and sanctions are stopped too early and athletes return to sport before they otherwise would have
Government agencies	Operating process & environment	Operating procedures	No standard operating procedures resulting in procedural inconsistency	Inappropriate OPs resulting in incorrect procedural consistency	Operating procedures being provided too late and older and inappropriate procedures are followed as a result	Operating procedures stopped too soon resulting in reliance on outdated procedures for decision-making
Government agencies	Operating process & environment	Rules & regulations	No rules and regulations provided resulting in no guidance on anti-doping approaches	Inappropriate rules and regulations provided resulting in incorrect guidance on anti-doping approaches	Rules and regulations are provided too late resulting in inadequate guidance and instruction	Rules and regulations are applied for too long resulting in the application of inappropriate or unlawful guidance
Government agencies	Operating process & environment	Sample collection manual	No sample collection manual provided resulting in no guide on how to collect samples	Inappropriate sample collection manual provided resulting in an incorrect guide on how to collect samples	The updated sample collection manual being provided too late resulting in out-of-date collection information being provided and athletes health being put at risk	Sample collection manual stopped too soon resulting in reliance on outdated collection practices for decision-making
Government agencies	Operating process & environment	Substance information	No information provided as to new and existing substances which are banned resulting in players consuming substances to dope (intentionally or unintentionally)	Incorrect information provided on substances which are banned resulting in players consuming substances to dope (intentionally or unintentionally)	Substance information being provided too late resulting in out-of-date information being relied on for decision-making by stakeholders	Substance information is stopped too soon resulting in incorrect information being provided to stakeholders for decision-making
Government agencies	Operating process & environment	TUE Approvals	No TUE approvals being given, resulting in athletes who should have TUEs not getting them, and being	Inappropriate TUE approvals being given, resulting in athletes who should not have them	TUE approval information being provided too late, resulting in athletes testing	TUE approvals applied too long resulting in athletes being covered under

			flagged for doping when they should have a TUE	and being wrongly allowed to use banned substances	positive for a substance they actually have a TUE for	a TUE for a substance which they no longer use
Operating process & environment	Operating process & environment	Access	No access to the operating environment to test the athletes, resulting in no testing taking place	Inappropriate access provided resulting in no testing taking place	Access being provided too late so that athletes are not able to be tested and testing is missed resulting in athletes not being caught and doping continuing	Access being stopped too soon resulting in an inability to access facilities for testing procedures and testing not occurring
Operating process & environment	Operating process & environment	ADRV Information	No information on athlete doping rule violations being provided and athletes being unaware of the ADRVs	Incorrect information on athlete doping rule violations being provided and athletes being misinformed of the ADRVs	Updated ADRV information being provided too late resulting in athletes and other stakeholders being misinformed with out-of-date information	ADRV information stopped too soon resulting in a lack of up-to-date information for stakeholders and reliance on outdated information
Operating process & environment	Operating process & environment	Communication	No communication between actors in the operating environment resulting in a poor information space and lack of accountability	Inappropriate communication between actors in the operating environment resulting in poor information exchanged and lack of accountability	Communication being given too late between stakeholders resulting in stakeholders having to rely on inadequate and out-of-date information in decision-making	Communication stopped too soon resulting in confusion from a lack of clear communication
Operating process & environment	Operating process & environment	Education	No education provided resulting in ineffective education and an increase in athlete doping	Inappropriate education provided resulting in uneducated stakeholders	Education being provided too late resulting in stakeholders who are relying on out-of-date education information	Education stopped too early resulting in outdated approaches being used
Operating process & environment	Operating process & environment	Enforcement	No enforcement of fines, suspensions, or sanctions resulting in athletes who are doping continuing to dope and compete	Inappropriate enforcement provided, resulting in an incorrectly enforced anti-doping system	Enforcement of fines, suspensions, and sanctions being provided late resulting in the continuation of doping and athletes not being sanctioned appropriately	Enforcement stopped too soon resulting in a lack of enforcement for penalties and athletes doping as a result
Operating process & environment	Operating process & environment	Event/venue requirements	No event/venue requirements communicated resulting in no understanding of what is	Inappropriate event/venue requirements communicated, resulting	The event/venue requirements not being communicated with enough time to facilitate testing/anti-	Event/venue requirements information stopped too soon resulting in

