Barriers to the implementation of aquatic animal health standards

Findings from a survey of WOAH Members and recommendations.
Barriers to the implementation of aquatic animal health standards: Findings from a Member survey and recommendations from WOAH

Published by
The World Organisation for Animal Health
Contents

TABLE OF AQUATIC ANIMAL DISEASES – ACRONYMS AND SHORT NAMES USED FOR THE SURVEY (BASED ON THE AQUATIC CODE 2021) ............................................................................................................................... 6

INTRODUCTION AND CONTEXT ........................................................................................................................................................................ 7

1. THE SURVEY .............................................................................................................................................................................................. 7
1.1. BRIEF DESCRIPTION OF THE METHODOLOGY .......................................................................................................................... 7
1.2. CONFIDENTIALITY ................................................................................................................................................................................. 8
1.3. LIMITATIONS OF THE DATA .............................................................................................................................................................. 8
1.4. PROFILE OF RESPONDING WOAH MEMBERS ............................................................................................................................ 9

2. WOAH STANDARDS RELATED TO AQUATIC ANIMAL DISEASE SURVEILLANCE AND NOTIFICATION ........................................ 10
2.1. WOAH-LISTED DISEASES FOR AQUATIC ANIMALS NOTIFIABLE AT THE NATIONAL LEVEL ........................................................................................................................................................................ 10
2.2. DISEASE-SPECIFIC STANDARDS TO DETERMINE DISEASE STATUS .............................................................................................. 11
2.3. AQUATIC ANIMAL DISEASE SURVEILLANCE ................................................................................................................................. 12
2.4. BARRIERS TO THE SURVEILLANCE OF AQUATIC ANIMAL DISEASES .......................................................................................... 12
2.5. ACCESS TO LABORATORY DIAGNOSTIC CAPACITY ......................................................................................................................... 13
2.6. TIMELINESS AND COMPLETENESS OF DISEASE NOTIFICATION TO WOAH ................................................................................ 14

3. WOAH STANDARDS RELATED TO TRADE AND BIOSECURITY ........................................................................................................... 15
3.1. NATIONAL LEGISLATION ...................................................................................................................................................................... 15
3.2. IMPLEMENTATION OF STANDARDS RELEVANT TO TRADE .............................................................................................................. 16
3.3. IMPLEMENTATION OF BIOSECURITY IN AQUACULTURE ESTABLISHMENTS ................................................................................ 17
3.4. BARRIERS TO THE IMPLEMENTATION OF WOAH STANDARDS ...................................................................................................... 18

4. CAPACITY BUILDING .................................................................................................................................................................................. 18
4.1. ENGAGEMENT WITH THE PVS PATHWAY FOR AQUATIC ANIMAL HEALTH SERVICES .............................................................. 18
4.2. MAIN BARRIERS TO REQUESTING A PVS AQUATIC EVALUATION ..................................................................................................... 19
4.3. EDUCATION AND TRAINING ......................................................................................................................................................... 20

5. POTENTIAL FACTORS INFLUENCING THE PRESENCE OF BARRIERS ......................................................................................... 23
5.1. METHODOLOGY .................................................................................................................................................................................. 23
5.2. MAIN FINDINGS .................................................................................................................................................................................. 23

CONCLUSION ................................................................................................................................................................................................. 26

ANNEX 1: TABLE OF COMPILED RECOMMENDATIONS ............................................................................................................................. 27
Table of aquatic animal diseases – acronyms and short names used for the survey (based on the *Aquatic Code* 2021)

