Report of the Meeting of the *ad hoc* Group on Next-Generation Wildlife Health Information System (NG-WHIS)

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1. Introduction

The *ad hoc* Group was convened by the Director General at the request of the Preparedness and Resilience Department to provide strategic and technical pieces of advice to WOAH on the development of the new wildlife disease reporting strategy as a part of the Wildlife Health Framework.

Gaps and lack of clarity in wildlife disease reporting are noticeable for diseases and species that are not mentioned in WOAH's Lists and Codes, whilst the need for a complete, timely and transparent picture of the circulation of pathogens and other health threats in nature is crucial for conservation of biodiversity, and early warning on threats potentially affecting human, wild and domestic animal health. It was highlighted that there is an urgent need to develop a coordinated global long-term strategy to optimise disease reporting in wild species, based on a robust scoping exercise of the goal and purpose for reporting diseases in wildlife. The new strategy will ensure that data is widely available for analysis to inform conservation and One Health decision-making through a customised, user-centred wildlife health reporting system that is flexible and tailored for reporting health events (scope to be discussed by this Group) in wild species including, first occurrences of pathogens in a species or an area, changing epidemiological behaviour of a disease, or undiagnosed die-off.

The *ad hoc* Group met virtually on 23 October 2023, and in person between 22 to 24 November 2023, which this report covers. The *ad hoc* Group met online on 30 January 2024, and finalised the report.

2. Adoption of agenda, terms of reference and appointment of chair and rapporteur.

Dr David Hayman accepted to chair and the WOAH Secretariat was appointed as rapporteur. The *ad hoc* Group adopted the agenda and the Terms of Reference. The agenda, the list of participants and the Terms of Reference are presented in Appendix 1, Appendix 2 and Appendix 3, respectively.

3. Welcome

Dr Keith Hamilton, the Head of the Preparedness and Resilience Department, welcomed the members of the *ad hoc* Group and thanked them for their availability and contribution to this work of WOAH. He extended his appreciation to their institutions and national governments for allowing their participation in this meeting. He acknowledged the good progress made by the *ad hoc* Group and emphasised the importance of their contribution in addressing this challenging issue. He recommended proposing a set of options to the senior management might be a good strategy.

Dr David Hayman, Chair of the *ad hoc* Group, welcomed the experts, acknowledged their valuable contribution to date and encouraged members to continue to actively participate.

4. Item 3 on the agenda: Understanding the WOAH context, overview

The *ad hoc* Group noted the prerequisite for several definitions, including wildlife (currently defined in the WOAH Code, but not in line with numerous common usages of the term), wildlife health (not defined in the Code), a health or mortality event and a case, as the Group is working on to develop a wildlife health information system. The *ad hoc* Group noted that, for the time being, these three definitions should be kept as broad as possible. In addition, the *ad hoc* Group noted the importance of better understanding WOAH's focus: domestic/trade; wildlife, or both. Consideration should be given to the links between wildlife health, the environment, and the health of domestic animals and people, as per the current One Health definition.

For the system being developed, the discussion considered defining an event both at population and individual level, as well as health-related events or cases. The *ad hoc* Group agreed that for the purposes of the discussion, "wildlife" included all wild animals.

5. Item 4 on the agenda: Wildlife disease reporting at WOAH, overview

Paolo Tizzani gave an overview of the current wildlife disease reporting to WOAH. Of the mandatory notifiable diseases listed by WOAH, 81 concern terrestrial and aquatic wildlife. The WAHIS system has been collecting data for both domestic and wild animals and on non-listed wildlife diseases through WAHIS-wild beta from 2011 until 2019. The system collects validated information through six-monthly reports, immediate notifications and follow-up reports (based on specific criteria). The current reporting process and requirements could be perceived as complex by new users (WOAH national focal points and Delegates), potentially leading to significant gaps in reporting. Avian influenza (AI) and African swine fever (ASF) are the two diseases for which good quality data are available for wildlife. WOAH listed diseases are those that are determined, by applying criteria specified in Terrestrial and Aquatic Animal Health Codes, to be important animal diseases with potential for international spread; several pose a threat to international trade. Increased transparency for these infections may therefore have economic implications for countries.

In 2011, a separate and dedicated system, WAHIS-wild, was launched to provide a pathway for voluntary reporting of around 50 non-listed diseases in wildlife annually. This system was paused in 2019. To replace WAHIS-wild, a temporary system, WAHIS-wild Beta was set up with several changes and simplifications and launched in September 2023. The system tracks the disease status, the type of surveillance in place, control measures, and qualitative and quantitative data (species affected, cases, deaths) related to health events in wildlife. The system uses a questionnaire on the SurveyMonkey software platform. Results are displayed on a dashboard available on the WOAH wildlife portal. To date, Members engagement has been low and little data has been entered into the system. A reporting procedure and training materials have also been developed to facilitate the reporting process. This data is currently not validated by WOAH but comes from official authorities and is directly published.

Reporting and use of the data for non-listed diseases has been very limited, hence requiring a different strategy on modalities and scope of the reporting. According to WOAH Members impediments to reporting wildlife health events, include (not in order of importance):

- Limited resources in some countries hinder wildlife diseases monitoring
- Focal Points are sometimes blocked from reporting some diseases because of the impact on imports and exports.
- Diseases that can be easily reported are often ones that are not important for trade (e.g., non-listed diseases).
- There are numerous barriers to obtaining information from the field through the multiple steps to reporting.
- For IUCN (International Union for the Conservation of Nature) listed threatened species, mortality must be reported to different departments, such as the Department of National Parks and Wildlife Conservation (NPWC) in Nepal, rather than to the national Veterinary Services, or WOAH Delegate or WOAH national focal point
- Lack of ability to diagnose and/or confirm the cases and therefore not knowing the cause of mortality
- Many wildlife mortality events have a non-infectious cause
- WOAH Wildlife National Focal Points have numerous different priorities and other tasks to focus on, which impacts their interest in and capacity to report to any system
- Diagnostic data is sometimes generated by other groups, including in academia, and is pending publication, making access to these data difficult.
- Many findings are not accredited, therefore posing challenges regarding their validity and interpretation

Some other existing databases, which collect information on wildlife, were briefly mentioned: GBIF (Global Biodiversity Information Facility), Genbank (National Institute for Health genetic sequence database), GISAID (Global Initiative on Sharing All Influenza Data), EMPRES-i+ (Global Animal Disease Information System, FAO), PHAROS (Pathogen Harmonized Observatory), WorldPop (Open Spatial Demographic Data and Research), Bluedot (Infectious disease intelligence with AI), VERENA (Viral Emergence Research Initiative), datacov (Bat Coronavirus database), iNaturalist (Citizen science record and identify wildlife observations) and eBird (Citizen science project to record bird sightings). Some are well-established, such as GBIF, Genbank, GISAID and WorldPop. Each has its strengths and weaknesses, and each has different levels of user engagement and data input and use, resulting in geographical bias. For example, they range from almost no data entered yet on PHAROS (a new wildlife infectious disease related platform), to millions or even billions of data points. For example, GenBank (www.ncbi.nlm.nih.gov/genbank/) is a comprehensive, public database of over 1.6 billion nucleotide sequences for 450,000 formally described species, launched in 1982. Over 820,000 people have contributed over 1.3 billion bird observations to eBird since 2002, and iNaturalist has over 165,767,807 observations from 2,901,899 observers since 2008.

6. Item 5 on the agenda

6.1. Item 5.a: Discussion on the need for a new strategy and recommendations

WOAH's initial objective for collecting wildlife disease data was to present a comprehensive report on the state of animal diseases to the World Assembly of Delegates at its General Session in May each year. Therefore, the *ad hoc* Group's ongoing efforts to define the scope and objectives are crucial for establishing an effective wildlife disease reporting system tailored to its intended purpose.