			required to allow testing/anti-doping practices	in incorrect understanding of what is required to allow testing/anti-doping practices	doping practices, resulting in missed or poorer quality testing procedures	an inability to access facilities for testing procedures and testing not occurring
Operating process & environment	Operating process & environment	Fines, suspensions, & sanctions	No fines, suspensions, or sanctions handed down resulting in athletes who are doping continuing to dope and compete	Inappropriate fines, suspensions, or sanctions resulting in continuation of doping	Fines, suspensions, and sanctions being provided late resulting in the continuation of doping	Fines, suspensions, and sanctions are stopped too early and athletes return to sport before they otherwise would have
Operating process & environment	Operating process & environment	Operating procedures	No standard operating procedures resulting in procedural inconsistency	Inappropriate OPs resulting in incorrect procedural consistency	Operating procedures being provided too late and older and inappropriate procedures are followed as a result	Operating procedures applied too long resulting in outdated practices relied upon for decision-making
Operating process & environment	Operating process & environment	Rules & regulations	No rules and regulations provided resulting in no guidance on anti-doping approaches	Inappropriate rules and regulations provided resulting in incorrect guidance on anti-doping approaches	Rules and regulations are provided too late resulting in inadequate guidance and instruction	Rules and regulations are applied for too long resulting in the application of inappropriate or unlawful guidance

Appendix 2. STPA of the feedback mechanisms identified in the STAMP control structure model						
From	To	Feedback	Action required but not provided	Unsafe action provided	Incorrect/timing order	Stopped too soon/applied too long
Operating process & environment	Local management & supervision	Education attendance data	No education attendance data provided resulting in an inability to determine who is attending education and compliant with current education requirements	Inaccurate education attendance data provided leading to an inaccurate understanding of who has been attending education	Education attendance data provided too late to accurately capture stakeholders who attended	Education attendance data recording stopped too soon, and attendees are not recorded leading to them being viewed as having not received anti-doping education

Operating process & environment	Local management & supervision	Evaluation	No evaluation provided leading to an inability to evaluate stakeholders' decisions	Inappropriate evaluation of stakeholders leading to an inability to detect poor decisions	Evaluation provided too late to detect poor decisions which occurred prior to evaluation which resulted in worsening outcomes	Evaluation stopped too soon to conduct a thorough evaluation leading to decisions made on limited evidence
Operating process & environment	Local management & supervision	Integrity complaints	No integrity complaints provided resulting in an inability to determine if stakeholders are acting with integrity	Inappropriate integrity complaints provisions resulting in an inability to detect integrity issues	Integrity complaints provided too late to detect and resolve integrity issues leading to worsening outcomes	Integrity complaints applied for too long that they are no longer valid
Operating process & environment	Local management & supervision	Social Controls	No social controls provided resulting in athletes continuing to dope without the guidance of their social group not to dope	Inappropriate social controls resulting in athletes undertaking doping as they believe there is social pressure and approval to do so	Social controls provided too late leading to increased normalisation of doping attitudes and increased doping	Social controls stopped too soon leading to normalisation of doping attitudes without supervision
Local management & supervision	Operational delivery & management	Data and statistics	No data and statistics provided leading to an inability to track progress and compliance	Inaccurate data and statistics provided which leads to an incorrect understanding of progress and compliance outcomes	Data and statistics provided too early to capture new trends in testing and doping	Data and statistics stopped too soon leading to inability to capture new data and trends in testing and doping
Local management & supervision	Operational delivery & management	Education auditing	No education auditing data provided resulting in an inability to determine who is attending education and compliant with current education requirements	Inaccurate education auditing data provided leading to an inaccurate understanding of who has been attending and completing education	Education auditing undertaken too late and stakeholder attendance not accurately captured, resulting in a decrease in education	Education auditing stopped too soon leading to an inability to detect whether education is leading to improved outcomes
Local management & supervision	Operational delivery & management	Equipment compliance reports	No equipment compliance reports provided resulting in the use of potentially broken or poorly maintained equipment	Inaccurate equipment compliance reports provided resulting in an inability to understand which equipment is compliant or faulty	Equipment compliance reports undertaken too late resulting in faulty equipment being used leading to inaccurate results	Equipment compliance reports stopped being recorded too soon and compliance failures are missed as a result

