

Perspectives on One Health: a survey of national Delegates to the World Organisation for Animal Health, 2012

M.K. Glynn ^{(1,2)*} & N. Brink ⁽³⁾

(1) United States Centers for Disease Control and Prevention, 1600 Clifton Road MS E-92, Atlanta, GA, 30333, United States of America

(2) Liaison to the World Organisation for Animal Health, 12 rue de Prony 75017, Paris, France

(3) Office for Public Veterinarian Health and Consumer Protection, Rheingau-Taunus-Kreis, Hessen, Germany

*Corresponding author: mjg6@cdc.gov

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Summary

In 2012, the World Organisation for Animal Health (OIE) surveyed all 178 national Delegates to better understand the perceptions and priorities of Veterinary Services with respect to One Health efforts and to guide future work in that area. For the purposes of this survey, the concept or practice of One Health was defined as 'the intersectoral collaborative approach to preventing, detecting, and controlling diseases among animals and humans, including the collaboration among the institutions and systems that support their prevention, detection and control'. A total of 120 OIE Delegates, representing countries from all five OIE regions, responded to the survey. Delegates identified zoonoses, rabies and influenza as high-priority disease areas and disease reporting and food safety as high-priority programme areas for One Health approaches. Veterinary Services participated in joint programmes, involving these priority disease and programme areas, with national intersectoral partners. Delegates reported barriers to implementing One Health approaches, including a lack of resources, the complexity of collaboration, inadequate capacity within their Veterinary Services, and a lack of adequate legislation, policy, guidance and political will for One Health activities. Delegates supported OIE efforts to enhance One Health activities, and requested that the OIE and partners provide technical information and advice and conduct training and capacity-building seminars for One Health. Veterinary Services cannot effectively apply One Health approaches at the national level without effective partnerships across sectors. The OIE can serve as a model for countries by continuing its commitment to these intersectoral partnerships at the international level.

Keywords

Food and Agriculture Organization of the United Nations – International agency – OIE – One Health – Public–private sector partnership – United Nations – Veterinary medicine – Veterinary Services – World Health Organization – World Organisation for Animal Health – Zoonosis.

Introduction

The concept of One Health builds on the centuries-old understanding that the health of humans and animals is interlinked and that human and animal populations affect, and are affected by, the environment in which they co-exist. One Health has gained momentum during recent years, highlighting the value of taking an intersectoral and

collaborative approach to the prevention, detection and control of endemic and epidemic diseases among animals and humans.

The World Organisation for Animal Health (OIE) is a standard-setting intergovernmental organisation with an overall mandate to improve animal health, veterinary public health and animal welfare worldwide. Member Countries (178, as of May 2012) identify a national Delegate to the

OIE, often the Chief Veterinary Officer, who participates in official OIE functions for his or her country. To fulfil its mandate, the OIE is increasingly adopting One Health approaches and working towards One Health outcomes. In particular, activities that contribute to the prevention and control of animal diseases transmissible to humans (i.e. zoonoses) and to improved animal production food safety measures will lead to the One Health outcome of reduced risks from infectious diseases at the animal–human–ecosystem interface. In the OIE Fifth Strategic Plan (2011 to 2015) (1), approved by the national Delegates of Member Countries in May 2010, one of the major new elements introduced was the application of the One Health concept for reducing risks from high-impact diseases at the animal–human–ecosystem interface. The Delegates were surveyed to further understand Member Countries' perspectives on how the OIE should implement the One Health component of the strategic plan.

Materials and methods

Every year the OIE conducts a survey of all national Delegates on a particular topic. This topic is then presented as the technical item at the annual General Session of the World Assembly of OIE Delegates (i.e. the General Session). The technical item topic is selected by the Delegates as a timely and relevant concern related to the work of the OIE. The technical item presentation and the information collected through the survey serve as the basis for a resolution adopted during the General Session. Such resolutions guide the work of the OIE with its Member Countries. For the 2012 General Session, the technical item was: 'Sharing responsibilities to address health risks at the animal–human–ecosystems interfaces: national and international experiences and roles in previous and future developments in the "One Health" approach'. In support of the technical item, a questionnaire with 12 questions (including multiple embedded questions) was distributed on 2 November 2011 to 178 OIE Delegates through E-mail and postal delivery in the three official languages of the OIE (English, French and Spanish). Non-respondents were followed up at least twice, using confirmed E-mail addresses, to solicit responses to the survey. All responses received by 1 May 2012 were included in the analysis.

