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Intersectoral collaboration in a One Health approach: Lessons learned from a country-level simulation exercise

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ABSTRACT

Intersectoral collaboration is an essential component of the One Health (OH) approach, which recognises the interconnectedness of the health of humans, animals, and the environment. The OH European Joint Programme (OHEJP) developed a national foodborne outbreak table-top simulation exercise (SimEx) to practice OH capacity and interoperability across the public health, animal health, and food safety sectors, improving OH preparedness for future disease outbreaks. The Portuguese OHEJP SimEx highlighted strengths and weaknesses regarding the roles and functions of available systems, the constraints of existing legislation, the importance of harmonisation and data sharing, and the creation of common main messages adapted to each target sector. However, there is still a long way to go to ensure cooperation among the Public Health, Animal Health, and Food Safety sectors, as a OH approach relies not only on the awareness of "field experts" but also on political and organisational willingness and commitment.

1. Introduction

Intersectoral collaboration is a key component of the One Health (OH) approach, which involves working across different sectors such as public health, animal health, food safety, and the environment to address challenges that affect human and animal wellbeing and the environment [1,2]. This requires a collaborative, coordinated, and transdisciplinary approach working at local, regional, national, and global levels [3,4]. Overall, the One Health approach's key aspects and benefits encompass: 1) improved disease control, with early detection and control of emerging threats, reducing the risk of pandemics; 2) improved efficiency and capacity strengthening, with streamlined resource allocation, training, research, and interventions; 3) better understanding of disease dynamics, with the development of preventive measures rather than reactive responses; and 4) improved health outcomes, by addressing the complex and interconnected factors that contribute to the global health issue [5,6]. However, implementing intersectoral collaboration requires major structural changes to integrate and support multi-sectoral communication, collaboration, coordination, and capacity strengthening. Despite these challenges, One Health initiatives have been established in various countries, and collaboration between different sectors is essential for building a

Abbreviations: ARS LVT, Regional Health Administration of Lisbon and Tagus Valley; **ASAE**, Economic and Food Safety Authority; **DGAV**, Directorate-General for Veterinary and Food; **DGS**, Directorate-General for Health; **GDPR**, General Data Protection Regulation; **INIAV**, National Institute for Agrarian and Veterinary Research; **INSA**, National Institute of Health Doutor Ricardo Jorge; **LELs**, Local Exercise Leaders; LEs, Local Evaluators; **NEL**, National Exercise Leader; **OH**, One Health; **OHEJP SimEx**, One Health European Joint Programme simulation exercise; **One Health EJP**, One Health European Joint Programme..

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resilient health system. One successful example is the One Health European Joint Programme (OHEJP), established in 2018. The OHEJP has made significant strides in reinforcing collaboration between European member states by enhancing transdisciplinary cooperation and by promoting OH through joint actions in the fields of Foodborne Zoonoses, Antimicrobial Resistance and Emerging Threats [7]. One important aspect of a One Health programme is to critically evaluate the challenges encountered and identify strategies for improvement. Under the OHEJP, a national-level foodborne outbreak table-top simulation exercise (SimEx) was conceptualised to practice OH interoperability and collaboration across the different sectors in an outbreak scenario on a national level. Eleven European countries, including Portugal, participated in the exercise [8,9].

2. One Health SimEx conduction in Portugal

In Portugal, the main objective of the OHEJP SimEx was to contribute to the improvement of national One Health preparedness to tackle future disease outbreaks. Specific national and institutional objectives included the acquaintance of the different sectors work in the event of a foodborne outbreak, the improvement of communication among them, and the reinforcement of the importance of data sharing. The identification of the difficulties, weaknesses, and strengths of the systems at the institution and/or national level was also an important objective. For the implementation of the OHEJP SimEx, each country designated a National (NEL) and Local Exercise Leader (LELs) to prepare its participation in the exercise.

