

## Perspective

# Operationalization of One Health and tripartite collaboration in the Asia-Pacific region

Gyanendra Gongal<sup>1</sup>, Roderico H Ofrin<sup>1</sup>, Katinka de Balogh<sup>2</sup>, Yooni Oh<sup>2</sup>, Hirofumi Kugita<sup>3</sup>, Kinzang Dukpa<sup>3</sup>

<sup>1</sup>World Health Organization Health Emergencies Programme, World Health Organization Regional Office for South-East Asia, New Delhi, India, <sup>2</sup>Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific, Bangkok, Thailand, <sup>3</sup>World Organisation for Animal Health Regional Representation for Asia and the Pacific, Tokyo, Japan

**Correspondence to:** Dr Gyanendra Gongal ([gongalg@who.int](mailto:gongalg@who.int))

## Abstract

One Health refers to the collaborative efforts of multiple disciplines working locally, nationally and globally to attain optimal health for people, animals and our environment. The One Health approach is increasingly popular in the context of growing threats from emerging zoonoses, antimicrobial resistance and climate change. The Food and Agriculture Organization of the United Nations, World Organisation for Animal Health and World Health Organization have been working together in the wake of the avian influenza crisis in the Asia-Pacific region to provide strong leadership to endorse the One Health concept and promote interagency and intersectoral collaboration. The programme on highly pathogenic emerging diseases in Asia (2009–2014) led to the establishment of a regional tripartite coordination mechanism in the Asia-Pacific region to support collaboration between the animal and human health sectors. The remit of this mechanism has expanded to include other priority One Health challenges, such as antimicrobial resistance and food safety. The mechanism has helped to organize eight Asia-Pacific workshops on multisectoral collaboration for the prevention and control of zoonoses since 2010, facilitating advocacy and operationalization of One Health at regional and country levels. The tripartite group and international partners have developed several One Health tools, which are useful for operationalization of One Health at the country level. Member States are encouraged to develop a One Health strategic framework taking into account the country's context and priorities.

**Keywords:** Asia-Pacific region, coordination, One Health, tripartite, zoonoses

## Background

One Health is a collaborative, multidisciplinary and multisectoral approach that can address urgent, ongoing or potential health threats at the human–animal–environment interface at subnational, national, global and regional levels.<sup>1</sup> This definition was worded in part to reflect the high proportion of zoonoses (estimated to be 60–70%) among the diseases that have emerged in the past 30 years.<sup>2,3</sup> Close human–animal relationships, intensification of agricultural practices to feed the ever-increasing human population, deforestation, human encroachment on natural habitats, indiscriminate use of antimicrobial agents and climate change have contributed to the emergence and re-emergence of new pathogens and public health emergencies. It is clear that no single discipline or sector of society has sufficient knowledge and resources to address the emergence or resurgence of these diseases. Therefore, One Health is a cost-effective, sustainable, and practical approach, particularly for developing countries with limited financial and human resources, and the concept must be put into practice from central to field level in every country.<sup>4</sup> The One Health approach is increasingly popular

in the context of growing threats from emerging zoonoses, antimicrobial resistance and climate change, which demand a holistic, multidisciplinary approach and public–private partnerships.

## Evolution of One Health in the region

The Asia-Pacific region is a hotspot for emerging infectious diseases and disasters for which countries need to develop core capacities for implementation of the International Health Regulations, 2005 (IHR). To address endemic, emerging and re-emerging infectious diseases, including zoonoses in the Asia-Pacific region, the World Health Organization (WHO) Regional Offices for South-East Asia and the Western Pacific devised the *Asia Pacific strategy for emerging diseases* (APSED) in 2005. This strategy provided a common framework for countries of the two regions to strengthen their capacities to manage and respond to emerging diseases, in line with the core capacity requirements of the IHR. In the decade since then, the remit of APSED has broadened to an all-hazards approach, i.e., to include non-infectious

hazards such as chemicals, toxins and radiological agents (APSED III).<sup>5</sup>