For the purpose of this survey, the concept or practice of One Health was defined as: 'the intersectoral collaborative approach to preventing, detecting, and controlling diseases among animals and humans, including the collaboration among the institutions and systems that support their prevention, detection and control'. The questions addressed various aspects of One Health approaches and the related needs of national Veterinary Services. Options for replying to the questions included: closed questions (e.g. Yes/No); the Likert scale (e.g. ranking along a scale from 1 [very low]

to 5 [very high]); and open-ended questions. For open-ended questions, responses were grouped thematically into broader categories during the analysis.

In the questionnaire, Delegates were presented with 17 topics or programmes (e.g. 'food safety' or 'antimicrobial resistance') and 12 diseases or groups of diseases (e.g. rabies, avian influenza or zoonoses) for which One Health approaches might be considered, and were asked to indicate the level of importance that their country's Central Veterinary Authority placed on taking a One Health approach to each topic. Respondents ranked the diseases and topics from 1 (very low priority) to 5 (very high priority). The questionnaire also requested information on the political and policy situation in OIE Member Countries with respect to One Health. Finally, Delegates were asked to identify key barriers to the implementation of One Health approaches by their country's Veterinary Services, and to specify the assistance in implementing One Health approaches that they would like to request from the OIE, either alone or in cooperation with other partners.

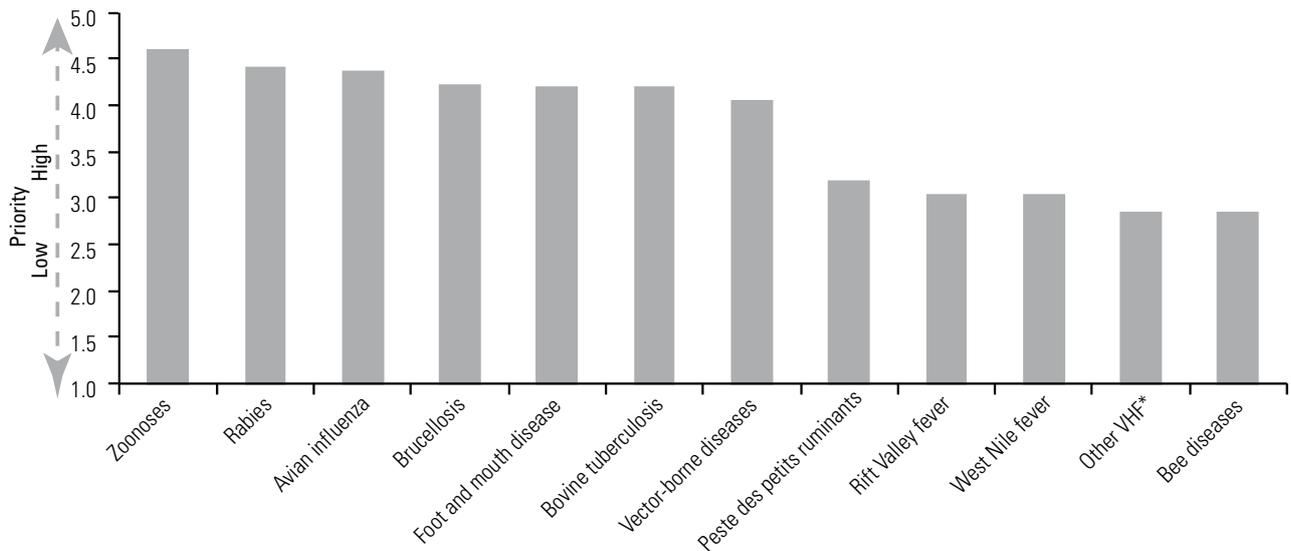
Data were entered and analysed by using Microsoft® Access® 2010 (Microsoft Corporation, Redmond, Washington). In standard OIE practices, selected countries are official Members in more than one OIE region. For this analysis, however, Member Countries were assigned to only one region, resulting in the following distribution of countries per OIE region: Africa (52), the Americas (29), Asia and the Pacific (32), Europe (53), and the Middle East (12).