Local management & supervision	Operational delivery & management	Medical records	No medical records provided resulting in a lack of information being provided as to the current health state of the athlete	Inaccurate medical records provided resulting in a poor understanding of athletes current and past medical needs and poorer health outcomes	Medical records provided too late resulting in an inaccurate medical history and current medical needs	Medical records are applied too long resulting in out of date records and guidance used to make medical decisions
Local management & supervision	Operational delivery & management	Policy complaints	No policy complaints provided resulting in an inability to determine if stakeholders are adhering to policy	Inaccurate policy complaint information resulting in deteriorating conditions and outcomes as policy issues are not known or rectified	Policy complaints provided too late to effect change in policy, resulting in poorer outcomes for stakeholders	Policy complaints are stopped too soon to reach critical mass which would influence the policy agenda
Local management & supervision	Operational delivery & management	Public opinion	No public views, attitudes, and beliefs regarding doping resulting in no understanding of societal sentiment	N/A	Public opinion is provided too late to influence outcomes and decision making deteriorates as a result	N/A
Local management & supervision	Operational delivery & management	Supplement Independent Testing	No supplement independent testing provided resulting in potentially tainted supplements being given and consumed	Inaccurate Supplement Independent Testing resulting in potentially tainted supplements being approved and consumed	Supplement Independent Testing is provided too late and potentially tainted supplements are consumed before testing and approval	Supplement Independent Testing is stopped too soon and supplements are not tested leading to inadvertent doping
Local management & supervision	Operational delivery & management	Supplement register	No supplement register provided leading to inability to track which supplements athletes are tracking and supplement information	Inaccurate supplement register resulting in an inability to track the supplements an athlete is consuming and increased likelihood of an athlete consuming a tainted supplement with no record	Supplement register provided too early to accurately reflect what the athlete is consuming and an inability to monitor this as a result	Supplement register is stopped too soon resulting in an inability to track which supplements athletes are using and to potential doping
Local management & supervision	Operational delivery & management	TUE applications	No TUE applications provided resulting in athletes testing positive when they should have had a TUE	Inaccurate TUE application submitted leading to the athlete not being covered by the TUE and potentially	TUE applications are given too late and athletes are not covered by the TUE they applied for and trigger a positive test as a result	TUE applications are stopped too soon leading to athletes not being able to access TUE's when they need to

				testing positive as a result		
Operational delivery & management	Government agencies	Advocacy	No advocacy provided so stakeholders are not advocated for and their feedback is not heard	Inappropriate advocacy is provided leading to worsening outcomes for stakeholders as their needs are not met	Advocacy provided too late leading to stakeholder feedback not being provided and integrated to improve outcomes	Advocacy stopped too soon leading to stakeholders not being advocated for and their needs are unmet
Operational delivery & management	Government agencies	Compliance outcomes	No compliance outcomes provided so stakeholders unaware of if they are compliant with current guidance	Inappropriate compliance outcomes communicated leading to confusion about whether stakeholders are compliant with up to date guidance	Compliance outcomes are provided too late and compliance deteriorates as a result of less monitoring	Compliance outcomes recordings stopped too soon leading to inability to determine current compliance outcomes and inaccurate guidance resulting
Operational delivery & management	Government agencies	Education attendance data	No education attendance data provided resulting in an inability to determine who is attending education and compliant with current education requirements	Inaccurate education attendance data provided leading to an inaccurate understanding of who has been attending education	Education attendance data provided too late to accurately capture stakeholders who attended	Education attendance data recording stopped too soon and attendees are not recorded leading to them being viewed as uneducated
Operational delivery & management	Government agencies	Registration and licensing data	No registration and licensing data provided resulting in an inability to determine who is registered to provide services to stakeholders	Inaccurate registration and licensing data provided leading to confusion as to which stakeholders are appropriately registered to provide services	Registration and licensing data provided too late leading to an inaccurate understanding of stakeholders who hold valid registration and licenses	Registration and licensing data collected stopped too soon leading to stakeholders becoming unregistered or unlicensed to undertake their roles
Operational delivery & management	Government agencies	Financial reporting	No financial reporting provided resulting in an inability to determine the current state of financial use and budgeting	Inaccurate financial reporting provided resulting in a lack of understanding and confusion as to the current financial situation for stakeholders	Financial reporting provided too late resulting in inaccurate financial information being used by decision makers and worsening outcomes	Financial reporting stopped too soon leading to decisions being made on an inaccurate financial basis and worsening financial outcomes
Operational delivery & management	Government agencies	Laboratory reporting	No laboratory reporting is provided resulting in an inability to determine if	Inaccurate laboratory reporting is provided resulting in athletes	Laboratory reporting provided too late leading	Laboratory reporting stopped too soon leading to laboratories being used which do not