The *ad hoc* Group unanimously recognised the necessity for a globally inclusive, robust and user-friendly reporting system that includes not only non-listed and non-infectious diseases but also those challenging to diagnose, particularly mortality events.

WOAH emphasized that the *ad hoc* Group should adopt a broader vision beyond the conventional focus on domestic animals and trade, maintaining a holistic perspective on animal health for the purposes of this exercise.

Key considerations for an up-to-date wildlife health reporting system highlighted by the *ad hoc* Group include:

a. Integration of the reporting system with key useful databases that reduce redundancy and maintain other current knowledge, including the IUCN RedList database for species lists and GenBank for gene sequences related to reports.

b. Reporting all types of mortality events, emphasizing the protection of endangered species.

c. Determination of whether the system will operate at the population or individual level.

d. Distinction between reporting infectious diseases and pathogens (e.g. presence of infection in the absence of disease).

e. Consideration of data usage and user identification before system design.

f. Emphasis on member-driven design rather than a top-down approach and involvement of stakeholders in system design discussions.

g. Simplicity and practicality in the design of the reporting system.

h. Differentiation in reporting strategies for non-listed diseases, focusing on data utility.

i. Confirmation and efficient quality checks for the data submitted.

j. Definition of significant events for which data should be collected, based on the species and number of animals involved.

k. Collection of data on health events, infectious and non-infectious, mortality, and non-mortality events (including usual and unusual situations).

l. Exploration of a dual system for verified and community-fed data.

m. Potential addition of IT-level filters to streamline data processing.

n. Consideration of collaboration with existing data-collecting entities for a global system.

o. Consistent data collection, processing, and structure.

p. Involvement of laboratories in uploading diagnostic results to the system.

q. Consideration of incremental testing with pilot countries for feedback and improvement.

r. Visibility of mortality events to support countries and focal points.

s. Recognition of potential involvement of multiple agencies in the diagnosis for high-profile events.

t. Avoidance of the term "outbreak" to prevent confusion, including with listed disease events.

u. Awareness of the risk of pathogens being misdiagnosed or even diagnosed by the “wrong” authority.

v. Caution against using systems where any user can connect without user identification and accountability was raised.

w. The group recommended broadening access compared with WOAH’s current business model with user authentication.

x. Ensuring usability in low-resource situations for global accessibility (acknowledging that even in high-income countries "lower resource" situations can occur, *e.g.* due to bad internet connectivity while being on the field or being at a lab that doesn't have the latest-and-greatest internet connection).

y. Interest in accessing the cause of death or event, even though it may not be relevant to veterinarians.

The *ad hoc* Group acknowledged that the current reporting system (WAHIS wild and WAHIS wild beta) fails to benefit stakeholders, particularly those such as ministries of the environment, leading to little incentive for reporting wildlife diseases. To address these issues, the *ad hoc* Group conducted a prioritization exercise to define the system's aim and address pertinent questions.

6.2. Item 5.b: Countries’ needs and capacity: analysis and comments on the PRD-2021/2023-in-country information system survey dashboard

Claire Cayol presented the main results of the 2021 in-country information survey that was targeted at WOAH National Focal Points for Wildlife (NFPW), and the 2023 survey on wildlife health management systems targeting the WOAH National Focal Points for Wildlife, Aquatic Animals and Animal Disease Notification. The overall response rate of the survey was 38.9% (56% for National Focal Points for Wildlife) and 145 countries or territories (72.5%) sent

at least one answer. 47% and 22% of respondents mentioned the existence of national surveillance programmes in terrestrial and aquatic wild animals respectively. Data collected on wildlife diseases was mainly (44%) used at the national level for disease monitoring, management and prevention as well as for WOAH reporting. A risk of data loss at the national level was highlighted due to unreliable data recording methods. The need for an information system or for guidance in data management were expressed by 70% and 64% of respondents, respectively. The core information recorded by countries were species affected, location and type of event, including symptoms or syndromes observed and pathogens identification as well as quantitative information. The dual reporting system for listed and non-listed diseases was considered useful by 65% of respondents. WOAH reporting of non-listed diseases was under the responsibility of the NFPW in only 34% of cases. The current reporting procedures were deemed clear by 61% of respondents and a majority (78% of respondents) agreed on the need for reporting non-listed diseases to WOAH. Respondents mainly (57%) opposed sharing non-validated data with WOAH while 31% were in favour and 12% were neutral. The features considered essential in an information system for wildlife disease reporting cited by more than 10% of respondents were user-friendliness, simplicity, offline mode, and usability on mobile devices.

The *ad hoc* Group identified that any early warning of disease events in wildlife from the field is not going to be confirmed or validated results because confirmation/validation takes time, therefore there is some disconnection between the reality (validated information collected at the moment) and the objectives (*e.g.* early reporting of events).

6.3. Item 5.c: Analysis and comments on the PRD-2023 information system survey

Other systems were briefly presented as successful systems, to discuss how WOAH could make the best of these databases: GBIF, SISS-GEO, HealthMap, iNaturalist (for tracking dead birds and reptiles among other things), EMPRES-i (most data coming from WAHIS (90% of the data displayed for the year 2022)), and WHISPers.

The results of the survey on existing information systems (PRD-2023) were presented: The survey aimed to compile systematic information on the design, maintenance, flexibility and exploitation of information systems currently used for wildlife data management, especially wildlife health data, and to identify good practices in wildlife health data management and to support decision-making. 82 information systems were targeted, 24 information system managers connected to the survey and 16 full answers were received from 14 countries. Despite the low response rate, the answers came with a high level of detail and were informative. The methodological objectives of the systems were: data collection, storage, integration, centralisation and consolidation for analysis, modelling, and dissemination through fast, simple, repeatable, accurate, standardised and auditable data processes. The operational objectives were to ensure the logistics of surveillance, provide data for situational awareness and detect changes, disease control, administrative adjustments, and preparedness. The good practices most commonly identified were: (01) Clear and simple case definitions and geographical scope *e.g.* “any animal found dead or sick constitutes an event” ; (02) Added value to system users ; (03) Selective access for accredited users; (04) No record of control measures; (05) Early warning system; (06) Updated reports and version control; (07) Input: species vernacular name (dynamic reference tables), sex, and age; (08) Location: GPS coordinates; (09) Passive and targeted surveillance reported, negative and positive results reported; (10) Disease, clinical signs, and mortality recorded, type of diagnostic procedure reported; (11) Numerical data: number of sick, death, sampled reported; (12) Interoperable; (13) Monitor access; (14) Intellectual property defined, protection against data manipulation, administrator, developers and hot-desk team in house; (15) Annual cost update/maintenance of the system: 10-20% of overall cost of the system.

The *ad hoc* Group discussed the need for interoperability: connecting any database like the WOAH wildlife disease reporting system to other databases such as the IUCN’s RedList to enable efficient and consistent use of the names of the species, plus additional data such as genetic sequences via GenBank, would be very useful, but from an IT perspective, it comes with some complications, especially with old databases.

The IUCN database could also be used to identify unusual geographic locations of a species. Sometimes, they are identified in zoological collections or farmed animals, which may be relevant for certain purposes. Genbank could prove useful in ensuring up-to-date data on genetic sequences. GenBank provides a standardised model for sequence management with a range of associated metadata.

The importance of partnering with an existing database would be to avoid redundancy, capture relevant data, and benefit from existing solid networks. Institutional challenges can arise when discussing sharing data, database interoperability or using data from other databases in one's own system.

Consideration needs to be given to the necessary human resources required to keep the countries engaged in data sharing. The WOAH National Focal Point for Wildlife Network is currently under development to ensure a more sustainable engagement, yet it is acknowledged that even if well-developed it is unlikely to have the capacity to do more than a limited amount of data entry and data validation, given the real number of animal health issues that could be reported.