For the conduction of the SimEx, and according to the guidelines provided by the One Health SimEx Team [10], the NEL/LELs identified participants from the three sectors (Public Health, Animal Health, and Food Safety) selected based on their expertise in investigating and managing foodborne outbreaks, as well as their knowledge of the specific roles and responsibilities within their respective sectors: epidemiologists (Public Health, Animal Health, Food Safety), laboratory personnel (Public Health, Animal Health), food-borne disease experts, veterinarians, and public health doctors working at national, central, and local levels (Fig. 1).

The OHEJP SimEx took place in June 2022 at the National Institute of Agrarian and Veterinary Research (INIAV), Oeiras. Previously to the exercise, an online meeting was held, introducing the objectives of the project and the Food-Lab Chain tool [11], which was planned to be used during the exercise, and giving the participants a chance to meet and understand each other's roles. The conduction of the exercise was carried out for two days in person, giving the table-top exercise the opportunity to have a deep, collaborative, and constructive group discussion on strengthening OH crisis preparedness. The SimEx scenario, delivered through a sequence of scripts covering the different stages of a national-level *Salmonella Typhimurium* outbreak that involved both the human food chain and the pet feed chain, was elaborated by the OHEJP SimEx Project Team [8,9]. The exercise involved collaborative group discussions on the role and functionality of relevant systems, data sharing, and cooperation and communication in an outbreak situation. The NEL/LELs also appointed two local evaluators (LEs), each from Public Health and Animal Health sectors. Throughout and following the OHEJP SimEx exercise, the task of gathering, examining, and assessing data was assigned to the NELs/LELs and LEs [12]. Subsequent to the exercise, the OHEJP SimEx Project Team distributed a post-exercise evaluation survey to all participants, aiming to pinpoint areas of strength and areas for improvement. The outcomes from these evaluations, which were then sent to the NEL/LELs, were analysed by the Portuguese Team.

Apart from the participants in the exercise (NEL, LELs, Les, and SimEx Portuguese Team), four persons participated as observers (from Public and Animal Health) expanding the number of relevant health authorities taking part in the exercise.