<table>
<thead>
<tr>
<th>Acronym/Short name</th>
<th>Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Listed amphibian diseases</strong></td>
<td></td>
</tr>
<tr>
<td><em>B. dendrobatidis</em></td>
<td>Infection with <em>Batrachochytrium dendrobatidis</em></td>
</tr>
<tr>
<td><em>B. salamandrivorans</em></td>
<td>Infection with <em>Batrachochytrium salamandrivorans</em></td>
</tr>
<tr>
<td>Ranavirus spp.</td>
<td>Infection with <em>Ranavirus</em> species</td>
</tr>
<tr>
<td><strong>Listed crustacean diseases</strong></td>
<td></td>
</tr>
<tr>
<td>AHPND</td>
<td>Acute hepatopancreatic necrosis disease</td>
</tr>
<tr>
<td>Crayfish plague</td>
<td>Infection with <em>Aphanomyces astaci</em></td>
</tr>
<tr>
<td>NHP</td>
<td>Infection with <em>Hepatobacter penaei</em> (necrotising hepatopancreatitis)</td>
</tr>
<tr>
<td>IHNV</td>
<td>Infection with infectious hypodermal and haematopoietic necrosis virus</td>
</tr>
<tr>
<td>IMV</td>
<td>Infection with infectious myonecrosis virus</td>
</tr>
<tr>
<td>White tail disease</td>
<td>Infection with <em>Macrobrachium rosenbergii</em> nodavirus</td>
</tr>
<tr>
<td>TSV</td>
<td>Infection with Taura syndrome virus</td>
</tr>
<tr>
<td>WSSV</td>
<td>Infection with white spot syndrome virus</td>
</tr>
<tr>
<td>YHV</td>
<td>Infection with yellow head virus genotype 1</td>
</tr>
<tr>
<td><strong>Listed fish diseases</strong></td>
<td></td>
</tr>
<tr>
<td>EUS</td>
<td>Infection with <em>Aphanomyces invadans</em> (epizootic ulcerative syndrome)</td>
</tr>
<tr>
<td>EHNV</td>
<td>Infection with epizootic haematopoietic necrosis virus</td>
</tr>
<tr>
<td>GS</td>
<td>Infection with <em>Gyrodactylus salaris</em></td>
</tr>
<tr>
<td>ISAV</td>
<td>Infection with HPR-deleted or HPR0 infectious salmon anaemia virus</td>
</tr>
<tr>
<td>SAV</td>
<td>Infection with salmonid alphavirus</td>
</tr>
<tr>
<td>IHNV</td>
<td>Infection with infectious haematopoietic necrosis virus</td>
</tr>
<tr>
<td>KHV</td>
<td>Infection with koi herpesvirus</td>
</tr>
<tr>
<td>RSIV</td>
<td>Infection with red sea bream iridovirus</td>
</tr>
<tr>
<td>SVCV</td>
<td>Infection with spring viraemia of carp virus</td>
</tr>
<tr>
<td>VHS</td>
<td>Infection with viral haemorrhagic septicaemia virus</td>
</tr>
<tr>
<td><strong>Listed mollusc diseases</strong></td>
<td></td>
</tr>
<tr>
<td>AbHV</td>
<td>Infection with abalone herpesvirus</td>
</tr>
<tr>
<td><em>B. exitiosa</em></td>
<td>Infection with <em>Bonamia exitiosa</em></td>
</tr>
<tr>
<td><em>B. ostreae</em></td>
<td>Infection with <em>Bonamia ostreae</em></td>
</tr>
<tr>
<td><em>M. refringens</em></td>
<td>Infection with <em>Martelia refringens</em></td>
</tr>
<tr>
<td><em>P. marinus</em></td>
<td>Infection with <em>Perkinsus marinus</em></td>
</tr>
<tr>
<td><em>P. olseni</em></td>
<td>Infection with <em>Perkinsus olseni</em></td>
</tr>
<tr>
<td><em>X. californiensis</em></td>
<td>Infection with <em>Xenohaliotis californiensis</em></td>
</tr>
<tr>
<td><strong>Emerging diseases</strong></td>
<td></td>
</tr>
<tr>
<td>CEV</td>
<td>Infection with carp edema virus</td>
</tr>
<tr>
<td>TiLV</td>
<td>Infection with tilapia lake virus</td>
</tr>
<tr>
<td>EHP</td>
<td>Infection with <em>Enterocytozoon hepatopenaei</em></td>
</tr>
</tbody>
</table>
Introduction and context

As part of its role as a standard-setting organisation, the World Organisation for Animal Health (WOAH) adopts international standards, particularly with respect to diseases that may be transmitted across international borders. For aquatic animal health, these standards are presented in the *Aquatic Animal Health Code (the Aquatic Code)* and the *Manual of Diagnostic Tests for Aquatic Animals (the Aquatic Manual)*; they aim to improve aquatic animal health and welfare worldwide. The Aquatic Animal Health Standards Commission (the Aquatic Commission) is responsible for the development and revision of these standards and is supported by *ad hoc* Groups, WOAH Reference Centre experts, experts from Member Countries and the WOAH Secretariat. The implementation of these science-based standards is critical to the improvement of aquatic animal health.

In 2021, WOAH launched its first *Global Aquatic Animal Health Strategy (the Strategy)*, which includes four objectives and 23 specific activities, including:

- identification of barriers to the implementation of standards (Activity 1.5)
- support for the implementation of standards (Activity 2.1)
- identification of barriers to transparency in disease reporting (Activity 2.4)
- Increased use of the Performance of Veterinary Services (PVS) Pathway (Activity 2.2)
- support for WOAH Delegates and Focal Points (Activity 2.6).

The implementation of WOAH standards varies across Regions and Members. Identifying the barriers to implementation is an important objective both for this Strategy and for the WOAH Observatory. However, the data routinely collected by WOAH and other partners were considered insufficient to reach this goal. Consultation with Members was therefore essential to identify the barriers preventing transparent reporting of aquatic animal diseases and full implementation of the standards outlined in the *Aquatic Code* and *Manual*.

1. The survey

1.1. Brief description of the methodology

This report provides a summary of results derived from a survey of national Focal Points for Aquatic Animals. The survey included 48 questions covering five main areas:

- disease surveillance and national reporting;
- disease notification to WOAH;
- implementation of recently adopted WOAH standards and identified barriers;
- PVS Pathway for Aquatic Animal Health Services;
- capacity building.

The English version of the questionnaire is provided as Annex 2. The questionnaire was translated into the other two official languages of WOAH (French and Spanish) and...

---

1 ‘Members’ refers to the countries and territories that are members of WOAH.  
https://www.woah.org/en/who-we-are/members/

2 Person nominated by the WOAH Delegate to provide technical assistance on aquatic animal health matters. Their Terms of Reference are available here:  
administered using the survey tool SurveyMonkey Audience (www.surveymonkey.com/mp/audience).

The survey was developed in early 2022 and trialled by a number of groups to assess its suitability. It was initially trialled internally by WOAH staff (from Headquarters and Regional and Sub-Regional Representations) and then by the Aquatic Commission and by a subset of Focal Points. After revision to take account of feedback from the test groups, all Focal Points for Aquatic Animals were invited to complete the survey between mid-March and the end of April 2022.

Initial findings were summarised and presented during the meetings of the five WOAH Regional Commissions and specific kiosk events at the WOAH General Session in May 2022.