The avian influenza crisis was a turning point for One Health in the Asia-Pacific region. A human outbreak of avian influenza A(H5N1), detected in 1997 in Hong Kong Special Administrative Region, China, was the first recognized instance in which a highly pathogenic avian influenza virus had been transmitted to humans and resulted in serious illness. Re-emergence of the virus in 2003–2004 in Asian countries compelled national authorities to work together at the human–animal interface and also highlighted the absence of guidance for establishing a functional coordination mechanism between the public health and animal health sectors. Considering the acute need to promote close collaboration between the sectors for management of the avian influenza crisis, as well as prevention and control of other priority zoonoses, the WHO Regional Offices for South-East Asia and the Western Pacific – in collaboration with the Food and Agriculture Organization of the United Nations (FAO) Regional Office for Asia and the Pacific and the World Organisation for Animal Health (OIE) Regional Representation for Asia – developed *Zoonotic diseases: a guide to establishing collaboration between animal and human health sectors at the country level* in 2008.<sup>6</sup> The guide focused on four components: (i) surveillance and information sharing; (ii) coordinated response; (iii) risk reduction; and (iv) collaborative research. In 2019, considering the evolving situation and growing need for a global standardized guidance document for taking a multidisciplinary One Health approach, WHO, in collaboration with FAO, OIE and international partners, further developed the guide as *Taking a multisectoral One Health approach: a tripartite guide to addressing zoonotic diseases in countries*.<sup>1</sup>

FAO, OIE and WHO have been working together in the wake of the avian influenza crisis in Asia and Africa to provide strong leadership to endorse the One Health concept and promote interagency and intersectoral collaboration. The programme on highly pathogenic emerging diseases (HPED) in Asia<sup>7</sup> was active during the period 2009–2014. The programme was funded by the European Commission and implemented by FAO, OIE and WHO in close consultation with the secretariats of the Association of Southeast Asian Nations (ASEAN) and the South Asian Association for Regional Cooperation (SAARC). The objective of the HPED project was to strengthen the institutional capacities of ASEAN and SAARC and their secretariats to control HPEDs and to improve epidemic and pandemic preparedness in the region. It provided funding to strengthen animal and human health services and to encourage regional integration and cooperation by contributing to the control of epidemics, epizootics and zoonoses.

The HPED project in turn led to the development of a regional tripartite coordination mechanism in the Asia-Pacific region to support collaboration between the animal and human health sectors. The commitment to a global tripartite collaboration to address animal and pandemic influenza at the human–animal interface, formally noted in a concept note in 2010, was further reiterated in 2017 to provide multisectoral collaborative leadership in addressing health challenges such as antimicrobial resistance (AMR) and food safety.<sup>8</sup>

## One Health activities coordinated by the tripartite collaboration

The regional tripartite coordination mechanism has enabled organization of eight Asia-Pacific workshops on multisectoral collaboration for the prevention and control of zoonoses since 2010, facilitating advocacy and operationalization of One Health at regional and country levels. The Asia-Pacific platform provides opportunities for Member States and international partners to share good practices, lessons learnt and challenges in operationalization of One Health at the country level. Some thematic issues have been identified for each workshop, considering importance and impact at a given time, such as AMR, neglected tropical zoonoses, disaster management at the human–animal interface and climate change. The role of coordinating and organizing the workshops rotates around the three partner organizations (see Box 1); the secretariat also rotates through the partners, and OIE will lead the 9th Asia-Pacific workshop in 2021.

The tripartite group and international partners have developed many One Health tools, which are useful at the country level. Various tools and frameworks developed by the tripartite group and partners, for operationalization of One Health and enhancing multisectoral collaboration, have been presented at these workshops. Some countries have also shared their experiences of using these One Health tools and frameworks and expressed interest in applying other tools as needed.<sup>9</sup> It was encouraging to see Member States' growing interest in using the One Health tools during the 8th Asia-Pacific workshop in April 2019 (see Table 1).<sup>9</sup>

The tripartite group, in collaboration with international partners, will continue to provide technical and financial support for utilizing these tools at the country level in the coming years. Joint risk assessment workshops are planned in Myanmar and Thailand, and training facilitators to use the One Health zoonotic disease prioritization tool will be organized in the first half of 2020.