Results

Of 178 OIE Member Countries, 120 (67%) submitted responses. The completion rate of the questionnaire varied by OIE region, ranging from 42 (79%) of 53 European Member Countries to seven (58%) of 12 Middle Eastern Member Countries.

When examining the priorities for national Veterinary Services in regards to taking a One Health approach, general zoonoses received the highest average score of 4.6, out of a possible ranking of 1 to 5 (Fig. 1), among the selected diseases or groups of diseases provided. The specific diseases of rabies and avian influenza were also high priorities for One Health approaches; each gained an average score of 4.4. In contrast, bee diseases and viral haemorrhagic fevers other than Rift Valley fever were ranked as the lowest priority, with an average ranking of 2.8.

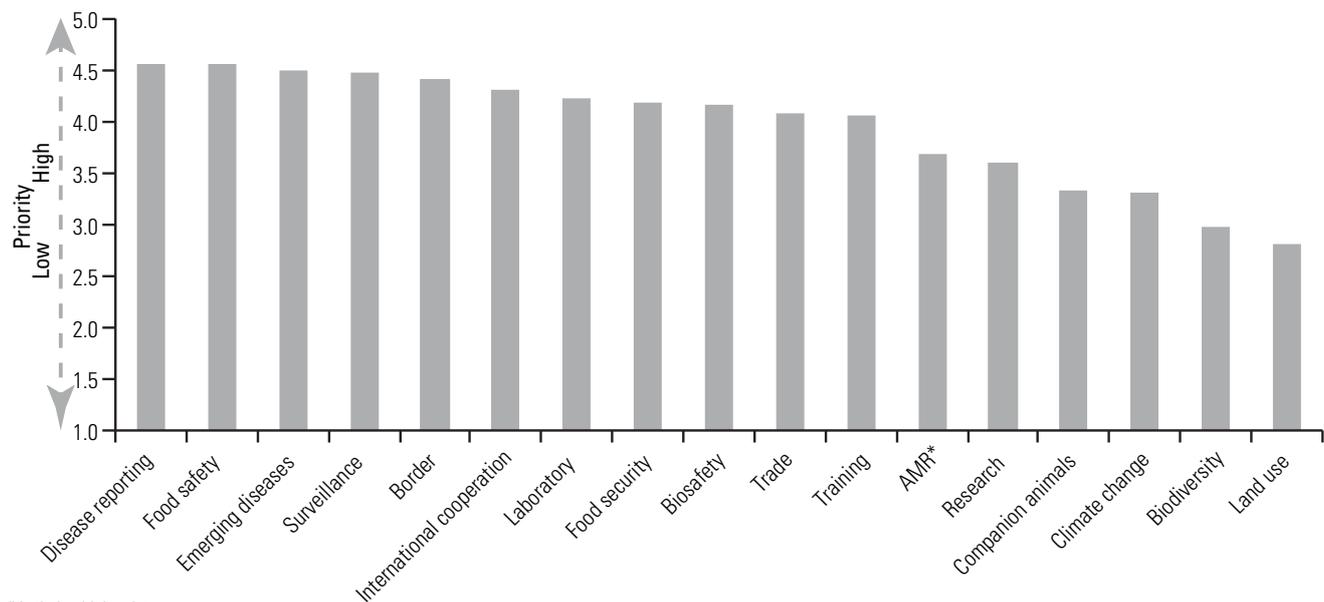
When examining selected broader topics or programmes for Veterinary Services (Fig. 2), the areas seen as the highest priority for taking a One Health approach were disease reporting and food safety (average = 4.6); followed



*Viral haemorrhagic fevers other than Rift Valley fever

Fig. 1
The importance of taking a One Health approach: average levels of importance attached to select diseases or groups of diseases by national Veterinary Services

Survey of national OIE Delegates, 2012 (120 delegates responded)



*Antimicrobial resistance

Fig. 2
The importance of taking a One Health approach: levels of importance attached to select topics or programmes by national Veterinary Services

Survey of national OIE Delegates, 2012 (120 delegates responded)

by emerging diseases and surveillance (average = 4.5). In contrast, the topics considered of lowest priority for One Health approaches were land-use changes associated with animal production (average = 2.8) and the biodiversity of wild animal populations (average = 3.0).