The results of the survey have been published in two documents: a dashboard that presents the results in graphical form (available here), and this report, which summarises the main findings. WOAH has proposed recommendations linked to the main findings; these can be found at the end of relevant paragraphs and have also been compiled in Annex 1.

1.2. Confidentiality

To encourage participation, WOAH guaranteed the confidentiality of respondents by aggregating the answers by region or other category (e.g. countries that import/export aquatic animals). The individual responses are therefore not available outside WOAH.

1.3. Limitations of the data

In addition to the usual limitations of surveys (survey errors, survey constraints and survey effects\(^3\)), the following should be taken into account when interpreting the survey results.

Participation

Among the 182 countries and territories that were Members of WOAH in 2022 (this number has since increased to 183), 119 completed the survey, making a participation rate of 65%. There were variations between regions, ranging from 58% in the Middle East to 75% in the Asia–Pacific (Figure 1). This participation rate is fairly high in comparison to other recent WOAH surveys. This is likely due to the strong support received from Regional and Sub-Regional Representatives, who encouraged Members to contribute, and to the perceived relevance of the topic.

However, 35% of Members did not complete the survey, representing an important source of bias in the results. Although the reasons for non-participation are not known, it is assumed that Members with less interest in aquatic animal health would be less likely to complete the survey.

\(^3\) Survey response effects refer to the various biases and tendencies that can affect how individuals respond to survey questions, e.g. response bias.
1.4. Profile of responding WOAH Members

The vast majority of the respondents were aware of the **WOAH Aquatic Animal Health Strategy**; only 9% were not. This might be due to the fact that 86% of the respondents were nominated WOAH national Focal Points for Aquatic Animals. However, less than half of the respondents (48%) were familiar with the content of the Strategy (Figure 2).

Most (83%) of the responding Members considered their WOAH Delegate to be part of the organisational structure of the Competent Authority for aquatic animal health and welfare. Most respondents also indicated that there are formal communication channel(s) between the WOAH Delegate, the Focal Point for Aquatic Animals and the Competent Authority for aquatic
animal health and welfare. Those channels include formal reporting chains and coordination meetings, as well as legal frameworks and consultation during the standard-setting process.

Two-thirds of respondents reported having staff dedicated to the implementation of aquatic animal health and welfare standards, with some variation between regions (from 63% each in Europe and the Asia–Pacific to 86% in the Middle East). However, this question did not assess the number of staff dedicated to this function and therefore cannot assess completely the capacity of the Aquatic Animal Health Services.

Most of the responding Members already import and/or export aquatic animals or aquatic animal products, or plan to do so in the coming years (93% and 98% respectively).

2. WOAH standards related to aquatic animal disease surveillance and notification

WOAH Members play a key role in developing standards by contributing expertise and country experience through their comments on draft standards. The implementation of standards is a fundamental responsibility of all WOAH Members, with ultimate responsibility lying with their Competent Authority.

2.1. WOAH-listed diseases for aquatic animals notifiable at the national level

Survey respondents were asked to assess the relevance of WOAH-listed aquatic animal diseases to their country/territory. Figure 3 shows that 46 responding Members (38%) said that up to five WOAH-listed diseases were notifiable by law/regulation at the national level, while 30 of them (25%) had laws/regulations in place for between 26 and 32 diseases. For the majority of respondents, a disease was notifiable only when it was considered relevant, but certain non-relevant diseases were also notifiable in some countries (Figure 4). Diseases may be considered not relevant for many reasons; for example, there may be no susceptible species in the country, there may be no trade in susceptible species or the disease may be considered endemic.

The Asia–Pacific and the Americas had the highest numbers of notifiable WOAH-listed aquatic animal diseases (respectively 47% and 46% of the responding Members from these regions said that more than 26 diseases were notifiable at national level). This may reflect the importance of aquaculture in these regions.

**Recommendation 1**: Members that do not have a national list of notifiable aquatic animal diseases are encouraged to develop one (also see Recommendations 12 and 15).
### 2.2. Disease-specific standards to determine disease status

For each disease listed by WOAH\(^4\), a chapter of the *Aquatic Code* provides a case definition and describes the requirements to determine the disease status of a country or territory (e.g. surveillance requirements).

Survey respondents were asked to assess their country’s degree of implementation of WOAH standards related to the establishment of disease status (whether the disease is present or absent). They were asked to say whether the standards were largely implemented for relevant diseases; some standards were implemented for relevant diseases; few standards were implemented or whether the standards were not implemented).

---

\(^4\) WOAH List of aquatic animal diseases in [Chapter 1.3. of the Aquatic Code](https://www.fao.org/aquaculture/about-aqco/aqco/)

---

![Figure 4: Percentage of Members that consider a disease to be relevant/not relevant to their country or territory and in which the disease is (or is not) notifiable at national level](chart.png)
Implementation of WOAH standards were reported as being highest for fish diseases, followed by crustacean diseases, mollusc diseases and then amphibian diseases. Almost half of the responding Members (46.2%) considered that they have a high degree of compliance for fish diseases against 9.2% for amphibian diseases (Figure 5).

For fish diseases, responding Members from Europe reported the highest level of compliance (65.7% reported a high degree of compliance), followed by the Middle East (57.1%). For the three other categories, the Asia–Pacific reported the highest level of compliance (62.5% for crustaceans, 37.5% for molluscs and 16.7% for amphibians), followed by the Americas for crustacean diseases (47.4%). This is followed by Europe for mollusc diseases (34.3%) and by the Americas and Europe for amphibian diseases (respectively 15.8% and 8.6%). It is worth noting that all responding Members from the Middle East indicated an absence of compliance for mollusc diseases or indicated that they were not relevant to their country.