			laboratories are compliant with the latest guidance and testing procedures	receiving incorrect guidance as to their current doping status	to a lack of accurate testing capacity information	provide accurate testing information
Operational delivery & management	Government agencies	Laboratory results reporting	No laboratory results reporting is provided resulting in an inability to determine if laboratories are conducting testing which reflects the guidance of governing organisations	Inaccurate laboratory results reporting is provided resulting in athletes receiving incorrect guidance as to their current doping status	Laboratory results reporting provided too late leading to athletes continuing to perform while they have tested positive	Laboratory results reporting stopped too soon leading to updated results not being communicated to stakeholders and decisions being made on athlete and team selection using inaccurate information
Operational delivery & management	Government agencies	Performance reporting	No performance reporting is provided resulting in an inability to determine if operational delivery is compliant with the latest guidance and procedures	Inaccurate performance reporting leading to an inability to detect worsening performance for stakeholders	Performance reporting provided too late leading to an inaccurate understanding of actual performance of stakeholders amid worsening performance	Performance reporting being stopped too soon leading to an inability to provide up to date information on performance to stakeholders and declining performance
Operational delivery & management	Government agencies	Policy complaints	No policy complaints provided resulting in an inability to determine if stakeholders are adhering to policy	Inaccurate policy complaint information resulting in deteriorating conditions and outcomes as policy issues are not known or rectified	Policy complaints provided too late to effect change in policy resulting in poorer outcomes for stakeholders	Policy complaints are stopped too soon to reach critical mass which would influence the policy agenda
Operational delivery & management	Government agencies	Public opinion	No public views, attitudes, and beliefs regarding doping resulting in no understanding of societal sentiment	N/A	Public opinion is provided too late to influence outcomes and decision making deteriorates as a result.	N/A
Operational delivery & management	Government agencies	Research proposals	No research proposals provided so new research isn't undertaken and new ideas aren't introduced and tested	Inappropriate research proposals provided leading to research being funded which doesn't address fundamental questions	Research proposals provided too late and are not funded leading to a lack of appropriate research	Research proposals applied too long leading to the research questions becoming redundant and no longer novel
Operational delivery & management	Government agencies	Research reports & findings	No research reports and findings are provided so practices are not updated	Inaccurate research reports and findings provided leading to	Research reports and findings are provided too late to influence policy	Research reports and findings stopped too soon leading to an

			to reflect changing trends and conditions	stakeholders not being able to determine changing trends or conditions	changes and outcomes for stakeholders	inability to influence current practice and a gap in capacity
Operational delivery & management	Government agencies	Whereabouts	No whereabouts provided resulting in an inability to determine athlete whereabouts to test and a deterioration in testing capacity	Inaccurate whereabouts information provided resulting in incorrect knowledge of athlete whereabouts and declining testing capacity	Whereabouts information provided too late leading to an athlete not being where they identified they would be and a whereabouts violation	Whereabouts stopped too soon leading to an inability to determine where athletes are for testing, resulting in missing doping tests
Government agencies	Parliament & legislatures	Advocacy & lobbying	No advocacy provided so stakeholders are not advocated for and their opinions are not heard	Inappropriate advocacy is provided leading to worsening outcomes for stakeholders as their needs are not met	Advocacy provided too late leading to stakeholders not being lobbied for and support not being provided and integrated to improve outcomes	Advocacy stopped too soon leading to stakeholders not being advocated for and their needs being unmet
Government agencies	Parliament & legislatures	Draft legislation	No draft legislation given so legislation does not renew and becomes outdated and no longer provides current guidance	Inappropriate draft legislation given resulting in the legislation not being effective in deterring or detecting doping activities	Draft legislation provided too late resulting in new legislation not being drafted and it not being implemented	Draft legislation applied too long so that it no longer reflects the current needs of stakeholders and is current
Government agencies	Parliament & legislatures	Financial reporting	No financial reporting provided resulting in an inability to determine the current state of financial use and budgeting	Inaccurate financial reporting provided resulting in a lack of understanding and confusion as to the current financial situation for stakeholders	Financial reporting provided too late resulting in inaccurate financial information being used by decision makers and worsening outcomes	Financial reporting stopped too soon leading to decisions being made on an inaccurate financial basis and worsening financial outcomes
Government agencies	Parliament & legislatures	Government reports	No governmental reports provided leading to less oversight and deteriorating standards	Inaccurate government reports provided resulting in policy development which doesn't reflect the underlying conditions and worsening outcomes for stakeholders	Government reports being provided too late to influence policy and worsening outcomes	Government reports are applied too long resulting in outdated guidance being used for decision making