Of the 120 countries, 106 (88%) replied that their Veterinary Services were involved in joint national programmes with intersectoral partners. Each Delegate could list up to three different joint programmes in which their Veterinary Services participated with other national partners and, in

total, Delegates provided information on 232 specific joint programmes. After grouping the 232 joint programmes into broader categories, the most commonly mentioned topics appeared in the following categories: influenza, including pandemic preparedness and avian influenza programmes ($n = 49$ countries); zoonoses, including intersectoral working groups on zoonotic diseases and other human–animal interface challenges ($n = 33$); rabies, including dog population control ($n = 28$); food safety and foodborne diseases ($n = 13$); and brucellosis and tuberculosis programmes ($n = 13$).

Of the 120 responding Delegates, 109 (91%) reported at least one barrier to implementing One Health and, in all, provided a total of 235 barriers. These barriers were grouped into a series of six overarching themes. The most frequently identified theme was a lack of resources. A total of 83 Delegates responded that the lack of resources was a major barrier; they most commonly cited budget or financial resources ($n = 50$), but also human resources ($n = 23$), or simply resources in general ($n = 10$). These answers could be combined into five other main themes: the complexity and difficulty of collaboration ($n = 54$); an inadequate capacity within the Veterinary Services ($n = 49$); a lack of adequate legislation, policy or guidance ($n = 23$); a lack of political will or support for One Health activities ($n = 10$); and the presence of technical or other challenges ($n = 11$). Five barriers identified could not be clearly categorised on the basis of the information provided.

Almost all countries, 106 (88%) of the 120 who responded, stated that their Veterinary Services needed more technical capacity building for One Health approaches. When asked to choose from among five capacity-building initiatives that might be requested, the most frequently cited response (from 92% of respondents) was joint training workshops on intersectoral collaboration for relevant topics (e.g. laboratory methods, surveillance for zoonotic diseases, and intersectoral contingency planning). In addition, 86% would request assistance to improve the governance of their Veterinary Services to develop and implement One Health approaches; 69% would request an intersectoral evaluation or assessment focused on One Health approaches; 61% would request an intersectoral post-evaluation analysis of weaknesses, and the cost of the investments needed; and 56% would request an OIE Performance of Veterinary Services (PVS) Pathway mission, focused on One Health approaches, as part of the activities of their Veterinary Services.

A total of 110 countries provided 244 ways in which they expected the OIE to promote or assist the development and implementation of One Health approaches within their Veterinary Services. These responses were clearly aligned with the barriers and needs previously mentioned. The two most commonly mentioned themes were closely related –

providing technical information and advice ($n = 44$), and conducting training and capacity building ($n = 40$). Replies were very similar when Delegates stated what assistance they would expect from the OIE alone or from the OIE in collaboration with other partners (especially the Food and Agriculture Organization of the United Nations [FAO] and the World Health Organization [WHO]). When examined further, the Delegates requested technical assistance and capacity building that addressed general methods for implementing One Health approaches (e.g. governance and legislation) or training on specific intersectoral activities (e.g. joint surveillance or risk analysis). Member Countries ($n = 21$) also looked to the OIE to develop and provide guidance and standards on intersectoral collaboration at the country level, including guidance developed collaboratively with the human health sector and other partners.

Discussion

This worldwide survey, representing the perspectives of 120 national Veterinary Services from every OIE region, is the first of its kind and provides a valuable picture of how and when One Health approaches are thought to be useful by the Veterinary Services of Member Countries. The results also shed light on the manner in which the Delegates and Veterinary Services expect the OIE to provide guidance and assistance on One Health. This survey was conducted primarily to help guide OIE activities, and several components of the results may be useful for the OIE leadership. Respondents expressed support for the OIE in continuing much of the work that is already under way in its One Health approach, particularly the OIE activities that assist countries, such as developing standards and guidance and providing regional and country-level capacity building.