![Figure 5: Implementation of the disease-specific standards of the Aquatic Code for determining disease status (percentage of Members indicating that they have a high, moderate or low level of compliance with the recommendations)](image)

2.3. Aquatic animal disease surveillance

Members were asked if they had a surveillance system in place for aquatic animal diseases and a targeted surveillance system for each of the WOAH-listed diseases. Seventy-nine per cent (79%) of respondents reported the existence of a passive surveillance system, while the number of respondents reporting the presence of a targeted surveillance system varied by disease. This ranged from 28% for infection with viral haemorrhagic septicaemia to just 4% for the three WOAH-listed diseases of amphibians.

2.4. Barriers to the surveillance of aquatic animal diseases

Survey respondents were also asked to assess a list of potential barriers to the surveillance of aquatic animal diseases. They were asked to confirm whether or not they were a barrier and, if they were, to rank them as ‘blocking barriers’, ‘barriers with high impact’, ‘barriers with moderate impact’ or ‘barriers with little impact’. Respondents also had the option to answer ‘I don’t know’. The analysis of this question focuses on barriers that were reported as blocking or highly impacting.

As shown in Figure 6, the lack of material and financial resources, the lack of human resources and workforce capacity, the lack of expertise in aquatic animal health, and the lack of laboratory diagnostic capacity were considered the main barriers to aquatic animal disease surveillance.
2.5. Access to laboratory diagnostic capacity

Members were asked about their access to laboratory diagnostic capacity for each WOAH-listed disease of aquatic animals.

Fifty-six per cent of responding Members indicated having laboratory diagnostic capacity for at least one WOAH-listed disease. Access to laboratory diagnostic capacity varied by region. Members in the Asia–Pacific, Europe and the Americas reported the highest level of laboratory diagnostic capacity, with each region having diagnostic capacity for at least one WOAH-listed disease, which may reflect the importance of aquaculture in these regions (Figure 7).

Diagnostic capacity also varied by disease. For example, 41% of Members (the highest proportion) had diagnostic capacity for infection with koi herpesvirus, while only 12% of respondents had diagnostic capacity for infection with *B. dendrobatidis*.

---

**Recommendation 2**: WOAH to promote regionally coordinated surveillance programmes through the establishment of regional networks for aquatic animal health. Regional programmes will be based on proximity, trade exchanges and risk for disease introduction, spread and impact.

**Recommendation 3**: WOAH to develop and propose capacity building activities to enhance national and regional expertise in aquatic animal disease surveillance and surveillance systems.

**Recommendation 4**: Members, particularly Members with significant aquatic animal production, are encouraged to invest more resources in improving regional and national surveillance capacity for aquatic animal diseases.
As might be expected, the diseases for which a high proportion of respondents said they have access to laboratory diagnostic capacity were the diseases that a high proportion of respondents considered relevant to their country (and which were notifiable at national level). The diseases for which there was no WOAH Reference Laboratory had a lower proportion of respondents reporting having access to laboratory diagnostic capacity.

**Recommendation 5:** WOAH to support diagnostic capacity for Members through the development of network/s of aquatic animal health Reference Centres.

**Recommendation 6:** Members are encouraged to identify national laboratories that could be accredited as a WOAH Reference Laboratory or could partner in Laboratory Twinning projects for aquatic animal diseases.

**Recommendation 7:** Members are encouraged to strengthen their national laboratory diagnostic capacity, performance and quality (also see Recommendation 15).

### 2.6. Timeliness and completeness of disease notification to WOAH

Survey respondents were asked to assess their level of confidence that immediate notifications to WOAH for aquatic listed diseases had been made in a timely and comprehensive manner. About half of the respondents were very confident that aquatic animal diseases had been reported in a timely manner over the past 5 years. This is not consistent with the submission times of the immediate notifications sent through the World Animal Health Information System (WAHIS) for aquatic listed diseases between 2017 and 2021. During this period, only 4 of the 35 countries and territories that submitted at least one immediate notification (11%) had an average submission time compliant with the requirements of the standards (within 24 hours of confirmation).

The same proportion (around 50%) were very confident that notifications had been comprehensive (mostly the same respondents). It is worth noting that 67% of the Members have submitted their semestrial report on aquatic animal diseases to WOAH via WAHIS. WOAH is currently undertaking an assessment of the completeness of reporting on aquatic animal diseases; this will provide additional data to better assess the responses to this question.

Disparities were observed between regions and depending on the contribution of the export of...
aquatic animal products to the GDP. For timeliness and comprehensiveness, more respondents from the Americas and Europe chose 'very confident' compared to respondents from other regions. In addition, higher rates of respondents chose 'very confident' in the countries where aquatic animal product exports contribute to 0.1% or more of the GDP.

While the lack of human resources and workforce capacity was identified as the main barrier to submitting timely and complete notifications, the impact of notification on trade and the lack of priority given by government agencies to aquatic animal health also scored high, as did the lack of knowledge on notification obligations or WOAH notification procedures (Figure 8).

![Figure 8: Main barriers to aquatic animal disease notification to WOAH (number of responding Members that ranked the barriers as blocking or highly impacting)](image)

**Recommendation 8:** WOAH Regional and Sub-Regional Representations to continue to encourage and support their Members to notify aquatic animal diseases to WOAH in a more timely and comprehensive way.