6.4. Item 5.d: Analysis and comments on the scope and objectives of a new information system

The two objectives of a new information system initially suggested were discussed and rephrased by the *ad hoc* Group, as follows:

- Highly sensitive and real-time data on wildlife mortality (primarily) is broadly available for analysis to inform conservation and One Health actions and in particular for conservation decision-making through real-time reporting.
- Robust (*i.e.* accurate and timely) information on disease diagnosis is provided through Veterinary Services or other validated stakeholders (validation process to be confirmed) to increase knowledge on non-listed wildlife diseases.

Discussions centred on the reporting scope and potential conflicts with the existing WAHIS system, which currently captures certain information on wildlife for WOAH listed diseases. Timing considerations were also explored, comparing real-time reporting to the current annual report, in the context of both WAHIS and a potential new system. WAHIS relies on validated data for listed diseases with implications for international trade, outlined in the WOAH Code.

The proposal of establishing a system reporting mortality events in wildlife, designed to complement WAHIS and provide valuable support to countries, was emphasized. It was stressed that the new system should complement the current one rather than replace it. This was due to the important legal implications of listed diseases and therefore the need for these to continue to be reported within the WAHIS system.

Two potential notification pathways were delineated: one for events with a diagnostic result available and another encompassing events without definitive diagnosis available. The complexity of the system was noted as a factor influencing design barriers and the ability to provide data. Linking these two pathways, especially considering the time needed to obtain a diagnostic result, was discussed as an issue. Therefore, the latter pathway is likely to generate the most data in the timeliest manner (*i.e.* be the most sensitive), which might be the most important for some uses (event detection and large-scale trends). Consideration is needed to provide mechanisms to pair up diagnosticians and pathologists to speed up identification of health events.

The importance of publishing open data with open licences was highlighted, ensuring accessibility and usability by anyone interested. Public data, whilst visible, may not necessarily be usable by all. However, public data increases user engagement, enables greater flexibility and more opportunities for data analysis thus allowing greater information and knowledge generation from the data.

A discussion ensued regarding the balance between anonymity and the identification of contributors under two scenarios: one citizen science type and one where only approved data stakeholder can upload information. It was underscored that being able to trace the origin of contributors is essential for follow-up purposes.

6.5. Item 5.e: Analysis and comments on data stakeholders and “personas” and strategy for integrating more data stakeholders without disrupting WOAH’s mandate and membership, including data ethics considerations

A data ethics presentation and discussion highlighted the difference between the law and ethics, as well as the importance of having a solid data ethical framework. Detailed results of the application of this exercise are presented in Appendix 4. Briefly, the data ethics canvas looks at:

(i) Data considerations (access to data, lack of representation, accuracy, limitations of data sources);

(ii) Impact considerations for different stakeholders (WOAH, data providers, data users, intended beneficiaries), both positive and negative, interconnections between both and in short and long terms; mitigation measures were proposed for the negative impacts.

(iii) Engagement considerations, how to engage stakeholders to contribute to the database and how they use the data.

In order to ensure ethical decision-making concerning data, it was suggested that the team appoint data ethics advocates or 'champions'. However, it is equally important to ensure that the entire team is well-informed about these ethical considerations and principles, enabling their integration into the system design process.

The *ad hoc* Group conducted a comprehensive review of the potential impacts, both positive and negative, that a new system could have on WOAH, data contributors, data users, and the intended beneficiaries. Strategies to mitigate some of the identified negative impacts were discussed and outlined (See Appendix 4).

Following the presentation, stakeholders engaged in further discussions, emphasizing the involvement of the WOAH Communication Department to determine the most effective strategies. It was recommended to consider that if the proposed system deviates from WOAH's usual operational standards it would require thoughtful planning on how to present it to upper management and member states for acceptance.

There is a recognition of the need to conduct a risk assessment for each critical point in the implementation process. Some countries might support an approach inspired by citizen-based systems to feed information directly to the government rather than WOAH or any global database. Getting a consensus from Members would be necessary.

6.6. Item 5.f: Discussions on the benefits/risks of high sensitivity, low specificity data (epidemiological relevance, technical challenge (level of validation), ethical considerations)

The issues relating to the benefits/risks of high sensitivity, low specificity data repeatedly arose during the discussions. Highly sensitive data may lead to non-specific information, restricting their epidemiological relevance. However, currently while the data WOAH receives are very specific, they have varying levels of sensitivity, depending on the disease involved. There are numerous technical challenges (*e.g.* level of validation) and ethical and trade considerations due to this and these were acknowledged and discussed.

The secretariat recalled the two data path scenarios:

- Current “Many to One” scenario, where a WOAH national focal point centralises the data and sends to WOAH
- Novel “Many to WOAH” scenario where numerous identified national data stakeholders directly transmit information to WOAH

Risk associated with the "Many to One" approach to WOAH were discussed, including the risk of removing reporting responsibility out of Veterinary Services that are the main WOAH partners. It was noted that in the context of a real-time mortality database, the "Many to WOAH" bypassing Veterinary Services approach could be more effective for tracking wildlife health issues, in terms of reporting timeliness and improved sensitivity while impairing specificity, with access to a wider source of data and sharing the burden of reporting. However, this approach could, on the other hand, come with issues related to specificity of the data collected as well as acceptability by Members.

The absence of background data for wildlife health poses a challenge, making it crucial to understand what, when, and where wildlife is dying. For a mortality-based system, one of the suggestions was to shift to a model offering the possibility of citizen-based reporting, moving away from the current model of reporting through WOAH National Focal Points. Another suggestion was to adopt a wider stakeholder approach while remaining under the responsibility of Veterinary Services. The validation process could involve the WOAH National Focal Point for wildlife, who would be responsible for entering validated tests, diagnoses, or other key information.

An option considered is incorporating country- and species-specific rapid risk analysis when a threshold (decided by veterinary services) is met, although management of such a system could be challenging. Questions arose regarding the quality of research vs. non-research data and its impact on system design. In general, having predetermined thresholds was not deemed particularly useful, given the broad scope of such a proposed system.

Validation is the responsibility of the system owner (WOAH) and the discussion included the potential use of specific databases, such as the IUCN Red List, to simplify the process. Verification of new data input is the responsibility of the notifier. The importance of understanding contributors and a process for those willing to enter data into the mortality database was emphasized.

Debates centred around a pure citizen science database versus a more restricted group of registered/validated contributors with the necessary background to comprehend the epidemiological situation. Acknowledgement that some entries (perhaps the majority) may never be linked to a diagnostic was deemed acceptable.

Recording all wildlife events generates a substantial amount of information, potentially diverting attention to non-focus species. It was emphasized that the system's primary purpose is reporting and not to initiate systematic investigations.

6.7. Item 5.g: Recommendations on interactions with current disease reporting pathways

Certain countries will likely prefer not to have a citizen-based system directly contribute to a global reporting system; instead, they would rather the information be routed through the government first, bypassing WOAH. It is understood that some members may opt out of reporting data and results.

The existing WAHIS system exhibits some deficiencies, leaving systematic gaps in coverage that need addressing.

Deliberations about the level of granularity in confidentiality settings took place: determining what information is shared or kept private. Questions arose about the purpose of collecting data if a significant percentage cannot be shared publicly.

The WOAH WAHIAD representative observed similarities between the proposed structure and WAHIS. She also highlighted the system's dual means, which could complicate matters. Opening access to the general public may not be well-received by some or many governments. Initial user engagement is crucial since, regardless of the system's design, without user participation, the system is unlikely to be utilized effectively, thus defeating the purpose and returning things to the current *status quo* with limited reporting.

The *ad hoc* Group discussed the use of the database for diagnostic information from non-governmental laboratories for listed pathogens, but that this listed data may not be made public through this database but lead to “normal” investigation and reporting as per the current listed disease reporting process.

It was emphasized that while there existed a lengthy wish list of functionalities during the establishment of WAHIS, the lessons learned emphasize the need to approach them with caution and prioritize, ensuring the system remains simple. Discussions revolved around the connection between national and global databases. Direct interoperability was noted as a costly endeavour, underscoring the importance of considering long-term system maintenance costs.