Government agencies	Parliament & legislatures	Policy development	No policy development given so policy becomes outdated and no longer provides current guidance	Inappropriate policy development provided leading to policies which are not effective and worsening outcomes for stakeholders	Policy development being implemented too early and updated policy not reflecting the current needs of stakeholders	Policy development is stopped too soon and over time the policy starts to disentangle from the needs of stakeholders
Government agencies	Parliament & legislatures	Research proposals, reports, & findings	No research proposals, reports, and findings provided so new research is not undertaken, research findings are not communicated, and new ideas aren't introduced and tested	Inaccurate research proposals, reports and findings provided leading to stakeholders not being able to determine changing trends or conditions	Research proposals, reports, and findings are provided too late to influence policy changes and outcomes for stakeholders	Research proposals, reports, and findings stopped too soon leading to an inability to influence current practice and a gap in capacity
Government agencies	Parliament & legislatures	Sanction data & statistics	No sanction data and statistics provided leading to an inability to track trends in testing and doping rates	Inaccurate sanction data and statistics leading to making guidance that does not improve outcomes for stakeholders	Sanction data and statistics being provided too late resulting in policies which do not address the accurate state of current sanctions	Sanction data and statistics being applied too long resulting in sanctions being applied for athletes who's sanctions should have finished
Government agencies	Parliament & legislatures	Senate estimates briefings	No senate estimates briefings provided resulting in a lack of governmental oversight into current practices and guidance	Inaccurate senate estimates briefings provided resulting in a lack of governmental oversight to the real underlying condition of current practice and guidance	Senate estimates briefings being provided too early resulting in a lack of accurate oversight on changes in conditions for stakeholders	Senate estimates briefings stopped too soon resulting in a lack of information being provided and a lack of appropriate oversight as to the current situation
Parliament & legislatures	International influence	Advocacy & lobbying	No advocacy provided so stakeholders are not advocated for and their opinions are not heard	Inappropriate advocacy is provided leading to worsening outcomes for stakeholders as their needs are not met	Advocacy provided too late leading to stakeholders not being lobbied for and support not being provided and integrated to improve outcomes	Advocacy stopped too soon leading to stakeholders not being advocated for and their needs being unmet
Parliament & legislatures	International influence	Financial reporting	No financial reporting provided resulting in an inability to determine the	Inaccurate financial reporting provided resulting in a lack of understanding and	Financial reporting provided too late resulting in inaccurate financial information being used by	Financial reporting stopped too soon leading to decisions being made on an inaccurate

			current state of financial use and budgeting	confusion as to the current financial situation for stakeholders	decision makers and worsening outcomes	financial basis and worsening financial outcomes
Parliament & legislatures	International influence	Government reports	No governmental reports provided leading to less oversight and deteriorating standards	Inaccurate government reports provided resulting in policy development which doesn't reflect the underlying conditions and worsening outcomes for stakeholders	Government reports being provided too late to influence policy and worsening outcomes	Government reports are applied too long resulting in outdated guidance being used for decision making
Parliament & legislatures	International influence	Research proposals, reports, & findings	No research proposals, reports, and findings provided so new research is not undertaken, research findings are not communicated, and new ideas aren't introduced and tested	Inaccurate research proposals, reports and findings provided leading to stakeholders not being able to determine changing trends or conditions	Research proposals, reports, and findings are provided too late to influence policy changes and outcomes for stakeholders	Research proposals, reports, and findings stopped too soon leading to an inability to influence current practice and a gap in capacity
Parliament & legislatures	International influence	Sanction data & statistics	No sanction data and statistics provided leading to an inability to track trends in testing and doping rates	Inaccurate sanction data and statistics leading to the making of guidance that does not improve current conditions and outcomes for stakeholders	Sanction data and statistics being provided too late resulting in policies which do not address the accurate state of current sanctions	Sanction data and statistics being applied too long resulting in sanctions being applied for athletes who's sanctions should have finished
Operating process & environment	International influence	International governing association's whereabouts	No whereabouts provided resulting in an inability to determine athlete whereabouts to test and a deterioration in testing capacity	Inaccurate whereabouts information provided resulting in incorrect knowledge of athlete whereabouts and declining testing capacity	Whereabouts information provided too late leading to an athlete not being where they identified they would be and a whereabouts violation	Whereabouts stopped too soon leading to an inability to determine where athletes are for testing and resulting in missing doping tests
Operating process & environment	International influence	Auditing	No auditing provided resulting in an inability to understand the current state of practice and guidance and deteriorating standards	Inaccurate auditing resulting in information being used that does not reflect the accurate state of practice leading to deteriorating standards	Auditing being undertaken too late to capture the current state of practice which leads to worsening outcomes	Auditing being stopped too soon resulting in a lack of up to date information being available for decision making