**Recommendation 9:** WOAH to develop resources to assist Member Countries and Territories in notifying WOAH of cases of aquatic animal diseases. These should include (i) specific training materials on disease notification, including an e-learning module (ii) a training tool kit for Focal Points, and iii) an advocacy paper on the benefits of transparent notification for decision-makers.

**Recommendation 10:** WOAH to coordinate the implementation of activities to improve knowledge of disease reporting procedures and obligations among national Focal Points for Aquatic Animals (and national Focal Points for Notification, as relevant).

3. **WOAH standards related to trade and biosecurity**

3.1. National legislation

Quality legislation is fundamental to the effective control of aquatic animal diseases, as it allows Aquatic Animal Health Services to act quickly and decisively through the power of clearly written and enforceable legislation.

Figure 9 represents the number of responding Members who reported having legislation on important topics (listed on the left). It also shows the extent to which the legislation complies with WOAH standards (exceeds them, is equivalent to them, or falls below them). The majority of respondents that reported the existence of national legislation indicated that it was
equivalent to WOAH standards, while a small percentage of Members indicated that their national legislation exceeded WOAH standards.

National regulations for trade measures, importation/exportation procedures and health certification were reported to exist by the largest proportion of respondents (89%), while approximately one-quarter of respondents reported the following areas of national regulations as non-existent: regulation of aquatic animal health professionals and veterinarians, the quality of Aquatic Animal Health Services, and the welfare of farmed fish.

Seventy-two per cent of respondents indicated that their country/territory has national regulations that list nationally notifiable aquatic animal diseases. This indicates that around 30% of Members do not have these regulations in place.

**Recommendation 12:** Members are encouraged to strengthen national aquatic animal health legislation in order to support the implementation of WOAH Standards (also see Recommendations 14 and 15).

### 3.2. Implementation of standards relevant to trade

As mentioned above, for each disease listed by WOAH, a chapter of the *Aquatic Code* describes recommendations for safe trade.

Survey respondents were asked to rate their country’s implementation of key responsibilities and core functions identified in the *Aquatic Code* concerning trade measures. Two-thirds of the responding Members indicated that their national regulations for trade in aquatic animals and/or aquatic animal products are equivalent to WOAH international standards (Figure 10). Very few (3%) considered their national legislation to be above WOAH standards, while 30% indicated that national regulations were below WOAH requirements (including no national legislation).
3.3. Implementation of biosecurity in aquaculture establishments

The chapter on ‘Biosecurity in aquaculture establishments’ (Chapter 4.1) of the *Aquatic Code* was adopted by the World Assembly of Delegates in May 2021. Biosecurity is a critical component of reducing the probability of pathogen introduction to, or transmission within, a region or growing unit(s), as outlined in the *Aquatic Code* chapter. Assessing the extent to which the requirements in this chapter are being implemented, almost a year after their adoption, was considered important.

Only 9% of the responding Members reported having entirely implemented the chapter’s requirements at the time the survey was conducted, that is, 11 months after the adoption of the chapter.

The level of implementation was higher (87% for full or partial implementation) among responding Members who indicated that their national regulations for disease prevention and control are equivalent to WOAH standards (Figure 11). In comparison, among the respondents that had indicated that their country had no national regulations for disease prevention and control, only a quarter indicated that the requirements of Chapter 4.1. were partially implemented (none for full implementation).
3.4. Barriers to the implementation of WOAH standards

Respondents were also asked to rate the impact of a list of pre-identified barriers to the implementation of standards. Access to training, diagnostic capacity, resources and expertise were considered to be the most significant barriers (Figure 12).

Recommendation 13: WOAH to continue to support the scientifically sound development of new standards and the revision of existing standards, in consultation with Members, in order to meet the needs of Members and reduce the barriers to the standards’ implementation. This will be achieved through the implementation of Activities 1.1 – 1.5 of the Strategy.

Recommendation 14: WOAH to develop additional guidance, including an e-learning module, to assist Members in understanding and using standards.

Figure 12: Main barriers to standards implementation (number of responding Members that ranked the barriers as blocking or highly impacting)

4. Capacity building

4.1. Engagement with the PVS Pathway for Aquatic Animal Health Services

A PVS Evaluation using the PVS Tool – Aquatic is undertaken at the request of a Member as part of the PVS Pathway. The evaluation is designed to identify gaps and weaknesses in the ability of Aquatic Animal Health Services to comply with WOAH international standards. In addition, it aims to share a common vision with stakeholders, establish priorities for improvements, and equip Members to carry out strategic initiatives. An external expert perspective can reveal gaps, inefficiencies and opportunities for innovation.

The PVS Tool – Aquatic is in line with WOAH standards related to the performance of Aquatic Animal Health Services, compiled in Section 3 of the Aquatic Code.

Nine Members out of the 119 that completed the survey indicated that they had undertaken a PVS Aquatic Evaluation. WOAH had conducted 13 PVS Aquatic Evaluation missions in total at the time of the survey (this number includes four missions carried out in countries/territories that did not respond to the survey). All the respondents that had undertaken a PVS Aquatic Evaluation considered that the Tool was well adapted to their country and to the assessment of their Aquatic Animal Health Services. Respondents also considered that the mission had met the country’s expectations (six fully met and three partially met).

Three respondents offered suggestions to improve the PVS Tool and the way missions were prepared and conducted, these included:
• all relevant actors of the value chain should be included for an optimal adoption of the results;
• activities aimed at preventing, controlling and/or eradicating diseases, as well as demonstrating their absence, could be addressed in more detail in Fundamental Component II ‘Authority and Technical Capacity’;
• WOAH could further support Members in adopting the recommendations arising from PVS reports.