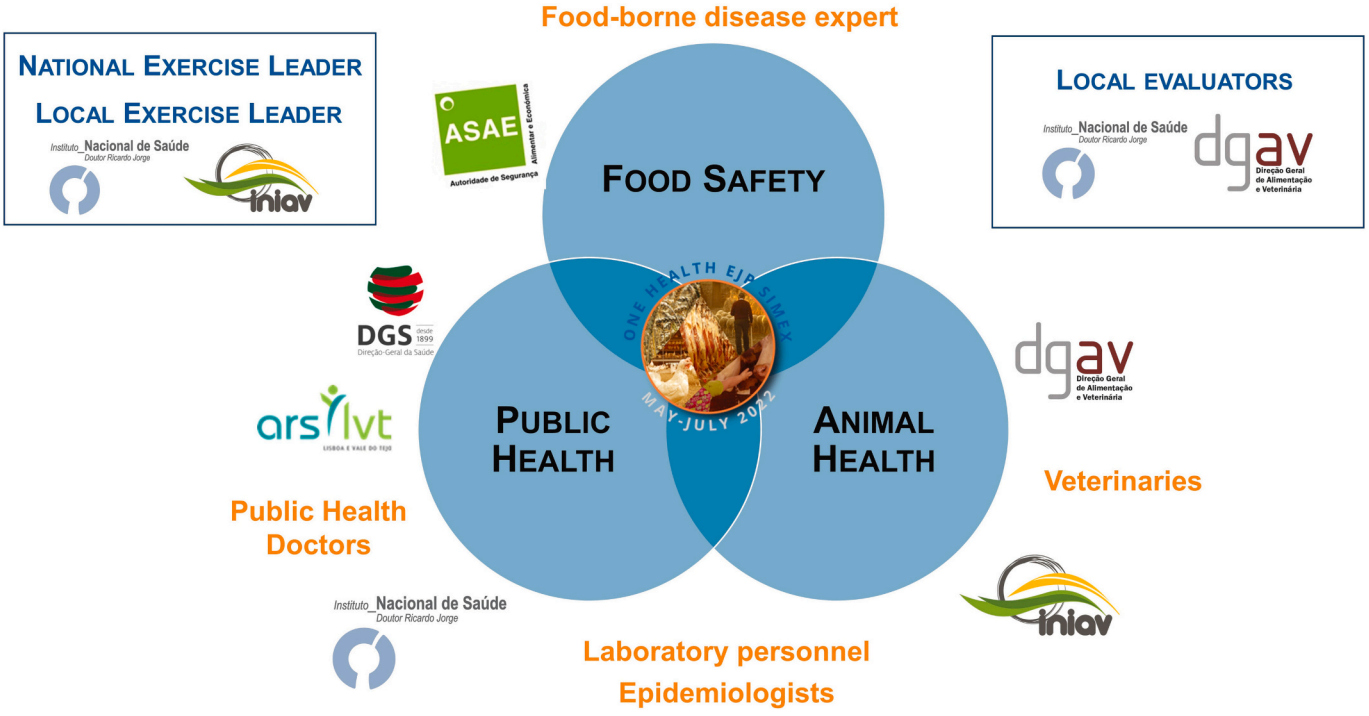

Fig. 1. Portuguese SimEx participants. ARS LVT: Regional Health Administration of Lisbon and Tagus Valley; ASAE: Economic and Food Safety Authority; DGAV: Directorate-General for Veterinary and Food; DGS: Directorate-General for Health; INIAV: National Institute for Agrarian and Veterinary Research; INSA: National Institute of Health Doutor Ricardo Jorge.

3. OneHealth SimEx results

3.1. Role and functionality of relevant systems

The participants started the SimEx working and thinking as an OH team, but without a clear definition of functions, actors' roles, and levels of intervention. According to the scenario, the discussion focused on the public health and food safety sectors, although the animal health sector was also involved as a member of the outbreak investigation team. During the discussion, it was recognised the importance of the laboratories in an early warning system and the need for communication among different sector laboratories. Reference was made to the lack of established circuits of information among sectors, which might contribute to some delay in the investigation and taking of action, and the need to improve communication among different sectors. By the end of the first part of the scenario, the participants recognised the contribution of this discussion to a better understanding of the roles, responsibilities, and ways of functioning of the other sectors at national, regional, and local levels in the event of a zoonotic foodborne outbreak. A more in-depth analysis of the challenges faced during the exercise would provide a comprehensive understanding of the specific barriers, delays in investigation, and actions taken. Future studies should focus on identifying and addressing these challenges to enhance the effectiveness of intersectoral collaboration.

3.2. Data sharing

The main observation of the second part of the scenario was the limited information and data sharing intra- and inter-sectors, or the timeliness of the share. The participants stressed the absence of common surveillance systems and databases, or the interoperability among the existing ones, making particularly difficult the data harmonisation, sharing, comparison, and/or investigation of events involving different sectors. The General Data Protection Regulation (GDPR) was an issue that was taken into consideration by all participants. The investigation and identification of the source of infection were hampered by the lack of a link between the different surveillance systems available in each sector. Identifying the barriers that hinder data/database harmonisation, sharing, comparison, and investigation of events involving different sectors is crucial. Future efforts should prioritise the development of common and harmonised databases, overcoming legal and technical obstacles to enable efficient and secure data sharing among sectors.

3.3. Cooperation and communication in an outbreak situation

At the stage of the outbreak investigation, the participants acknowledged the need for a communication specialist(s) in the team. After identifying and discussing different target audiences and communicational aims for the sectors, the participants agreed on a common main communication for the general population signed by all sectors, with the representative being the public health authority. Evaluating the limitations of communication strategies and identifying areas for improvement, such as the inclusion of a communication specialist within the team, is of utmost importance. The decision-making process about who is responsible for the control and/or mitigation measures was discussed with already-existing examples of joint press releases. Further examining the difficulties faced during the decision-making process, such as conflicting responsibilities and ambiguous roles, would offer valuable insights. The cooperation among sectors increased, and participants managed to reach agreement on the measures to be taken by each sector. During the final outbreak group meeting, the outbreak investigation and management were evaluated. In general, each sector authored its own report, which is usually not shared with the other sectors.