6.8. Item 5.h: Discussion of a strategy to enhance data quantity and quality

Several aspects of data quality were covered by the *ad hoc* Group during the meeting, such as ensuring consistency and accuracy in the dataset, defining the frequency of data collection, the importance of interoperability with other relevant databases, and the level of security needed to store and access the data. Having a good description of what is in the dataset is also important. Developing a visual format, such as a schema, that will support the concept and the idea is very helpful to support IT needs. Note that visual displays of the data also enhance insights and user engagement. Finally, Focal Points must undergo appropriate training and sensitization to effectively engage with the system.

The discussion revolved around data cleaning and the requisite resources for its execution, as it is acknowledged as a labor-intensive process that constrains the utilization of data. Therefore, a suitable and clear data management plan is required.

Research bodies could support low-resource countries to conduct data analysis on large and, potentially huge, volumes of data, should any scheme become successful.

Currently, the data reported to WOAH are based on case definitions. There will likely be key differences for any system that targets wildlife where the current case definitions likely do not exist or will not be relevant.

The level of confidence of data was discussed, regarding location and GPS position points for example. There was a discussion about the need for smartphones for some of these aspects, along with data privacy issues. If GPSs or such phones were not available discussions about the trade-off between simplicity, accessibility, error and reporting likelihood followed.

Adding photographs would add a data quality checkpoint but could be a technical burden. Considerations should be taken around privacy with photos, due to identifiable data (e.g. GPS points, people on the photo). One way to curb this would be to not make the photo available on the public interface, though that might still not remove other privacy issues. A photo would also support Veterinary Services ability to learn more about wild species.

6.9. Item 5.i: Notification structure (chart) and technical considerations

The *ad hoc* Group decided on the following categories to be captured by the system:

- Primary information that will be the core of the system: species, location, time of detection, type of event (mortality/morbidity), type of surveillance, quantitative data (number of individuals impacted), with links to other datasets possible, particularly IUCN for species classification.
- Secondary information: this would ideally link the primary event/mortality data to further data: aetiology confirmed/provided by Focal Points, the level of confidence (*i.e.* suspected/probable/confirmed), records of co-infection/co-aetiology, laboratory procedures (particularly serology vs molecular and/or isolation) and negative/positive case numbers, with links to other datasets possible, in particular such as GenBank as a genetic sequence repository.

An option could be to have a dataset on mortality that would be linked to another dataset with diagnostics information. The level of control of WOAH National Focal Points was discussed, and its link to the likelihood of them and others using the database. Concerns about location were also discussed – without any GPS information, it could be difficult to locate the event. Some additional fields may need to be included, such as country and administrative division, depending on the purpose.

Two broad scenarios are proposed by the *ad hoc* Group:

1. Targeted registered users – with WOAH National Focal Points validating diagnostics – providing more specific data with a focus on diagnosis. This is like the current WAHIS-wild model.
2. All registered users (Citizen Science) – with WOAH National Focal Points validating diagnostics – providing very sensitive and open data with a focus on mortality. This is substantially different from the current model.

Four scenarios regarding diagnostics were discussed:

(i) WOAH National Focal Points have the diagnosis – information can be shared after validation by competent authority,

(ii) Research or other non-governmental institutions have the diagnosis – the WOAH National Focal Points need to do some additional work to check and validate the results before sharing the information.

(iii) Research or other non-governmental institutions have the diagnosis – the WOAH National Focal Points do not do any work to check and validate the results before sharing the information.

(iv) No diagnosis – information can be shared.

Option (iii) above, the release of diagnostic data by anyone, was not liked and excluded from further discussion, but the others (i, ii, and iv) were all seen to have potential benefits, despite other weaknesses.

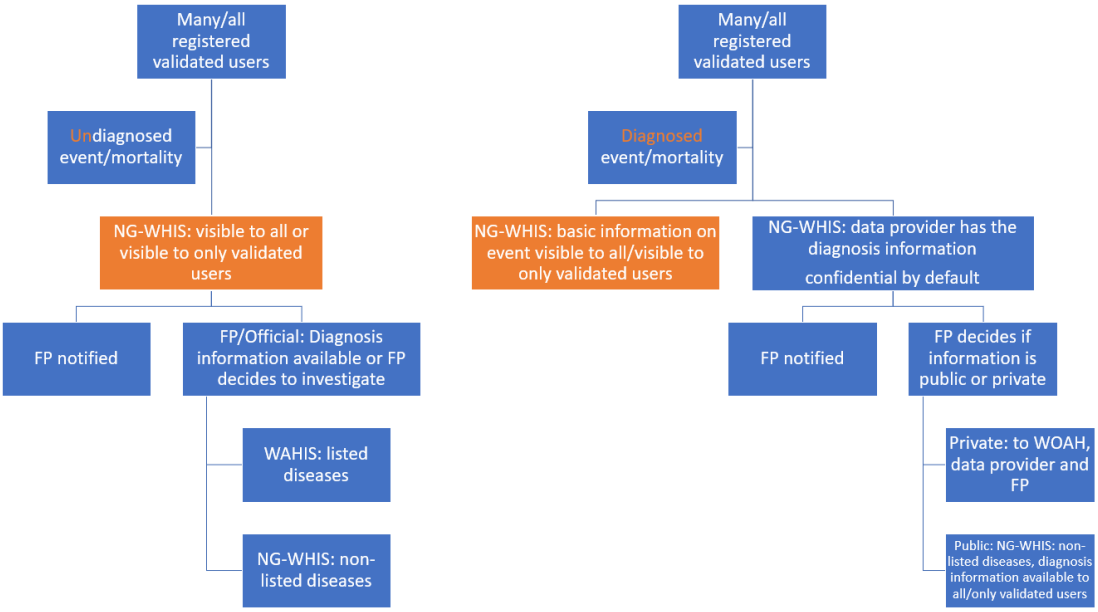

***Figure1**. Chain of action suggested with two scenarios: system collecting information from diagnosis events*

A presentation covered technical considerations for the systems, emphasizing general design principles and network setup as mandatory requirements. The strengths and weaknesses of various application architectures were discussed, taking into consideration features mentioned by Members, such as ease of use, mobile friendliness, and offline use. Web-based delivery was noted as likely more suitable, as Web applications can be accessed via any device equipped with a Web browser – as opposed to e.g. mobile applications working only on smartphones and requiring an app delivery mechanism such as a third-party app store. However, typical web application designs place a hard requirement on a stable Internet connection between the user's device and a server. This can be a problem to ensure the widest accessibility of the system. The application should be designed to treat the network as optional as possible. It should provide basic functionality such as data entry and cached data access when offline. The functionality should expand with *e.g.* data submission and updates when Internet access is redeemed. Open technologies such as the PWA (Progressive Web App) architecture could be leveraged for this purpose. Overall, ensuring the system is available to users in diverse situations in order to increase the amount of submitted data will require a creative approach to the technical design.

Several other crucial parameters need consideration, including system security, data integrity to prevent compromise, authenticity verification of both data and the system, and performance monitoring using tools. System access, a potential barrier, underscores the importance of performance optimization. While storage is cost-effective, the rapid consumption of space by images necessitates attention if photos are used, which is one possible proposed approach for recording mortality and species data.

The strengths and weaknesses of Free and open-source software (FOSS) were discussed. Opting for building the system upon open source software (software libraries, frameworks, or entire applications if deemed relevant) would eliminate the need for long-term agreements. The system would still have to be developed, either via external entities or in-house by WOAH. In any case, releasing the system as open-source software itself would reduce the risk of vendor lock-in and give WOAH more control and ownership of the system. But this may require additional oversight by WOAH on the governance of the system, such as managing code repositories.

The design approach advocates for an iterative process and a pilot phase following industry principles, emphasizing careful planning. Acknowledging the possibility of initial errors, the first stage allows for correction as long as it occurs early. The subsequent phase involves general deployment. This is the industry best practice and reduces the risk of costly errors.