Most of the Members who had not undertaken a PVS Aquatic Evaluation knew about the existence of the Tool; however, 19 had not known about it before the questionnaire was conducted (Figure 13). Interestingly, 60% said that information on the existence of the PVS Tool – Aquatic had not been distributed to the relevant stakeholders in their country/territory (Figure 14).

This survey also provided an opportunity to gauge Members’ interest in the PVS Aquatic Programme. Fifty-four Members (59% of the 95 respondents to this question) expressed an interest in requesting a PVS Aquatic Evaluation mission in the next 5 years (Figure 15), with large regional variation (from 20% of respondents in Europe to 85% of respondents in the Asia–Pacific).

4.2. Main barriers to requesting a PVS Aquatic Evaluation

Of the nine pre-identified barriers to requesting a PVS Aquatic Evaluation, the most common barrier reported was the unavailability of funds to cover the costs of the mission (no financial support from the government or external donors). Forty-six Members considered it to be a ‘blocking’ or ‘highly impacting’ barrier (Figure 16). The second most impactful barrier reported was the lack of knowledge about the benefits of conducting this activity. The third-ranking barrier was the burden that preparing and receiving a PVS Evaluation places on local staff.
Finally, 78% of the responding Members considered that WOAH offers a sufficient range of tools and activities to support the strengthening of Aquatic Animal Health Services. Several suggestions were received to further improve WOAH support. Those proposals are being explored and prioritised by the WOAH Capacity Building Department, in line with the Strategy implementation plan.

**Recommendation 15:** WOAH will continue to promote and advocate for the use of PVS Evaluations of Aquatic Animal Health Services as the first step in engaging with the PVS Pathway. It will also promote the use of PVS Targeted Support activities, such as the Veterinary Legislation Support Programme (to support Recommendation 12) and the Sustainable Laboratories Programme (to support Recommendation 7). Opportunities for Focal Point trainings and WOAH regional networks for aquatic animal health will be identified and activities developed, as well as any PVS Pathway activities. This should also include a resource mobilisation strategy to address the financial barriers.

### 4.3. Education and training

Members were asked to assess the quality of both initial and continuing education of their Aquatic Animal Health Services personnel, as a lack of effective education and training can limit the capacity of these services to implement WOAH standards. As shown in Figure 17, more than 75% of the responding Members indicated that both initial and continuing education of their Aquatic Animal Health Services personnel is inadequate. This figure includes those who said that there was no training at all, those who said training was insufficient, and those who described the training provision as average and in need of improvement. (The association between low-capacity Aquatic Animal Health Services and poor implementation of WOAH standards for aquatic animals is explored in Section 5 of this report.)

A lack of initial education on aquatic animal health and welfare, both for veterinarians and aquatic animal health professionals, was widely considered to be a barrier to the implementation of WOAH standards, with close to 50% of respondents describing it as a blocking or highly impacting barrier. Budget allocation was considered the main barrier to continuing education on aquatic animal health (Figure 18). Respondents noted that, training, when provided, often lacks learning needs assessments and impact assessments. The training offer and limited access to training were also identified as important barriers.
Figure 17: Respondents’ perceptions of the quality of education (initial and continuing) for Aquatic Animal Health Services

Figure 18: Main barriers to continuing education on aquatic animal health and welfare (percentage of Members that ranked the barrier as blocking or highly impacting)

Figure 19 shows that 45 responding Members (38%) have no access to training materials for continuing education in aquatic animal health. For Members with access to an aquatic animal health training programme, the main education providers were the national Aquatic Animal Health Services (39 Members – 33%) and international and regional organisations (31 Members – 26%), with FAO cited as the most common provider. Only two Members, both in Europe, had access to training provided by private business operators.

Members were asked to select three topics that WOAH should focus on for the development of a training programme on aquatic animal health. The highest number of responses was related to disease surveillance, detection and reporting, followed by risk analysis (Sections 1, 2 and 4 of the Aquatic Code). Members had less interest in training on the quality of Aquatic Animal Health Services and the welfare of farmed fish (Figure 20).
Figure 19: Number of Members who have access (or not) to training materials that could support the implementation of aquatic animal health and welfare standards (the figure shows the various providers that offer training materials and the number of countries that access these materials) [AAHS: Aquatic Animal Health Services]

Figure 20: Main topics of interest for training programmes for Aquatic Animal Health Services as expressed by responding Members

**Recommendation 16**: WOAH to use the findings from this survey to inform the development of the Terms of Reference of the Competency Package on Aquatic Animal Health and produce eLearning modules for the WOAH community (Delegates, Focal Points and aquatic animal health professionals). This should include a resource mobilisation strategy to address the limited capacity to invest in training in this field. eModules will be offered free of charge to Members.

**Recommendation 17**: WOAH to identify existing training resources, assess them against quality criteria and offer them to the WOAH learning community. It will look in particular at the resources developed by Members who consider their level of aquatic animal health education to be ‘excellent’. Other training resources considered will be those developed by Collaborating Centres, Reference Laboratories and other partners willing to sharing such resources.

**Recommendation 18**: WOAH to develop a webinar series for the aquatic animal health community on important aquatic animal health topics. This would be open to Focal Points, Delegates and other professionals of the aquatic animal health community.