As a unique model outside the global tripartite group, the regional tripartite group has established a One Health tripartite coordination group in Bangkok to provide dynamic leadership for better coordination and collaboration among the tripartite groups at regional and country levels. This will soon be formalized. The coordination group regularly collects and disseminates information (on focal points, activities and case studies) and communicates at and between global, regional and country levels and with technical, development and

### Box 1. Year, location and lead agency of Asia-Pacific workshops on multisectoral collaboration under the tripartite collaboration

- 2010; Sapporo, Japan; WHO
- 2012; Chiang Mai, Thailand; FAO
- 2012; Bali, Indonesia; OIE
- 2013; Kathmandu, Nepal; WHO
- 2014; Bangkok, Thailand; FAO
- 2015; Sapporo, Japan; OIE
- 2017; Manila, Philippines; WHO
- 2019; Bangkok, Thailand; FAO

**Table 1. Countries' use of and interest in standardized One Health tools as of April 2019<sup>a</sup>**

Country	Tool(s) applied	Tool(s) under consideration	Country	Tool(s) applied	Tool(s) under consideration
Afghanistan	JEE	–	Nepal	JEE	NBW, JRA, OHZDP
Australia	JEE	–	Pakistan	JEE, JRA, OHZDP	OH-APP
Bangladesh	JEE, NBW, OH-APP, 4WLP	JRA	Papua New Guinea	PVS	JRA, OHZDP, JEE, NBW, OH-SMART™, OH-APP
Bhutan	JEE, NBW	JRA, OH-APP, OH-SMART™	Philippines	JEE	NBW, JRA, OHZDP
Cambodia	JEE, OH-SMART™	–	Samoa	–	JEE, JRA
China	OHZDP	–	Sri Lanka	JEE	JRA
Indonesia	JEE, NBW, JRA, OHZDP, OH-APP, 4WLP, OH-SMART™	SARE	Thailand	JEE, OH-APP, OH-SMART™, OHZDP	MCDA
Lao People's Democratic Republic	JEE, OH-SMART™, OH-APP	–	Timor-Leste	JEE	–
Malaysia	JEE	NBW, OH-APP	Tonga	–	JEE
Maldives	JEE	OHZDP, NBW	Vanuatu	JEE	JRA, NBW, OH-SMART™, OH-APP
Mongolia	JEE	NBW, JRA, OH-SMART™	Viet Nam	JRA, JEE, 4WLP, OH-APP	OH-SMART™, SARE, NBW, OHZDP
Myanmar	JEE	JRA, NBW, OH-SMART			

4WLP: four-way linking project for assessing health risks at the human–animal interface;<sup>10</sup> JEE: joint external evaluation; JRA: joint risk assessment; MCDA: multi-criteria decision analysis for assessment of national rabies control programme; NBW: National Bridging Workshop (International Health Regulations and Performance of Veterinary Services); OH-APP: One Health assessment for planning and performance; OH-SMART™: One Health system mapping and analysis resource toolkit; OHZDP: One Health zoonotic disease prioritization; PVS: Performance of Veterinary Services; SARE: step-wise approach towards rabies elimination.<sup>11</sup>

<sup>a</sup>As reported at the 8th Asia-Pacific workshop on multisectoral collaboration, April 2019, Bangkok, Thailand.<sup>9</sup>

financing institutions. It also monitors progress and arranges technical and administrative support. The regional tripartite will take turns to host the regional secretariat, and FAO, the current host, will hand the role over in mid-2020 to OIE, which will carry out this function until the completion of the 9th Asia-Pacific workshop on multisectoral collaboration in 2021. In addition, several tripartite activities have been organized recently at subregional levels. These include the ASEAN rabies meeting, the SAARC rabies meeting, webinars on rabies, workshops on zoonotic influenza and regional workshops on AMR.

### Priority areas for collaborative activities at regional and country levels

Emerging zoonoses (including zoonotic influenza), rabies, AMR and food safety have been identified as priority areas for collaborative activities at regional and country levels. The coordination group is working with the United States of America Centers for Disease Control and Prevention, the Fleming Fund, the Global Alliance for Rabies Control, Mission Rabies and specialized regional organizations in tripartite priority areas of interest.