During discussions, the *ad hoc* Group recommended incorporating a section on the type of surveillance into the system, emphasizing the inclusion of information on how surveillance levels have evolved—an insightful addition for tracking changes in mortality data, however, this would be a further field and require clear definitions.

6.10. Item 5.j: Recommendation on governance

Potential partners were presented, such as international organisations (UNEP, GBIF, IUCN's Red list), NGOs (WWF), and international treaties (CITES), to co-develop the system (dual governance), to be able to benefit their audience, and eventually join forces and resources.

To set up the system, international partners were deemed to be a more appropriate fit, but the NGO system may be more relevant users. Adding these partners would be powerful in terms of representativeness, legitimacy, and engaging with conservation stakeholders.

Recommendations were made to consider involving WHO and FAO, along with UNEP, as members of the Quadripartite.

6.11. Item 5.k: Final recommendation on the best implementation strategy

The *ad hoc* Group went through a live survey exercise to evaluate key points discussed during the three-day meeting and tried to reach a consensus to inform next steps and decision making. The main results of this live survey can be found in Appendix 5. The *ad hoc* Group recognizes its small size and the limited inclusion of end users such as Focal Points. Therefore, further discussion is deemed necessary despite these findings.

The *ad hoc* Group highlighted the need for **user-centric design**, and a **focus on operability in low-resource settings** as a priority while considering **data ethics** at all steps of the process.

The *ad hoc* Group voted to go **forward with a new system or to adapt a current system,** as an alternate option on the basis that the current WAHIS/WAHIS-wild beta systems are not suitable for the intended purpose.

The *ad hoc* Group was in favour of having an open submission of mortality data, with the **system being used by registered users** (users could be approved by Veterinary Services, or a more open approach could be taken, where public, registered users could contribute), who might be asked to provide the crude cause of mortality. The *ad hoc* Group recommended that some sort of registration was implemented.

The *ad hoc* Group felt that the systems should accept **diagnostic data on non-listed diseases from *pre-approved (e.g. by veterinary authorities)* laboratories,** irrespective of whether they were governmental laboratories, but without each individual submission having to be approved by a WOAH National Focal Point. This would reduce the National Focal Point's workload and increase reporting of results.

The *ad hoc* Group was divided over who should have access to the database of submitted mortality-only data – responses. Members were divided between 1. the data being accessible to the public immediately, 2. only to the registered users, or 3. only accessible to WOAH, FP and Collaborating Centres.

The *ad hoc* Group estimated that a monitoring and evaluation system was needed to understand if and how the system operates successfully. It may be necessary to set up a **set of simple KPIs**. The sensitivity of the system could be assessed automatically.

The *ad hoc* Group briefly commented on **what success and failure might look like**. Success (identified by metrics and evidence) would be increased reporting, from a greater number of countries, from more regions, on a greater range of health issues among a wider range of species. The system would have failed if nothing changed.

Making data accessible to a greater number and wider range of people would justify a new system. The *ad hoc* Group concluded that although a consensus may not have been reached on all points raised during the discussions, it is evident from this poll that **adjustments are necessary to align with WOAH's new narrative on animal health, including wildlife**.

7. Next steps

The Secretariat informed the *ad hoc* Group the report would be presented to the WOAH Director General for consideration at its 05.02.2024 meetings.

…./Annexes

Annex 1. Agenda

MEETING OF THE WOAH AD HOC GROUP FOR THE NEXT GENERATION WILDLIFE HEALTH INFORMATION SYSTEM

Virtual meetings, 23 October 2023, and 30 January 2024

Face to Face Meeting,Paris, 22 to 24 November 2023

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1. **Introduction**
2. **Opening of the meeting by Dr Keith Hamilton, Head of the Preparedness and Resilience Department**
3. **Adoption of the agenda and Terms of Reference (ToRs)**
4. **Understanding the WOAH context, overview**
5. **Wildlife disease reporting at WOAH, overview**
6. **Discussions**

   6.1 Discussion on the need for new strategy and recommendations

   6.2 Countries' needs and capacity: analysis and comments on the PRD-2021/2023-in-country information system survey dashboard.

   6.3 Analysis and comments on the PRD-2023 information system survey

   6.4 Analysis and comments on the scope and objectives of a new information system

   6.5 Analysis and comments on data stakeholders and "personas" and strategy for integrating more data stakeholders without disrupting WOAH's mandate and membership, including ethics considerations.

   6.6 Discussions on the benefits/risks of high sensitivity low specificity data (epidemiological relevance, technical challenge) level of validation), ethical considerations)

   6.7 Recommendations on interactions with current disease reporting pathways

   6.8 Discussion of a strategy to enhance data quantity and quality.

   6.9 Notification structure (chart) and technical considerations

   6.10 Recommendation on governance

   6.11 Final recommendation on the best implementation strategy

7. **Other matters**
8. **Adoption of the partial report**

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Annex 2. List of Participants

MEETING OF THE WOAH AD HOC GROUP FOR THE NEXT GENERATION WILDLIFE HEALTH INFORMATION SYSTEM

Virtual meetings, 23 October 2023, and 30 January 2024

Face to Face Meeting,Paris, 22 to 24 November 2023

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Annex 3. Terms of Reference

MEETING OF THE WOAH AD HOC GROUP FOR THE NEXT GENERATION WILDLIFE HEALTH INFORMATION SYSTEM

Virtual meetings, 23 October 2023, and 30 January 2024

Face to Face Meeting,Paris, 22 to 24 November 2023

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Purpose

The purpose of the ad hoc Group for the Next-Generation Wildlife Health Information System (NG-WHIS) is to provide strategic and technical pieces of advice to WOAH in the design of the new strategy for wildlife diseases reporting.

Ad hoc Groups are convened under the authority of and report to the WOAH Director General.

Background

One objective of the WOAH's Seventh Strategic Plan (2021-2025) is 'implementing digital transformation through Data Strategy' by developing data governance framework to optimise data management, while improving accessibility and visibility of data for stakeholders as well as efficiency and agility through modern internal processes and tools. The WOAH wildlife health framework further advocates for an improved collection, analysis, reporting and utilization of good quality wildlife health data at national and global levels.

Although information regarding surveillance of domestic species is captured by the existing reporting pipelines (WAHIS, relaunched in 2022), the situation with reporting wildlife diseases is ambiguous. Listed and emerging diseases occurring in wild species are currently reported to WAHIS. Other events not clearly identified can be reported in accordance with Article 1.1.5 of the terrestrial code. For a set of 56 non-listed diseases or health events, a temporary online survey WAHIS-Wild beta was launched in 2023 after five years of discontinuation of the reporting module WAHIS-Wild. A reporting gap is noticeable for diseases and species (mainly invertebrates) that are not mentioned in WOAH's lists and code.

There is an urgent need to develop a coordinated global long-term strategy to optimise disease reporting in wild species, based on a robust scoping exercise of the goal and purpose for reporting diseases in wildlife. This strategy includes the characterisation of the needs and capacity of Members and the proposition of an **optimal reporting route based on a bespoke information system** for worldwide reporting of non-listed diseases in wild species, alongside an effective communication strategy to encourage reporting. *A survey was launched in 2023 to better characterise members' needs and capacity (SURVEY 1)*. This system, temporarily called the 'next-generation wildlife health information system (NG-WHIS)', will necessarily build on knowledge gained from previous experiences and use cutting-edge technology while complementing already existing systems. It will ensure that high-quality big data is widely available for analysis to inform conservation and One Health decision-making through a bespoke user-centred wildlife health reporting system that is flexible and tailored for reporting all non-listed health events in wild species especially, first occurrences (geographic or in a new species), unusual health events or undiagnosed die-off. In 2022, a group of experts was gathered and contributed to developing *a questionnaire to audit existing information systems for wildlife health data (SURVEY 2)*. It was agreed that this group would continue the work to the next step *i.e.* create an *ad hoc* Group to contribute to the business case for a coordinated global long-term strategy for wildlife health data collection.