Operating process & environment	Operational delivery & management	Education attendance data	No education attendance data provided resulting in an inability to determine who is attending education and is compliant with current education requirements	Inaccurate education attendance data provided leading to an inaccurate understanding of who has been attending education	Education attendance data provided too late to accurately capture stakeholders who attended	Education attendance data recording stopped too soon and attendees are not recorded leading to them being viewed as uneducated
Operating process & environment	Operational delivery & management	Education auditing	No education auditing data provided resulting in an inability to determine who is attending education and compliant with current education requirements	Inaccurate education auditing data provided leading to an inaccurate understanding of who has been attending and completing education	Education auditing undertaken too late and stakeholder attendance not accurately captured, resulting in a decrease in education	Education auditing stopped too soon leading to an inability to detect whether education is leading to improved outcomes
Operating process & environment	Operational deliv & management	Integrity complaints	No integrity complains provided resulting in an inability to determine if stakeholders are acting with integrity	Inappropriate integrity complaints provisions resulting in an inability to detect integrity issues	Integrity complaints provided too late to detect and resolve integrity issues leading to worsening outcomes	Integrity complaints applied for too long that they are no longer valid
Operating process & environment	Operational delivery & management	Policy complaints	No policy complaints provided resulting in an inability to determine if stakeholders are adhering to policy	Inaccurate policy complaint information resulting in deteriorating conditions and outcomes as policy issues are not known or rectified	Policy complaints provided too late to effect change in policy resulting in poorer outcomes for stakeholders	Policy complaints are stopped too soon to reach critical mass which would influence the policy agenda
Operating process & environment	Operational delivery & management	Samples	No samples provided resulting in an inability to test athletes and athletes not being tested and caught while they continue to dope	Inaccurate samples collected resulting in worsening performance of testing as athletes are notified of false positive and negative results	Samples provided too late and are not tested in time to capture doping leading to athletes continuing to dope	Samples being collected too soon resulting in the athlete beginning doping after the sample collection period
Operating process & environment	Government agencies	Audit results	No audit results provided resulting in an inability to understand the current state of practice and guidance and deteriorating standards	Inaccurate audit results presented resulting in information being used that does not reflect the accurate state of practice leading to deteriorating standards	Audit results communicated too late to capture the accurate state of practice resulting in reliance on inaccurate information for decisions	Audit results communication being applied too late resulting in out of date information being relied upon by stakeholders

Operating process & environment	Government agencies	Policy complaints	No policy complaints provided resulting in an inability to determine if stakeholders are adhering to policy	Inaccurate policy complaint information resulting in deteriorating conditions and outcomes as policy issues are not known or rectified	Policy complaints provided too late to effect change in policy, resulting in poorer outcomes for stakeholders	Policy complaints are stopped too soon to reach critical mass which would influence the policy agenda
Operating process & environment	Government agencies	TUE Applications	No TUE applications provided resulting in athletes testing positive when they should have had a TUE	Inaccurate TUE application submitted leading to the athlete not being covered by the TUE and potentially testing positive as a result	TUE applications are given too late and athletes are not covered by the TUE they applied for and trigger a positive test as a result	TUE applications are stopped too soon leading to athletes not being able to access TUE's when they need to
Operating process & environment	Government agencies	Whistleblowing	No whistleblowing undertaken resulting in integrity issues not being reported as they should be and incorrect or illegal practices continuing	Inappropriate whistleblowing complaints made leading to the use of investigative resources which do not improve outcomes for stakeholders	Whistleblowing is undertaken too late leading to integrity issues not being captured accurately at the time and worsening outcomes	Whistleblowing is stopped too soon and subsequently there is a resulting lack of pressure by decision makers to improve outcomes
Operating process & environment	Government agencies	Athlete location	Athlete's location is not made available to governing bodies and ADOs are unable to conduct anti-doping testing	Incorrect or inaccurate location is provided to governing bodies and ADOs are unable to locate athlete to conduct testing	Athletes do not provide current location or information on future whereabouts and ADOs are unable to conduct testing	Athlete did not continue to update whereabouts of current and upcoming locations so ADOs are unable to conduct testing
Local management & supervision	Government agencies	Audit results	No audit results provided resulting in an inability to understand the current state of practice and guidance and deteriorating standards	Inaccurate audit results presented resulting in information being used that does not reflect the accurate state of practice leading to deteriorating standards	Audit results communicated too late to capture the accurate state of practice resulting in reliance on inaccurate information for decisions	Audit results communication being applied too late resulting in out of date information being relied upon by stakeholders
Local management & supervision	Government agencies	Education attendance data	No education attendance data provided resulting in an inability to determine who is attending	Inaccurate education attendance data provided leading to an inaccurate understanding of who	Education attendance data provided too late to accurately capture stakeholders who attended	Education attendance data recording stopped too soon and attendees are not recorded