#### Antimicrobial resistance

AMR is an increasing global challenge affecting public health, animal health, food safety and environment. The largest hotspots of AMR in animals are in Asia, which is home to 57.6% of the world's pigs and 56% of the world's chickens.<sup>12</sup>

In addition, the Asia-Pacific region is home to 60% of the world's population.<sup>13</sup> Targeted and coordinated interventions such as legislative action and subsidies to improve farm hygiene are needed to reduce the need for antimicrobials in animal production, thereby preserving critical drugs for human medicines and treatment of sick animals.<sup>14</sup> Multisectoral collaboration to combat AMR at the human–animal interface in the Asia-Pacific region may serve as another example of a One Health operational model. Since the release of the *Global action plan on antimicrobial resistance* in 2015,<sup>15</sup> WHO Regional Offices for South East Asia and the Western Pacific have, in collaboration with regional offices of FAO and OIE, provided technical support for the development of national action plans with a One Health focus in Member States. In 2016 and 2018, these were followed up with reviews of the progress of implementation<sup>16,17</sup> in partnership with FAO, OIE and the United Nations Environment Programme (UNEP), thus ensuring that multisectoral collaborations and a One Health focus of national efforts are strengthened and maintained. Tripartite AMR country self-assessment surveys have been done since 2016 annually to monitor progress in the implementation of national plans on AMR, and data are collated in a global database.<sup>18</sup>

In another example of a concrete One Health model, countries in the Asia-Pacific region are being assisted to establish and strengthen integrated One Health AMR through “Tricycle surveillance” as part of national action plans for AMR containment. This uses a globally harmonized protocol for a simplified and integrated surveillance system with a single key

indicator: the frequency of extended-spectrum  $\beta$ -lactamase (ESBL)-producing *Escherichia coli*.<sup>19</sup> The Tricycle surveillance protocol aims to help countries to establish a simple multisectoral integrated system to monitor ESBL-producing *E. coli* in humans, the food chain and the environment and to build from this a systematic and standardized national integrated surveillance system on AMR. This provides additional insights into source attribution, identifying hotspots of ESBL-producing *E. coli* emergence in the environment and animals and their transmission to humans, and mapping risk factors for transmission of ESBL-producing *E. coli*. The insights thus gained will help prioritize and target control and mitigation strategies to directly decrease the burden of disease. WHO is supporting the Tricycle project in Asia-Pacific countries, namely India, Indonesia, Malaysia and Nepal, on a pilot basis.

### International Health Regulations–Performance of Veterinary Services national bridging workshops

WHO and OIE are the two main international organizations responsible for proposing standards and references for the public health and animal health sectors, respectively. WHO and OIE support their Member States in undertaking assessments of existing strengths and gaps to comply with IHR and the OIE intergovernmental standards. WHO and OIE work together and have clarified the links between their respective assessment tools, namely the IHR monitoring and evaluation framework (MEF)<sup>20</sup> and the Performance of Veterinary Services (PVS) Pathway.<sup>21</sup> WHO and OIE consider that joint use of the IHR-MEF and the OIE PVS Pathway at the country level will result in better alignment of capacity-building and strategies between the human and animal health sectors. Using their comparative advantages, they have jointly defined an operational approach to proposing capacity-building activities to strengthen interactions between professionals and policy-makers from both sectors.

WHO and OIE are therefore working together to support national IHR-PVS bridging workshops at the country level.<sup>22</sup> The workshops guide the participants through the IHR and PVS assessments conducted in the human and animal health sectors, respectively, explore options for improved collaboration and coordination, and inform operational strategies to be used by policy-makers for concerted corrective measures and strategic investments in national roadmaps. The workshops have the added value of a One Health approach for the management of public health events at the human–animal interface. The outcome from the workshops is valuable for developing national action plans for health security. So far, workshops have been organized in Bangladesh, Bhutan, Indonesia and Myanmar and are expected to be conducted in Maldives, Nepal and the Philippines in 2020.