Specific issues to be addressed

The new long-term strategy involves adapting or developing a wildlife disease reporting system and ensuring that this system meets the current and upcoming challenges encountered by Members while contributing to making the World a safer place. It also involves developing a durable communication plan to incentivize and ensure forthwith reporting. The *ad hoc* Group on NG-WHIS aims to bring to WOAH supplementary expertise in a forum for constructive brainstorming on the best strategy to reach the objectives identified by WOAH.

The *ad hoc* Group will agree on the scope and purpose of the project and contribute to analysing the results of the two surveys launched by WOAH in 2023. With these surveys, the *ad hoc* Group will provide transparent advice on the five options regarding an information system for collection and sharing of information on wildlife health worldwide:

1. The collection of data on wildlife using the existing WAHIS system developed to collect information on listed diseases of interest for trade.

2. The revival of the WAHIS-wild module which was an extra module in WAHIS to report information on wildlife diseases.
3. The adaptation of an existing system used at national or regional levels to meet WOAH's needs.
4. The development of a new information system from scratch.
5. The *status quo:* no change to the ongoing business.

Actions to deliver

The *ad hoc* Group will be asked to:

- Acquire a good level of knowledge on the general WOAH reporting and notification, listed and non-listed diseases and wildlife health framework, as well as an overview of the existing ecosystem of information systems for reporting diseases and key stakeholders involved;
- Share relevant experience on good practices in acquisition, management, analysis of epidemiological big data, including ethical data-related concerns;
- Contribute to the analysis of the two surveys launched by WOAH;
- Provide inputs and comments, advise on the five options proposed, and recommend strategies, including high-level guidance and recommendations on wildlife disease reporting while taking into account WOAH's constraints, members' capacity, and the current ecosystem of wildlife disease reporting systems;
- Actively contribute to the final report describing the best strategy.

Consideration

- Consider the results of the Wildlife Health Survey Report 2020
- Consider the results of the in-country report 2021
- Consider the results of the two surveys launched in 2023 by the Preparedness and Resilience Department

Expectation

Ad hoc Group members should:

- Sign the WOAH Undertaking on Confidentiality of information
- Complete the Declaration of Interest Form
- Read and study written material provided by the WOAH prior to the meeting
- Agree on the appointment of the chair and rapporteur of the meeting
- Contribute to discussions
- Contribute to drafting text for the recommendations
- Understand that the membership of the Group may be retained between *ad hoc* Group meetings to ensure continuity of the work

Deliverables

By the end of the meetings, the Group will have developed a report including high-level guidance and recommendations on NG-WHIS as well as advice on the best implementation route for the future of wildlife disease reporting and environmental surveillance to WOAH.

Reporting/timeline

A draft report for comments will be circulated no more than 8 days after the last online meeting. A review will be required to be finalized by the end of January 2024 on a date agreed with the Group.

Annex 4. Data Ethics Considerations

MEETING OF THE WOAH AD HOC GROUP FOR THE NEXT GENERATION WILDLIFE HEALTH INFORMATION SYSTEM

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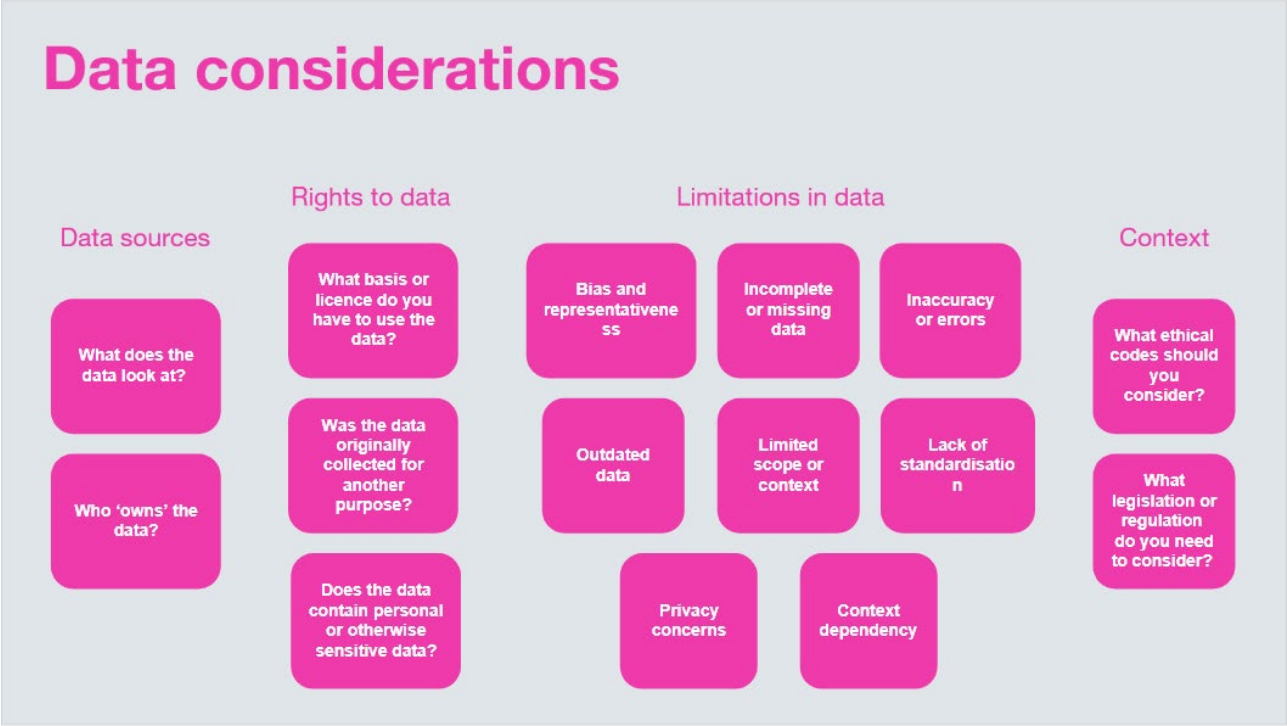
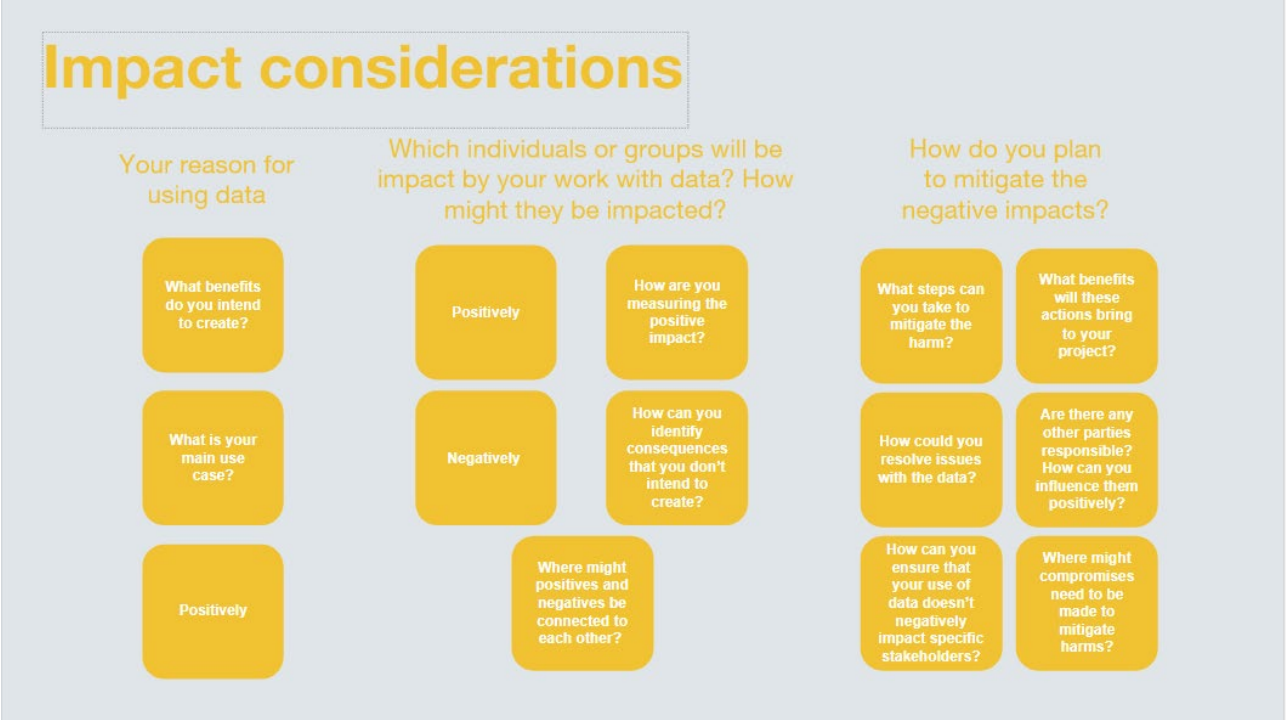