General agreement existed among Member Countries about areas in which One Health approaches were a priority for their country's Veterinary Services and there was consistency between those priority areas and the participation of these Veterinary Services in joint national programmes. Building upon the priorities expressed by Veterinary Services could be the key to successful future One Health efforts. For example, in this survey, 83% of national Delegates ranked rabies as a disease for which One Health approaches were a high or very high priority. The global effort to control rabies has benefited from the One Health collaborative approach and could serve as a model for other disease control programmes. An estimated 55,000 persons, at a minimum, die of rabies each year in Africa and Asia alone, and almost eight million persons receive post-exposure prophylaxis (2). The main reservoir of rabies globally is the dog (3), and the control and elimination of canine rabies through vaccination and dog population control remains the most cost-effective single intervention to protect humans against contracting the

disease (3, 4). The successful implementation of national rabies control programmes, however, remains dependent on good Veterinary Services governance, political commitment, multisectoral and community participation, and adequate financial resources at the global, regional, national and local level – a comprehensive combination which is still not commonly found.

In recent years, a One Health approach has been presumed to include a direct effect on human health. However, many consider that diseases that only affect (non-human) animals, and for which prevention and control do not require collaboration with the public health authorities, can still contribute to One Health outcomes. One example is foot and mouth disease (FMD), which was among the highest-ranked priority diseases in the survey. Although FMD does not cause human disease, FMD control has implications for human health and well-being, based on its effects on economic and food security. The global impact of FMD, attributable to vaccination costs and direct economic losses, has recently been estimated at US\$11 billion annually (5). Even though controlling FMD, a disease affecting domestic and wild animals, does not require cooperation with public health partners, it does require intersectoral collaboration with national wildlife agencies and therefore still benefits from the One Health approach.

Delegates identified a lack of technical capacity as one barrier to implementing One Health and requested the OIE to suggest practical methods for approaching or improving intersectoral collaboration. The OIE has made a strong commitment to improve the implementation of One Health approaches to reduce health risks at the animal–human interface. This commitment was first specifically expressed in the 2008 strategic framework for reducing risks from infectious diseases at the animal–human–ecosystem interface (6), jointly prepared by FAO, the OIE, WHO, the United Nations Children’s Fund (UNICEF), the United Nations System Influenza Coordination, and the World Bank. The collaboration of the OIE, FAO, and WHO was further described in a joint statement, referred to as the 2010 Tripartite Concept Note (7), in which taking a One Health approach was conceived as an intersectoral, collaborative approach to diseases that occur among animals and humans, through cooperation and coordination of the institutions and systems that support the prevention, detection and control of these diseases.

In 2011, FAO, OIE, WHO and the Mexican Government convened a high-level technical consultation on reducing health risks at the human–animal–ecosystem interface, specifically intended to translate the principles laid out in the Tripartite Concept Note into national and regional actions, and to identify successful national and regional-level intersectoral programmes that might be implemented in other countries or regions. Conclusions from this

consultation included a set of key elements that are vital for supporting effective cross-sectoral collaboration. These key elements align with the challenges identified and recommendations made by the national Delegates in the OIE survey. They include the following:

- political will and high-level commitment
- strong governance structures, aligned legal frameworks, and recognition of existing international standards
- adequate and equitably distributed resources
- guidance for implementing cross-sectoral collaborations
- capacity development
- strong and effective health systems within the individual sectors.

The findings of this Mexico City consultation (8) were widely disseminated and can serve as a framework for collaboration to improve One Health efforts at the national and regional level.

In addition to citing the need for capacity building to tackle One Health concerns, Delegates also identified the need for fundamental capacity building for Veterinary Services. This highlights an important consideration as the OIE continues to advance its One Health efforts; the ability for Veterinary Services to collaborate with intersectoral partners is dependent on a minimum level of capacity within those Veterinary Services. Therefore, Delegates’ responses demonstrate that the OIE’s efforts to improve and advance One Health must go hand-in-hand with its efforts to improve the quality of Veterinary Services.