			education and compliant with current education requirements	has been attending education		leading to them being viewed as uneducated
Local management & supervision	Government agencies	TUE applications	No TUE applications provided resulting in athletes testing positive when they should have had a TUE	Inaccurate TUE application submitted leading to the athlete not being covered by the TUE and potentially testing positive as a result	TUE applications are given too late and athletes are not covered by the TUE they applied for and trigger a positive test as a result	TUE applications are stopped too soon leading to athletes not being able to access TUE's when they need to
Local management & supervision	Government agencies	Whistleblowing	No whistleblowing undertaken resulting in integrity issues not being reported as they should be and incorrect or illegal practices continuing	Inappropriate whistleblowing complaints made leading to the use of investigative resources which do not improve outcomes for stakeholders	Whistleblowing is undertaken too late leading to integrity issues not being captured accurately at the time and worsening outcomes	Whistleblowing is stopped too soon and resulting in a lack of pressure by decision makers to improve outcomes
Operational deliv & management	Parliament & legislatures	Advocacy	No advocacy provided so stakeholders are not advocated for and their opinions are not heard	Inappropriate advocacy is provided leading to worsening outcomes for stakeholders as their needs are not met	Advocacy is provided too late and stakeholders are not advocated for and their outcomes worsen in the intervening period	Advocacy stopped too soon leading to stakeholders not being advocated for and their needs being unmet
Operational deliv & management	Parliament & legislatures	Public opinion	No public views, attitudes, and beliefs regarding doping resulting in no understanding of societal sentiment	N/A	Public opinion is provided too late to influence outcomes and decision making deteriorates as a result	N/A
Operational deliv & management	Parliament & legislatures	Research reports & findings	No research reports and findings are provided so practices are not updated to reflect changing trends and conditions	Inaccurate research reports and findings provided leading to stakeholders not being able to determine changing trends or conditions	Research reports and findings are provided too late to influence policy changes and outcomes for stakeholders	Research reports and findings stopped too soon leading to an inability to influence current practice and a gap in capacity
Operational deliv & management	Parliament & legislatures	Sanction data & statistics	No sanction data and statistics provided leading to an inability to track	Inaccurate sanction data and statistics leading to the making of guidance	Sanction data and statistics being provided too late resulting in policies which	Sanction data and statistics being applied too long resulting in sanctions being

			trends in testing and doping rates	that does not improve current conditions and outcomes for stakeholders	do not address the accurate state of current sanctions	applied for athletes who's sanctions should have finished
Operational deliv & management	International influence	Education attendance data	No education attendance data provided resulting in an inability to determine who is attending education and compliant with current education requirements	Inaccurate education attendance data provided leading to an inaccurate understanding of who has been attending education	Education attendance data provided too late to accurately capture stakeholders who attended	Education attendance data recording stopped too soon and attendees are not recorded leading to them being viewed as uneducated
Operational deliv & management	International influence	Research reports & findings	No research reports and findings are provided so practices are not updated to reflect changing trends and conditions	Inaccurate research reports and findings provided leading to stakeholders not being able to determine changing trends or conditions	Research reports and findings are provided too late to influence policy changes and outcomes for stakeholders	Research reports and findings stopped too soon leading to an inability to influence current practice and a gap in capacity
Operational deliv & management	International influence	Sanction data & statistics	No sanction data and statistics provided leading to an inability to track trends in testing and doping rates	Inaccurate sanction data and statistics leading to the making of guidance that does not improve current conditions and outcomes for stakeholders	Sanction data and statistics being provided too late resulting in policies which do not address the accurate state of current sanctions	Sanction data and statistics being applied too long resulting in sanctions being applied for athletes who's sanctions should have finished
Government agencies	International influence	Auditing	No auditing provided resulting in an inability to understand the current state of practice and guidance and deteriorating standards	Inaccurate auditing resulting in information being used that does not reflect the accurate state of practice leading to deteriorating standards	Auditing being undertaken too late to capture the current state of practice which leads to worsening outcomes	Auditing being stopped too soon resulting in a lack of up to date information being available for decision making
Government agencies	International influence	Compliance outcomes	No compliance outcomes provided so stakeholders are unaware of if they are compliant with current guidance	Inaccurate compliance outcomes provided leading to a lack of clarity regarding the accurate state of stakeholders compliance with guidance	Compliance outcomes are provided too late, and compliance deteriorates as a result of less monitoring	Compliance outcomes recordings stopped too soon leading to the inability to determine current compliance outcomes and inaccurate guidance