### Foodborne diseases and food safety

Food safety is another shared responsibility. It requires multisectoral collaboration – from food production to consumption – and cooperation to ensure compliance with acceptable food standards, i.e. a One Health approach. The international food standards produced by the Codex Alimentarius Commission<sup>23</sup> are among the most important global public goods that WHO produces together with FAO. The national Codex committee in each Member State plays an important role in promoting multisectoral coordination and collaboration for food

safety and in providing national input to the Codex standard development process at regional and global levels. The FAO/WHO Codex Trust Fund supports countries to build strong, solid and sustainable national capacity to engage in Codex. The WHO South-East Asia Regional Office and FAO Regional Office for Asia and the Pacific facilitated submission of a robust group application by Bhutan, India and Nepal to the Codex Trust Fund;<sup>24</sup> this was the first group application approved by the Fund at the global level as well as in Asia. These countries shared their experience of successful application, scope and use of the FAO/WHO Codex Trust Fund during a side-event at the 21st meeting of the Codex Committee for Asia in Goa in September 2019. As a result, many Asian countries are now encouraged and interested in making a group application within the next round of the Codex Trust Fund.

Parasitic zoonoses such as foodborne trematodiasis, taeniasis/cysticercosis and echinococcosis are neglected tropical diseases causing a significant burden of disease in Asia. Lessons learnt from past experience show that these parasitic zoonoses can be controlled, prevented and possibly eliminated through the One Health approach by using an integrated mix of effective and feasible interventions. These include preventive chemotherapy, treatment, vaccination and management of animal reservoirs, safe food handling and preparation, and provision of safe water, hygiene and sanitation, delivered through strong intersectoral collaboration and partnership. In view of the burden of neglected parasitic zoonoses in Asia and the need for a One Health approach, FAO, OIE and WHO organized a meeting to accelerate prevention and control of neglected foodborne parasitic zoonoses in high-burden Asian countries in Luang Prabang, Lao People's Democratic Republic, in October 2018 with the involvement of the animal health, human health, food safety, and water and sanitation sectors, at which country-specific action plans to accelerate prevention and control were developed.<sup>25</sup>

FAO, WHO, the World Trade Organization and the African Union hosted two high-level food safety conferences in 2019 – the first International Food Safety Conference in Addis Ababa<sup>26</sup> and the International Forum on Food Safety and Trade in Geneva.<sup>13</sup> Both events highlighted the need for urgent international action to bolster food safety, to align food safety strategies and approaches across sectors and borders using a One Health approach and to reinforce efforts to achieve the United Nations Sustainable Development Goals.

## Conclusion

There is a growing recognition of One Health at global, regional and country levels, not only for prevention and control of zoonoses but also in response to AMR, food safety and climate change concerns. The establishment of a functional tripartite One Health coordination group in the Asia-Pacific region to provide leadership and technical support and to apply various One Health tools for operationalization of One Health at the country level is crucial. The regional tripartite group has benefited from added value by working together to provide better services in a coordinated and cost-effective manner. Member States are encouraged to establish a One Health secretariat to deal with One Health issues and to develop a One Health strategic framework taking into account

the country's context and priorities. Domestic funding for One Health activities is critical for sustainable operationalization of One Health.

**Acknowledgements:** We would like to thank Dr Manish Kakkar, World Health Organization Regional Office for South-East Asia, and Dr Lesa Thompson, World Organisation for Animal Health Regional Representation for Asia and the Pacific, for their valuable contributions.

**Source of support:** None.

**Conflict of interest:** None declared.

**Authorship:** GG developed the first draft. All authors provided inputs and refined subsequent versions of the manuscript.

**How to cite this paper:** Gongal G, Ofrin RH, de Balogh K, Oh Y, Kugita H, Dukpa K. Operationalization of One Health and tripartite collaboration in the Asia-Pacific region. *WHO South-East Asia J Public Health*. 2020;9(1):21–25. doi:10.4103/2224-3151.282991.