One key way that the OIE works with Member Countries to improve the quality of their Veterinary Services is through the OIE Performance of Veterinary Services (PVS) Pathway (9). On request from a Member Country, the OIE uses the multi-step PVS Pathway to increase the compliance of that Member’s national Veterinary Services with the OIE international standards. The first step of the PVS Pathway is to evaluate the Veterinary Services, using the standard OIE Tool for the Evaluation of Performance of Veterinary Services (PVS Tool). The current and sixth edition of the PVS Tool (10) includes collaboration with the relevant authorities, including other Ministries and Competent Authorities, as a component of the assessment. Building on the findings of the PVS Evaluation, and undertaking additional steps such as the PVS Gap Analysis and country-level technical assistance interventions, the PVS Pathway offers an effective mechanism to improve the overall capacity of the Veterinary Services under examination and, at the same time, provides an opportunity to improve their One Health capacity.

The PVS Pathway focuses on the activities of national Veterinary Services. However, during the survey, Delegates also expressed a strong interest in assessments, gap analysis missions, or training sessions that could be conducted as joint exercises with other sectors, such as public health. This need is consistent with the growing collaboration between the OIE and WHO in the area of governance. The public health sector conducts national capacity assessments based on the WHO International Health Regulations (IHR) (11), somewhat comparable to the Veterinary Services assessments conducted within the OIE PVS Pathway. The OIE PVS Pathway and the WHO IHR implementation framework include areas of potential overlap, particularly in relation to zoonoses. These areas of overlap can be a starting point for countries to identify crucial areas for capacity building, such as joint epidemiologic surveillance and multisectoral risk analysis, and to make decisions about optimising national programmes that involve more than one sector, to achieve synergy.

During the 2012 General Session, based in part on the findings from this survey presented to the Delegates in attendance, the 178 OIE Member Countries passed a resolution: 'The One Health approach to address health risks at the animal–human–ecosystem interface' (12). Among the ten recommendations in the resolution, the Assembly of Delegates recommended that the Director General and OIE Delegates should become advocates to governments and regional and international organisations for the fundamental role of Veterinary Services in the protection of animal, human, and ecosystem health and the application of One Health approaches. The Assembly also recommended that OIE standards and guidance should provide support for Member Countries to implement One Health approaches, and that the OIE should continue to work through its Specialist Commissions, Working Groups, and *ad hoc* Groups to review existing standards and develop evidence-based guidance on health risks at the animal–

human–ecosystem interface. In addition, the Delegates specifically recommended that the OIE continue to work closely with WHO to negotiate and ensure harmonisation of the OIE international guidance and standards for good governance of Veterinary Services with the guidance from WHO for good governance of human health services, and with other international organisations that provide guidance related to the good governance of ecosystems.

Conclusions

The concept of One Health is not new, but One Health approaches have become more necessary over recent years than in the preceding decades; the complexity of concerns pressuring human, animal (including wildlife) and environmental health requires joint solutions. Humans and animals have been co-existing for the history of our respective species, but perhaps never before in such high concentrations, with such unrestricted global movement, and with such increasing demand and competition for space and resources, which severely affects the environment. The OIE has the opportunity to play a leadership role in promoting the importance of Veterinary Services in reducing health risks at the animal–human–ecosystem interface by preventing and controlling animal diseases, including zoonoses, and contributing to food production to feed the human population. Veterinary Services cannot effectively meet many of these challenges at the national level without effective partnerships across sectors. The OIE can serve as a model for all countries by continuing its commitment to these partnerships at the international level by advocating for One Health worldwide, by further developing the principles of the Tripartite Concept Note, and in leading by example to implement the One Health approach.

Perspectives d'avenir d'« Une seule santé » : résultats de l'enquête auprès des Délégués des Pays Membres de l'Organisation mondiale de la santé animale en 2012

M.K. Glynn & N. Brink

Résumé

En 2012, l'Organisation mondiale de la santé animale (OIE) a réalisé une enquête auprès des 178 Délégués nationaux de ses Pays Membres afin de mieux comprendre la manière dont les Services vétérinaires percevaient les efforts relevant du concept « Une seule santé » et leurs priorités en la matière, et de pouvoir ainsi orienter les activités futures dans ce domaine. Aux fins de cette enquête, le concept « Une seule santé » et son application ont été définis comme