**Recommendation 19**: WOAH to continue regionally based training for Focal Points for Aquatic Animals, with the support of its Reference Centres, to address issues of regional importance and facilitate timely and comprehensive reporting of aquatic animal diseases to WOAH.
5. Potential factors influencing the presence of barriers

5.1. Methodology

A summary of the barriers reported by Members in the survey, and the main factors influencing their presence, is provided in this last section. The topics considered for this transversal analysis were ‘Outbreak investigation’, ‘Surveillance and data collection at national level’, ‘Notification of diseases to WOAH’, ‘Requirements in relation to imports and exports’ and ‘Chapter 4.1. on Biosecurity for aquaculture establishments’.

Descriptive analysis. For each of the five topics mentioned above, the barriers listed in the survey were grouped into three categories: i) barriers related to lack of expertise, ii) barriers related to a lack of national legislation or political will / sector reluctance, and iii) barriers related to lack of resources (human, financial, logistics). This resulted in 15 groups of barriers (three for each of the five topics). At least one barrier in a specific group of barriers was blocking or highly impacting was analysed. A score of 1 was attributed to a Member each time at least one barrier in a specific group of barriers was reported as blocking or highly impacting. This generated a score ranging from 0 to 15 for each Member (higher scores reflect a greater number of barriers reported as blocking or highly impacting).

Inferential analysis. Using the scores, a generalised linear model was applied to evaluate the influence of different predictors on the presence of barriers at country level.

The predictors used to build the model were:

- region (five WOAH regions);
- gross domestic product (GDP) of each Member (most recent year with data available);
- export value of aquatic animals and aquatic animal products, calculated as a percentage of GDP;
- import value of aquatic animals, calculated as a percentage of GDP;
- total production value of aquatic animals, calculated as a percentage of GDP;
- situation of the country with regard to the export of aquatic animals (exporting, not exporting, or planning to export) (data collected through the survey);
- access to education and training material (data collected through the survey).

5.2. Main findings

Descriptive analysis

The percentage of Members that responded that one or more of the group barriers was blocking or highly impacting, is presented in Figure 21.

Resources (human, financial, logistical) constituted the main group of blocking or highly impacting barriers across the topics analysed in the survey.

Thirty-one per cent of Members identified only one or two (out of a possible 15) blocking or highly impacting barrier groups. Thirty-seven per cent of Members reported between 9 and 14 blocking or highly impacting barriers. There were significant variations depending on regions.
Inferential analysis

The model showed that there were two predictors that had significant associations with reports of blocking/highly impacting barriers, namely, region and access to education and training material.

For the regions, Members in Africa reported significantly more blocking and highly impacting barriers (average for the region around 10 barriers) than other regions, with Members in Europe reporting the fewest barriers (Figure 22).

There was a strong association between access to education and the reporting of blocking or highly impacting barriers: the better the access to education is, the fewer blocking or highly impacting barriers were reported (Figure 23).

These results suggest that improving access to education may therefore reduce the number of blocking or highly impacting barriers and thus lead to improved implementation of international standards on aquatic animal health and welfare. This is particularly important for some regions, as the data shows important geographical variation.

Figure 22. Member scores by regional group (higher scores reflect a greater number of barriers reported as blocking or highly impacting).

Figure 23. Member scores by education group (higher scores reflect a greater number of barriers reported as blocking or highly impacting) [NA: No information available]
Conclusion

The World Organisation for Animal Health consulted its Members in April–May 2022 to better identify the national barriers to the implementation of its international aquatic standards. A 48-question survey was completed with a 65% participation rate (up to 75% in the Asia–Pacific).

Several barriers to the implementation of WOAH aquatic standards were identified. The survey indicated that lack of material, financial and human resources, as well as gaps in national regulations, were considered the most important barriers to the implementation of standards and transparency in disease reporting. There were, however, some variations depending on the type of standard; for example, Members’ obligation to report aquatic animal diseases to WOAH was reported to be impacted by specific barriers: the potential impact of notification on trade, the lack of priority given by government agencies to aquatic animal health, the lack of knowledge on notification obligations, and WOAH notification procedures.

Analysis of the data collected in this survey has demonstrated the strong association between access to education and reporting of blocking and highly impacting barriers. Capacity building for Aquatic Animal Health Services and education activities are key priorities identified throughout the survey. A number of the recommendations provided in this report are already being addressed or will be addressed through the implementation of the WOAH Aquatic Animal Health Strategy 2021–2025.
### Annex 1: Table of compiled recommendations