## References

1. Taking a multisectoral One Health approach: a tripartite guide to addressing zoonotic diseases in countries. World Health Organization, Food and Agriculture Organization of the United Nations and World Organisation for Animal Health; 2019 ([https://www.oie.int/fileadmin/Home/eng/Media\\_Center/docs/EN\\_TripartiteZoonosesGuide\\_webversion.pdf](https://www.oie.int/fileadmin/Home/eng/Media_Center/docs/EN_TripartiteZoonosesGuide_webversion.pdf), accessed 13 December 2019).
2. Woolhouse ME, Gowtage-Sequeria S. Host range and emerging and reemerging pathogens. *Emerg Infect Dis*. 2005 Dec;11(12):1842–7. <https://doi.org/10.3201/eid1112.050997> PMID:16485468
3. Jones KE, Patel NG, Levy MA, Storeygard A, Balk D, Gittleman JL, et al. Global trends in emerging infectious diseases. *Nature*. 2008 Feb;451(7181):990–3. <https://doi.org/10.1038/nature06536> PMID:18288193
4. Gongal G. One Health approach in the South East Asia region: opportunities and challenges. *Curr Top Microbiol Immunol*. 2013;366:113–22. [https://doi.org/10.1007/978-3-662-45791-7\\_242](https://doi.org/10.1007/978-3-662-45791-7_242) PMID:22820705
5. Asia Pacific strategy for emerging diseases and public health emergencies (APSED III): advancing implementation of the International Health Regulations (2005). Manila: World Health Organization Regional Office for the Western Pacific; 2017 (<https://apps.who.int/iris/bitstream/handle/10665/259094/9789290618171-eng.pdf;jsessionid=7EECD60081F1511D7F6F41AD55782EDB?sequence=1>, accessed 13 December 2019).
6. Zoonotic diseases: a guide to establishing collaboration between animal and human health sectors at the country level. Manila: World Health Organization Regional Office for the Western Pacific; 2008 ([https://apps.who.int/iris/bitstream/handle/10665/207731/9789290613992\\_eng.pdf?sequence=1&isAllowed=y](https://apps.who.int/iris/bitstream/handle/10665/207731/9789290613992_eng.pdf?sequence=1&isAllowed=y), accessed 13 December 2019).
7. WHO programme on highly pathogenic, emerging and re-emerging diseases. New Delhi: World Health Organization Regional Office for South-East Asia; 2011 ([http://apps.searo.who.int/PDS\\_DOCS/B4790.pdf](http://apps.searo.who.int/PDS_DOCS/B4790.pdf), accessed 13 December 2019).
8. The tripartite's commitment: providing multi-sectoral, collaborative leadership in addressing health challenges. World Health Organization, Food and Agriculture Organization of the United Nations and World Organisation for Animal Health; 2017 ([https://www.oie.int/fileadmin/Home/eng/Media\\_Center/docs/pdf/Tripartite\\_2017.pdf](https://www.oie.int/fileadmin/Home/eng/Media_Center/docs/pdf/Tripartite_2017.pdf), accessed 13 December 2019).
9. Report of the 8th Asia-Pacific workshop on multisectoral collaboration at the animal-human-ecosystems interface. Bangkok, Thailand, 9–11 April 2019. Food and Agriculture Organization of the United Nations, World Organisation for Animal Health and World Health Organization; 2019 (<http://www.fao.org/3/ca6059en/ca6059en.pdf>, accessed 13 December 2019).
10. Four-way linking project for assessing health risks at the human–animal interface. World Health Organisation, Food and Agriculture Organization of the United Nations and World Organisation for Animal Health; 2013 ([https://www.who.int/influenza/human\\_animal\\_interface/EN\\_GIP\\_FourWay\\_HAI\\_2013.pdf](https://www.who.int/influenza/human_animal_interface/EN_GIP_FourWay_HAI_2013.pdf), accessed 13 December 2019).
11. The stepwise approach towards rabies elimination: a planning and evaluation tool. *caninerabiesblueprint.org*; 2014 ([https://caninerabiesblueprint.org/IMG/pdf/stepwise\\_approach\\_toward\\_rabies\\_elimination\\_sept\\_2014.pdf](https://caninerabiesblueprint.org/IMG/pdf/stepwise_approach_toward_rabies_elimination_sept_2014.pdf), accessed 13 December 2019).