Negative impacts	Risk level (1 low - 5 high)	Mitigation
Inherent data security concerns applicable to all information systems.	3	• Implementation of robust security measures to safeguard sensitive wildlife and organizational data. • Accessibility limited to validated stakeholders. • Approval of confidentiality undertakings by all stakeholders.
Focal points may face constraints in data collection/reporting	4	• Opened data contribution to all relevant stakeholders enhances system resilience.

Negative impacts	Risk level (1 low - 5 high)	Mitigation
Political pressures may discourage reporting certain data points, leading to reduced contributions	3	• Establish a secure reporting environment disconnected from trade, guided by a narrative that ensures the collection of information on non-listed diseases in wild species avoids any harm to Members' economy or reputation. • Adapt the narrative and terminology, utilizing "reporting" instead of "notification," "real-time reporting" in place of "early warning," and "monitoring" replacing "surveillance" where applicable, considering the challenges in calculating prevalence in wild species due to limited population size data. • Incentivize voluntary reporting without reinforcement, fostering a non-policing atmosphere. • Position the system as a decision-making aid at national, regional, and global levels, emphasizing its contribution without negatively impacting Members. • Exclude all mentions of WAHIS from the new system's name to clearly disassociate the initiatives; the term "WAHIS-wild" is consequently not adapted.
Users may lack domain expertise, impacting event reporting accuracy	2	• Training • E-learning • Q&A • Simplicity of the minimalistic interface • Opened data contribution to all relevant stakeholders enhances system resilience.
Users might report conflicting versions of events	5	• Real-time reporting with the possibility to update a report • Version control for tracking the status of events • Data users hold responsibility for data checks • Automatic checks, including location/time/species geographic range coherence
Lack of standards may result in reporting inconsistencies	2	• Minimalistic data collection • Clear and simple standards readily available
Overly prescriptive standards may lead to mislabeling or overlooking non-listed diseases.	2	• Reporting of non-listed diseases enabled • Reporting not bound to a list • Reporting opened to all wildlife health events • Blocking of listed disease reporting
Absence of data validation can result in inaccurate analysis if the submitted data is flawed.	4	• Inclusion of only non-validated data in the system • Transparency regarding the type of data collected by the system • Responsibility of data users to verify information validity • Limited accessibility to informed users, not open to the general public • Blocking and rerouting of listed-disease reporting to WAHIS



Impacts and mitigation for WOAH

Positive Impacts on WOAH
Improves the range, volume and timeliness of data collected by WOAH
Lead to early detection of diseases
Enables WOAH to more effectively communicate the benefits of reporting non-listed disease events, through monitoring usage
Improves WOAH's connection and collaboration with environmental stakeholders
More information from users to feed back into the WOAH evidence-base
Building data ethics into WOAH's processes around data projects for the first time
Building eco-design and field accessibility as a priority for an information system designed by WOAH
Raising the profile of WOAH, specifically the wildlife health goals
Re-educating people about WOAH's goals
Open up funding opportunities
Collaboration between the different partners on the One Health platforms, WOAH contributes to meeting its international engagement
Not only channelling contributions through government might increase diversity of thought and experience
Opportunity for WOAH to showcase its expertise in animal health data collection, in eco-designing and integrating data ethics considerations.

Negative impacts on WOAH	Risk level (1 low - 5 high)	Mitigation
Poor implementation could amplify existing issues or draw negative attention.	3	• Implementation of a multisectoral communication strategy to boost data collection • Development of a user-friendly interface to enhance accessibility • Utilization of data for rapid risk assessment, coupled with a clear engagement strategy • Implementation of a promotion and marketing campaign, employing positive storytelling to incentivize reporting • Mitigation of the low level of WOAH maturity in data management through strategic partnership with an institution like GBIF, known for robust data procedures.

Negative impacts on WOAH	Risk level (1 low - 5 high)	Mitigation
Possibility of not being a cost-effective solution. Cost impact and resources required for translating data into different languages.	3	• Comprehensive cost assessment and effective communication strategy to sustain engagement • Utilization of collected data for rapid risk analysis
Lack of apparent upfront benefits may cause delays in contributions and usage	2	• Implementation of a multisectoral communication strategy to improve data collection • Monitoring of usage of the system and data
Increase workload on WOAH's team Potential increase in workload for WOAH's team	3	• Devoted team budgeted
Creation of confusion in reporting pathways, leading to a reduced system utilization.	2	• Clarification of current notification • Simple and clear reporting • All listed diseases blocked • All non-listed health events in wild species reportable
Competition with national reporting systems	1	• Global initiative that will complement without competing with national systems • Allow spreadsheet upload, simplifying reporting through extractions from national systems.
Reporting fatigue leading to lack of reporting	3	• Simplify data upload (spreadsheet, minimalistic data) • Utilize data for rapid risk analysis and generate regular reports to incentivize reporting • Increased types of contributors will enhance the system's resilience.
Lack of representativeness in data contributors could lead to a majority view that is insensitive to diversity in-country	3	• Opened data contribution to all relevant stakeholders enhances system resilience. • Concentrate communication efforts on current reporting gaps
Impact on Members	2	• Inform NFPW of new data submission • Empower focal points, delegates, and other essential in-country stakeholders with flexibility and autonomy, facilitated through training, to decide on their responses and whether to pursue additional field investigations based on submitted information.

Impacts and mitigation for data contributors

Positive impacts on data contributors
Increases the pool of potential contributors, leading to more data collected
Alleviates some of the burden on focal points on reporting
Reflects impact on communities impacted by disease events
Enables focal points to contribute more data without conflicts of interest
Focal points will have a better understanding of in-country context
Reinforces the wildlife network at the national level
Institutional validation and support for focal points

Negative impact	Risk level (1 low - 5 high)	Mitigation
Difficulty using the system may discourage people from reporting data.	2	• Simple interface with a user-centric focus • Minimalistic data collection. • Ensure system flexibility to accommodate additional data points (dynamic referential/codification)
Lack of no visible added value might impair level of contribution	2	• Regular communication on data use and risk assessment produced
Could increase the workload of focal points	1	• Increase data flow without additional impact on workload • Clearly communicate the system's goal: Real-time centralized dataflow • Emphasize that the decision for action remains the sole responsibility of Veterinary Services
Lack of quality of communication/training/tutorial might create confusion about where to report	3	• Training during NFP in-person seminars • Simple e-learning, guidance • Continuous communication with data stakeholders • Community of practice • Communication via and about the platform to engage stakeholders effectively. • Preliminary discussions initiated with collaborating centres, academic champions, and the Wildlife Disease Association.
Potential contribution to unhealthy power dynamics if the system is not tailored for low-resource settings	2	• Prioritize usability for contributors in low-resource settings as the primary consideration, followed by usability for all stakeholders.
Probably won't address some existing barriers for focal points, e.g. political will	4	• Establish a secure environment independent of trade barriers. • Opened data contribution to all relevant stakeholders enhances system resilience.
Risk of misrepresentation or non-reporting of some events due to overly prescriptive standards.	3	• Implement minimalistic data collection • Readily available, clear and simple standards.