une « méthode de participation intersectorielle visant à prévenir, à détecter et à contrôler les maladies aussi bien chez l'homme que chez l'animal, notamment à travers la collaboration entre des institutions et des systèmes soutenant ces activités de prévention, de détection et de lutte ». Au total, 120 Délégués représentant des pays des cinq régions de l'OIE ont répondu au questionnaire. Les maladies citées comme étant hautement prioritaires étaient les zoonoses, la rage et la grippe ; les programmes jugés hautement prioritaires dans une démarche « Une seule santé » concernaient la notification des maladies et la sécurité sanitaire des aliments. Les Services vétérinaires participaient avec des partenaires intersectoriels nationaux à des programmes mixtes axés sur ces maladies et thématiques prioritaires. Les obstacles relevés par les Délégués à la mise en œuvre des approches « Une seule santé » étaient notamment le manque de ressources, la complexité des collaborations, les capacités insuffisantes au sein des Services vétérinaires, et le fait que les activités relevant du concept « Une seule santé » n'étaient pas soutenues par une législation, des mesures, des orientations et une volonté politique appropriées pour leur mise en œuvre. Les Délégués ont soutenu l'OIE dans ses efforts pour renforcer les activités « Une seule santé » et demandé que l'OIE et ses partenaires leur fournissent des conseils et des informations techniques et organisent des formations et des séminaires de renforcement des capacités dans le domaine « Une seule santé ». En l'absence de partenariats intersectoriels efficaces, les Services vétérinaires ne peuvent pas appliquer des approches « Une seule santé » au niveau national. L'OIE peut servir d'exemple pour les pays en persévérant dans sa volonté d'établir de tels partenariats intersectoriels au niveau international.

Mots-clés

Agence internationale – Médecine vétérinaire – Nations unies – OIE – Organisation des Nations unies pour l'alimentation et l'agriculture – Organisation mondiale de la santé – Organisation mondiale de la santé animale – Partenariat public-privé – Une seule santé – Services vétérinaires – Zoonose.



Puntos de vista sobre «Una sola salud»: encuesta a los delegados nacionales ante la Organización Mundial de Sanidad Animal (2012)

M.K. Glynn & N. Brink

Resumen

En 2012, la Organización Mundial de Sanidad Animal (OIE) realizó una encuesta entre los 178 delegados nacionales con el fin de entender mejor las ideas y prioridades de los Servicios Veterinarios con respecto a las iniciativas de «Una sola salud» y de orientar las futuras labores en la materia. A los efectos de dicha encuesta, el concepto o la praxis de «Una sola salud» se definieron como un «planteamiento de colaboración intersectorial para prevenir, detectar y controlar enfermedades en los animales y el ser humano, lo que incluye la colaboración entre las instituciones y sistemas que apoyan dichas labores de prevención, detección y control». En total respondieron a la encuesta 120 delegados, representantes de países de las cinco regiones de la OIE. Como temas de la máxima prioridad a la hora de aplicar los planteamientos de «Una sola salud» los delegados señalaron la zoonosis, la rabia y la influenza, por lo que respecta a las enfermedades, así como la notificación de enfermedades y la inocuidad de los

alimentos, por lo que respecta a las áreas programáticas. En relación con esas prioridades, los Servicios Veterinarios participaron en programas conjuntos con asociados intersectoriales de cada país. Los delegados describieron las barreras existentes para aplicar los planteamientos de «Una sola salud», en particular la falta de recursos, la complejidad de la colaboración, la ausencia de capacidad suficiente en sus Servicios Veterinarios y la falta de legislación, políticas, directrices y voluntad política para actuar en clave de «Una sola salud». Los delegados apoyaron los esfuerzos de la OIE para mejorar ese trabajo y pidieron a la OIE y sus asociados que proporcionaran información y asesoramiento técnicos y realizaran seminarios de formación y capacitación en la materia. En ausencia de alianzas eficaces entre los sectores, los Servicios Veterinarios no pueden aplicar fructuosamente los planteamientos de «Una sola salud» a escala nacional. En este sentido, la OIE puede erigirse en un modelo para los países perseverando en su compromiso con ese tipo de alianzas intersectoriales a escala internacional.