<table>
<thead>
<tr>
<th>No.</th>
<th>Recommendation</th>
<th>Who</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Members that do not have a national list of notifiable aquatic animal diseases are encouraged to develop one (also see Recommendations 12 and 15).</td>
<td>Members</td>
<td>Ongoing</td>
</tr>
<tr>
<td>2</td>
<td>WOAH to promote regionally coordinated surveillance programmes through the establishment of regional networks for aquatic animal health. Regional programmes will be based on proximity, trade exchanges and risk for disease introduction, spread and impact.</td>
<td>WOAH (RAD, RRs &amp; SRRs)</td>
<td>In progress</td>
</tr>
<tr>
<td>3</td>
<td>WOAH to develop and propose capacity building activities to enhance national and regional expertise in aquatic animal disease surveillance and surveillance systems.</td>
<td>WOAH (RAD, RRs, SRRs &amp; WAHIAD)</td>
<td>Start in 2024</td>
</tr>
<tr>
<td>4</td>
<td>Members, particularly Members with significant aquatic animal production, are encouraged to invest more resources in improving regional and national surveillance capacity for aquatic animal diseases.</td>
<td>Members</td>
<td>Ongoing</td>
</tr>
<tr>
<td>5</td>
<td>WOAH to support diagnostic capacity for Members through the development of network/s of aquatic animal health Reference Centres.</td>
<td>WOAH (RAD &amp; Science Department)</td>
<td>To commence in 2024</td>
</tr>
<tr>
<td>6</td>
<td>Members are encouraged to identify national laboratories that could be accredited as a WOAH Reference Laboratory or could partner in Laboratory Twinning projects for aquatic animal diseases.</td>
<td>Members</td>
<td>Ongoing</td>
</tr>
<tr>
<td>7</td>
<td>Members are encouraged to strengthen their national laboratory diagnostic capacity, performance and quality (also see Recommendation 15).</td>
<td>Members</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>WOAH Regional and Sub-Regional Representations to continue to encourage and support their Members to notify aquatic animal diseases to WOAH in a more timely and comprehensive way.</td>
<td>WOAH (RRs &amp; SRRs)</td>
<td>Ongoing</td>
</tr>
<tr>
<td>9</td>
<td>WOAH to develop resources to assist Member Countries and Territories in notifying WOAH of cases of aquatic animal diseases. These should include (i) specific training materials on disease notification, including an e-learning module (ii) a training tool kit for Focal Points, and (iii) an advocacy paper on the benefits of transparent notification for decision-makers.</td>
<td>WOAH (WAHIAD, CDB, Communication Department)</td>
<td>To commence in 2024</td>
</tr>
<tr>
<td>10</td>
<td>WOAH to coordinate the implementation of activities to improve knowledge of disease reporting procedures and obligations among national Focal Points for Aquatic Animals (and national Focal Points for Notification, as relevant).</td>
<td>WOAH (WAHIAD, CBD, RAD, RRs &amp; SRRs)</td>
<td>In progress</td>
</tr>
<tr>
<td>11</td>
<td>WOAH to strengthen and further develop its epidemic intelligence activities regarding aquatic animal diseases by, for example, assessing the completeness of WAHIS information regarding aquatic animal health or improving performance of active searching for non-official information to support Members in their official reporting.</td>
<td>WOAH (DID)</td>
<td>2025</td>
</tr>
<tr>
<td>12</td>
<td>Members are encouraged to strengthen national aquatic animal health legislation in order to support the implementation of WOAH Standards (also see Recommendations 14 and 15).</td>
<td>Members</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>WOAH to continue to support the scientifically sound development of new standards and the revision of existing standards, in consultation with Members, in order to meet the needs of Members and reduce the barriers to the standards’ implementation. This will be achieved through the implementation of Activities 1.1 – 1.5 of the Strategy.</td>
<td>WOAH (Standards Department &amp; Observatory) AAHSC</td>
<td>In progress</td>
</tr>
<tr>
<td>14</td>
<td>WOAH to develop additional guidance, including an e-learning module, to assist Members in understanding and using standards.</td>
<td>WOAH (Standards Department, RAD, DID &amp; CBD)</td>
<td>To commence in 2024</td>
</tr>
<tr>
<td>15</td>
<td>WOAH will continue to promote and advocate for the use of PVS Evaluations of Aquatic Animal Health Services as the first step in engaging with the PVS Pathway. It will also promote the use of PVS Targeted Support activities, such as the Veterinary Legislation Support Programme (to support Recommendation 12) and the Sustainable Laboratories Programme (to support Recommendation 7). Opportunities for Focal Point trainings and WOAH regional networks for aquatic animal health will be identified and activities developed, as well as any PVS Pathway activities. This should also include a resource mobilisation strategy to address the financial barriers.</td>
<td>WOAH (CBD &amp; RAD)</td>
<td>Ongoing</td>
</tr>
<tr>
<td>16</td>
<td>WOAH to use the findings from this survey to inform the development of the Terms of Reference of the Competency Package on Aquatic Animal Health and produce e-learning modules for the WOAH community (Delegates, Focal Points and aquatic animal health professionals). This should include a resource mobilisation strategy to address the limited capacity to invest in training in this field. e-modules will be offered free of charge to Members.</td>
<td>WOAH (CBD)</td>
<td>To commence in early 2024</td>
</tr>
<tr>
<td>17</td>
<td>WOAH to identify existing training resources, assess them against quality criteria and offer them to the WOAH learning community. It will look in particular at the resources developed by Members who consider their level of aquatic animal health education to be ‘excellent’. Other training resources considered will be those developed by Collaborating Centres, Reference Laboratories and other partners willing to sharing such resources.</td>
<td>WOAH (CBD)</td>
<td>2024 and beyond</td>
</tr>
<tr>
<td>18</td>
<td>WOAH to develop a webinar series for the aquatic animal health community on important aquatic animal health topics. This would be open to Focal Points, Delegates and other professionals of the aquatic animal health community.</td>
<td>WOAH (RAD &amp; Standards Department)</td>
<td>2024 and beyond</td>
</tr>
<tr>
<td>19</td>
<td>WOAH to continue regionally based training for Focal Points for Aquatic Animals, with the support of its Reference Centres, to address issues of regional importance and facilitate timely and comprehensive reporting of aquatic animal diseases to WOAH.</td>
<td>WOAH (RAD, RRs &amp; SRRs) Reference Centres</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>

AAHSC: Aquatic Animal Health Standards Commission  
CBD: Capacity Building Department  
DID: Data Integration Department  
RAD: Regional Activities Department  
RR: Regional Representation  
SRR: Sub-Regional Representation  
WAHIAD: World Animal Health Information and Analysis Department