12. FAOSTAT [online database]. Live animals. Rome: Food and Agriculture Organization of the United Nations; 2017 (<http://www.fao.org/faostat/en/#data/QA>, accessed 13 December 2019).
13. United Nations Population Fund. Population trends – Asia and the Pacific (<https://asiapacific.unfpa.org/en/node/15207>, accessed 13 December 2019).
14. Van Boeckel TP, Glennon EE, Chen D, Gilbert M, Robinson TP, Grenfell BT, et al. Reducing antimicrobial use in food animals. *Science*. 2017 Sep;357(6358):1350–2. <https://doi.org/10.1126/science.aao1495> PMID:28963240
15. Global action plan on antimicrobial resistance. Geneva: World Health Organization; 2015 ([https://apps.who.int/iris/bitstream/handle/10665/193736/9789241509763\\_eng.pdf;jsessionid=4DA1AF081493244B1CFA704C120303C0?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/193736/9789241509763_eng.pdf;jsessionid=4DA1AF081493244B1CFA704C120303C0?sequence=1), accessed 13 December 2019).
16. Situation analysis on antimicrobial resistance in the South-East Asia Region: report 2016. New Delhi: World Health Organization Regional Office for South-East Asia; 2017. (<https://apps.who.int/iris/handle/10665/272873>, accessed 13 December 2019).
17. Situational analysis of antimicrobial resistance in the South-East Asia Region, 2018: an update on two years implementation of national action plans. New Delhi: World Health Organization Regional Office for South-East Asia; 2019 (<https://apps.who.int/iris/handle/10665/327117>, accessed 13 December 2019).
18. Global database for antimicrobial resistance country self-assessment. World Health Organization, Food and Agriculture Organization of the United Nations and World Organisation for Animal Health (<https://amrcountryprogress.org>, accessed 13 December 2019).
19. Matheu J, Aidara-Kane A. The ESBL Tricycle AMR surveillance project: a simple, One Health approach to global surveillance. *AMR Control*. 2017 (<http://resistancecontrol.info/2017/the-esbl-tricycle-amr-surveillance-project-a-simple-one-health-approach-to-global-surveillance/>, accessed 10 February 2020).
20. World Health Organization. IHR monitoring and evaluation framework (<https://extranet.who.int/sph/ihrmef>, accessed 13 December 2019).
21. OIE tool for the evaluation of Performance of Veterinary Services: OIE PVS tool. Paris: World Organisation for Animal Health ([https://www.oie.int/fileadmin/Home/eng/Support\\_to\\_OIE\\_Members/docs/pdf/2019\\_PVS\\_Tool\\_FINAL.pdf](https://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/docs/pdf/2019_PVS_Tool_FINAL.pdf), accessed 31 March 2020).
22. World Health Organization. IHR–PVS national bridging workshop (<https://extranet.who.int/sph/ihr-pvs-bridging-workshop>, accessed 13 December 2019).
23. World Health Organization. International food standards (FAO/WHO Codex Alimentarius) ([https://www.who.int/foodsafety/areas\\_work/food-standard/en/](https://www.who.int/foodsafety/areas_work/food-standard/en/), accessed 13 December 2019).
24. World Health Organization. FAO/WHO Codex Trust Fund ([https://www.who.int/foodsafety/areas\\_work/food-standard/codextrustfund/en/](https://www.who.int/foodsafety/areas_work/food-standard/codextrustfund/en/), accessed 13 December 2019).
25. World Organisation for Animal Health. Meeting to accelerate prevention and control of neglected foodborne parasitic zoonoses in selected Asian countries (Luang Prabang, Lao People's Democratic Republic, 16–18 October 2018) (<https://rr-asia.oie.int/en/events/meeting-accelerate-prevention-and-control-of-neglected-foodborne-parasitic-zoonoses/>, accessed 12 November 2019).
26. World Health Organization. The First FAO/WHO/AU International Food Safety Conference, 12–13 February 2019, Addis Ababa, (<https://www.who.int/news-room/events/international-food-safety-conference>, accessed 13 December 2019).