Impacts and mitigation on data users

Positive impacts on data users
Generates a centralized data platform for all wildlife heath stakeholders, broad data inclusion
Guides further investigations
Increases volume of data available for users to analyse
Provision of more ready-made insights for users
Higher frequency of data publication could improve user's ability to understand trends over time
Could bring new users to WOAH platforms, including technically literate audiences
Could enable users to combine or compare WOAH data with other datasets (if data is interoperable)
Improves decision-making for organisations in the wildlife ecosystem
Save time and effort on data cleaning

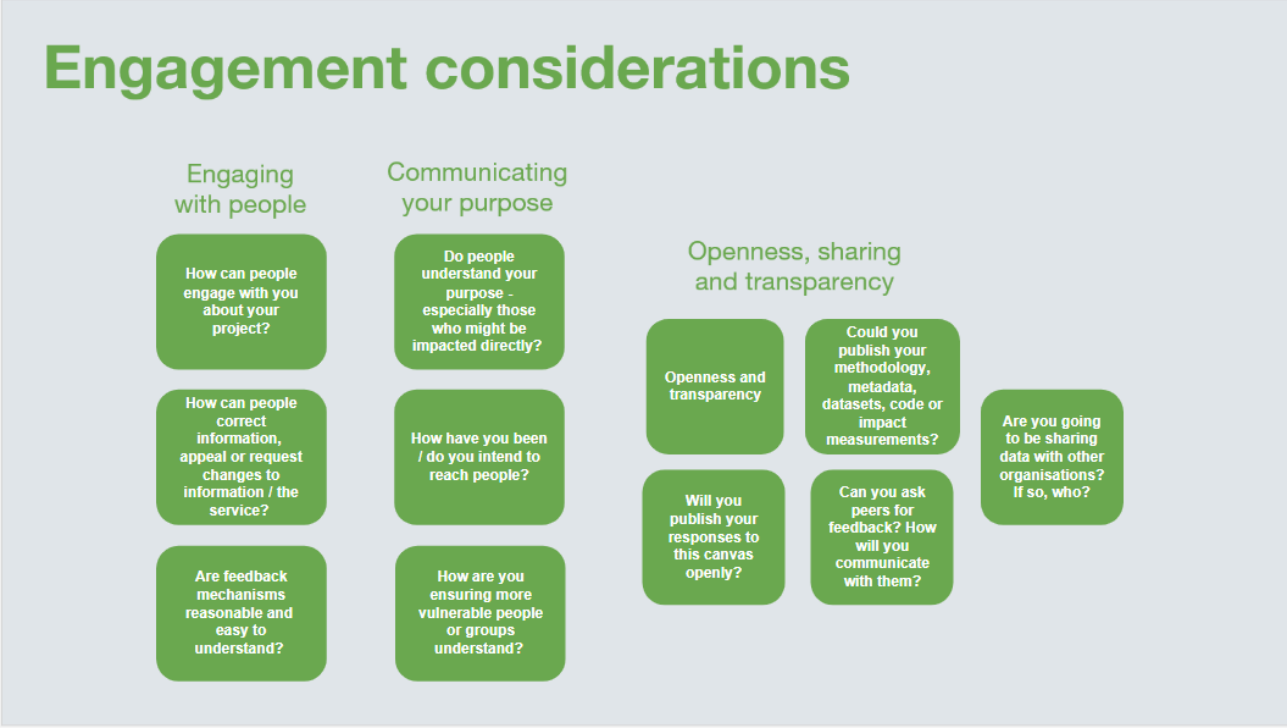
Negative impact	Risk level (1 low - 5 high)	Mitigation
Unclear audience may result in low adoption of low data use	2	• Clearly identify and maintain a constant communication flow with both data users and data providers.
Not reaching potential users	3	• Conduct a stakeholder inventory • Foster a community of practice around reporting.
Data reported by non-expert users may be inaccurate, leading to inaccurate analyses with impacts on trade and conservation	2	• Conduct a stakeholder inventory • Restrict system access to authorized users only.

Negative impact	Risk level (1 low - 5 high)	Mitigation
System/data not available in languages that users can read	3	• Ensure the system is translated into at least three WOAH languages.
Translation delays availability of data for users	4	• Ensure the system is translated into at least three WOAH languages.
Raw data might require important cleaning if not conform to a set schema and standard	2	• Implement standardized data collection with basic automatic checks for consistency

Impact and mitigation on intended beneficiaries

Positive impact
Earlier detection of disease events, allowing early management and mitigate impacts on wildlife, domestic species and humans
Improved conservation efforts nationally and globally
Supports the publication of scientific research in this space
Collaboration between the different partners on the One Health platforms
More advocacy for wildlife health and reinforce One Health within countries
May contribute to progress towards health and environment-related SDGs

Negative impact	Risk level (1 low - 5 high)	Mitigation
Reports, whether accurate or inaccurate, may have adverse effects on trade	4	• Disconnected from official notification and trade. • Conduct a stakeholder inventory and restrict system access to authorized users. • - Establish clear guidelines for data governance.
Inaccurate reporting might trigger preventive measures, potentially harming wildlife species and communities in proximity to them	4	• Conduct a stakeholder inventory • Limit system access to authorized users. • - Ensure transparency regarding data type (non-validated) and diagnosis procedures, if available.
Reporting could lead to negative perspectives about wildlife in general	4	• Conduct a stakeholder inventory. • Restrict system access to authorized users. • - Establish clear guidelines for data governance.
Reporting could lead to culturally insensitive outcomes	5	• - Acknowledging that in specific cultural contexts, information concerning wild species is considered private.
Unethical use of the data by malicious actors	2	• Conduct a stakeholder inventory. • Restrict system access to authorized users. • - Establish clear guidelines for data governance.
Impact on tourism	2	• Conduct a stakeholder inventory. • Restrict system access to authorized users. • - Establish clear guidelines for data governance.



How do we ensure that WOAH is engaging frequently with focal points to encourage sharing of non-listed disease data?
• WOAH needs to bring focal points together • Focal points need to be trained • The system needs to be easy to use and fit for all, but particularly for countries who might find it difficult at the moment • National focal points can organise/participate online meetings • Needs to be confidence and urgency to contribute data • Access to the data needs to be easy, including visualisations • Monthly summary of information from WOAH to focal point
How do we ensure that WOAH is engaging with delegates to encourage sharing of non-listed disease data? **How do we engage with regional representatives?** **How should WOAH engage with and support new data contributors, particularly those who are not wildlife health professionals?** **How does WOAH let potential users know the data and insights are publicly available?** **Should there be a helpdesk for the WOAH platform?** **Will there be mechanisms for contributors and users to make suggestions for improvements (either data or system related)**? • There needs to be a cost effective, easy to implement way for platform users to feedback **How do we encourage people to engage with WOAH about how they are using the data?** **How does WOAH reach communities who may be impacted by the data use, but are not direct users of the system?** **Should the data be published as open data?** **What else could be published openly?** **Which other organisations can help to drive the success of the new system?**


Implementation considerations
Ongoing implementation
How will you routinely build in the thoughts and ideas of those affected by the project?
What information or training might be needed to support the positive impact of the project?
Are systems, processes and resources available to respond to data issues that arise in the long term?
Reviews and iterations
How will ongoing data ethics issues be measured, monitored, discussed and actioned?
How often will you reassess the ethical implications of this project?
Your actions and decisions
What actions will you take before moving ahead with this project?
Who needs to be involved in making each decision?