Palabras clave

Alianzas publicoprivadas – Medicina veterinaria – Naciones Unidas – OIE – Organismos internacionales – Organización Mundial de la Salud – Organización Mundial de Sanidad Animal – Organización de las Naciones Unidas para la Alimentación y la Agricultura – Servicios Veterinarios – «Una sola salud» – Zoonosis.



References

1. World Organisation for Animal Health (OIE) (2010). – Fifth Strategic Plan: 2011–2015. OIE, Paris. Available at: www.oie.int/fileadmin/Home/eng/About_us/docs/pdf/5th_StratPlan_EN_2010_LAST.PDF (accessed on 8 October 2013).
2. Knobel D.L., Cleaveland S., Coleman P.G., Fèvre E.M., Meltzer M.I., Miranda M.E.G., Shaw A., Zinsstag J. & Meslin F.X. (2005). – Re-evaluating the burden of rabies in Africa and Asia. *Bull. WHO*, **83**, 360–368.
3. Anderson A. & Shwiff S.A. (2013). – The cost of canine rabies on four continents. *Transbound. emerg. Dis.* E-pub.: 24 September. doi:10.1111/tbed.12168.
4. Franka R., Smith T.G., Dyer J.L., Wu X., Niezgodá M. & Rupprecht C.E. (2013). – Current and future tools for global canine rabies elimination. *Antiviral Res.*, **100** (1), 220–225. doi:10.1016/j.antiviral.2013.07.004.
5. Knight-Jones T.J.D. & Rushton J. (2013). – The economic impacts of foot and mouth disease – what are they, how big are they and where do they occur? *Prev. vet. Med.*, **112**, 161–173.
6. Food and Agriculture Organization of the United Nations, World Organisation for Animal Health, World Health Organization, United Nations Children's Fund, United Nations System Influenza Coordination & World Bank (2008). – Contributing to One World, One Health: a strategic framework for reducing risks of infectious diseases at the animal–human–ecosystems interface. *In Proc. Interministerial Conference on Avian and Pandemic Influenza*, 14 October, Sharm El-Sheik, Egypt. Available at: un-influenza.org/files/OWOH_14Oct08.PDF (accessed on 10 March 2012).
7. Food and Agriculture Organization of the United Nations (FAO), World Organisation for Animal Health (OIE) & World Health Organization (WHO) (2010). – The FAO-OIE-WHO Collaboration. Sharing responsibilities and coordinating global activities to address health risks at the animal–human–ecosystems interfaces. A Tripartite Concept Note. Available at: www.oie.int/fileadmin/Home/eng/Current_Scientific_Issues/docs/pdf/FINAL_CONCEPT_NOTE_Hanoi.PDF (accessed on 26 March 2012).

8. Food and Agriculture Organization of the United Nations, World Organisation for Animal Health & World Health Organization (2013). – High-level technical meeting to address health risks at the human–animal–ecosystems interfaces, 15–17 November 2011, Mexico City, Mexico. Available at: www.oie.int/fileadmin/Home/eng/Media_Center/docs/pdf/00F9Fd01.PDF (accessed on 10 November 2013).
 9. Landford J. & Nunn M. (2012). – Good governance in 'One Health' approaches. In Good governance and financing of efficient Veterinary Services (L. Msellati, ed.). *Rev. sci. tech. Off. int. Epiz.*, **31** (2), 561–575. Available at: http://web.oie.int/boutique/index.php?page=ficprod&id_produit=1073&fichrech=1&lang=en (accessed on 2 June 2014).
 10. World Organisation for Animal Health (OIE) (2013). – OIE Tool for the Evaluation of Performance of Veterinary Services, 6th Ed. OIE, Paris. Available at: www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/pdf/A_PVS_Tool_Final_Edition_2013.PDF (accessed on 10 November 2013).
 11. World Health Organization (WHO) (2008). – International health regulations (2005), 2nd Ed. WHO, Geneva. Available at: www.who.int/ihr/publications/9789241596664/en/ (accessed on 4 June 2014).
 12. World Organisation for Animal Health (OIE) (2012). – Resolution No. 27. The 'One Health' approach to address health risks at the animal–human–ecosystem interface. Final Report of the 80th General Session, 20–25 May, Paris. OIE, Paris, 30–31. Available at: www.oie.int/doc/ged/D11687.PDF (accessed on 10 November 2013).
-