Government agencies	International influence	Education data & statistics	No education attendance data provided resulting in an inability to determine who is attending education and compliant with current education requirements	Inaccurate education data and statistics provided, leading to an inaccurate understanding of who has been attending and completing education	Education data and statistics are provided too late to accurately capture who is attending education programmes, leading to worsening education outcomes	Education data and statistics being stopped too soon, resulting in an inability to track accurate education data and compliance
Government agencies	International influence	Investigation reporting	No investigation reporting provided resulting in an inability to detect dopers through investigative practices and athletes continuing to dope without detection	Inaccurate investigative reporting leading to investigations which do not target actual underlying issues and a waste of resources	Investigative reporting is undertaken too early and does not capture when athletes are doping leading to an inaccurate view of current state of doping practice	Investigative reporting being stopped too soon resulting in an inability to catch and detect athletes who dope and their suppliers
Government agencies	International influence	Research reports & findings	No research reports and findings are provided so practices are not updated to reflect changing trends and conditions	Inaccurate research reports and findings provided, leading to stakeholders not being able to determine changing trends or conditions	Research reports and findings are provided too late to influence policy changes and outcomes for stakeholders	Research reports and findings stopped too soon leading to an inability to influence current practice and a gap in capacity
Government agencies	International influence	Sanction data & statistics	No sanction data and statistics provided, leading to an inability to track trends in testing and doping rates	Inaccurate sanction data and statistic leading to the making of guidance that does not improve current conditions and outcomes for stakeholders	Sanction data and statistics being provided too late resulting in policies which do not address the accurate state of current sanctions	Sanction data and statistics being applied too long, resulting in sanctions being applied for athletes whose sanctions should have finished
Government agencies	International influence	Testing & collection (NADOs)	Testing and collection of samples is not undertaken in foreign countries by the relevant NADO, resulting in athletes not being tested and continuing to dope	Inaccurate testing and collection resulting in athletes not being tested as they should be and continuing to dope as their tests are missed	Testing and collection being provided too late, and athletes are not tested as a result leading to increased doping	Testing and collection being stopped too soon resulting in an inability to catch and detect athletes who dope and continuation of doping practices
Government agencies	International influence	Advocacy	No advocacy provided so stakeholders are not	Inappropriate advocacy is provided leading to worsening outcomes for	Advocacy is provided too late, and stakeholders are	Advocacy stopped too soon leading to stakeholders not

			advocated for, and their opinions are not heard	stakeholders as their needs are not met	not advocated for, and their outcomes deteriorate	being advocated for and their needs not being met
Government agencies	International influence	Code compliance survey	Code compliance questionnaire is not completed so international governing organisations are unaware of compliance standards being met by signatories	Code compliance questionnaire is not completed accurately, and international governing organisations have a false representation of signatories' compliance	Code compliance questionnaire results are completed too late, and compliance deteriorates because of less monitoring and governance	Code compliance questionnaire is completed too soon, and an accurate reflection of updated compliance behaviours is not communicated to international governing organisations
Government agencies	International influence	TUE outcomes	No TUE outcomes provided resulting in TUE applications not being approved and athletes who would otherwise have a TUE being detected as doping	Inaccurate TUE outcomes being provided resulting in athletes being approved for a TUE they are not using and being detected for a substance they are using but not covered for	TUE outcomes being provided too late resulting in athletes unsure about if they have a TUE and withdrawing from competition as a result	TUE outcomes being applied too long resulting in TUEs that cover athletes for longer than necessary and tacit approval to use those substances for purposes other than medical need
Local management & supervision	International influence	Coordination of education	No data relating to the coordination or oversight of education efforts provided	Inaccurate data relating the coordination or oversight of education efforts is provided	Data pertaining to coordinating education requirements are not provided in an appropriate timeframe	Data pertaining to coordinating education requirements stopped being reported too early