4. Lessons learned from a One Health perspective

The SimEx exercise allowed the participants to interact with colleagues from other institutes/sectors in an informal way and sharing-experience setting. Knowing who the stakeholders are is a key step for successful intersectoral collaboration. The SimEx significantly contributed to improving the understanding of each sector's roles, ways of functioning at the national, regional, and local levels, and their responsibilities, strengthening networks and intersectoral communication. Indeed, the overall discussion helped to raise issues about the way the different institutions/sectors communicate and provided an opportunity for clarification of the usual approach in an OH outbreak situation, which was not always clear from the starting point of view of the different sectors. Currently, each sector works separately, interacting only with the other sectors on specific issues or in emergency situations and at a later stage of the process. Outbreak investigation is done separately by each sector (with few exceptions), and no joint evaluation of signals or joint risk assessment is routinely performed. From an OH perspective, the SimEx exercise allowed us to identify several strengths and weaknesses. The SimEx demonstrated that there are active and functional surveillance systems in place at the institutional and national level, with motivated, skilled people. It was recognised that there was a need for common training in outbreak investigation to refine terminology and complementary methodologies. However, it also revealed the lack of intra- and intersectoral communication and national multisectoral guidelines, methods, and systems for an OH approach. There is neither an OH intervention team nor a dedicated OH early warning system, which would allow quicker involvement of all authorities as soon as an alert is raised, which is fundamental to controlling and mitigating the (re)emergence of zoonoses at an early stage. The establishment of a common OH national plan for outbreak detection and investigation was suggested by all the sectors, including establishing intersectoral intervention teams to be activated whenever necessary, as well as guidelines to support the articulation among sectors. A recent comprehensive review of the literature has outlined six key steps for addressing obstacles and enhancing the functionality of an integrated One Health surveillance system suitable for adoption and implementation on a national scale [13]. These steps, aligning with the OHEJP SimEx results, involved defining surveillance scope, understanding disease drivers, creating a surveillance framework, capacity building, implementation, and continuous system evaluation and enhancement [13].

Regarding cross-sector data sharing, it was noticed the importance of developing common and harmonised databases that would allow all sectors to retrieve, compare, and analyse information in an integrated way. It was also highlighted the need for a common software for foodborne diseases that would retrieve data from existing sectoral database platforms, but that would depend on a legal framework not yet existing. Templates and online platforms can be used to share information quickly and efficiently [14]. Indeed, encouraging open communication and maintaining relationships between epidemiology, environmental health and laboratory partners may increase investigation success [15].

The current legal framework in Portugal ensures the Human Health intersectoral approach in Public Health emergencies, but not in a regular way. Establishing these conditions during inter-outbreak periods would enhance communication and information exchange among institutions, fostering real-time cross-sector intervention and analysis. Outbreak preparedness and response are processes of continuous improvement, so the evaluation of outbreak investigations and management after their completion is critical. Following SimEx, the participants gained a better understanding of how to create and communicate common main messages, having identified the need for a common and shared final report across all sectors.

5. SimEx limitations in Portugal and recommendations

One of the challenges faced during the SimEx exercise in Portugal was the difficulty in recruiting participants with the necessary abilities. This specifically included people with skills in analytical epidemiology, risk communication, and policy making. The availability and scheduling conflicts of potential participants limited the diversity and representation of the exercise. Finding the right balance between a realistic scenario and one that is logistically feasible was also challenging. The participants' feedback from the exercise survey indicated that they did not find the scenario to be realistic or relevant. One reason for this was that the raw pet food market is not significant in Portugal, making it difficult for the participants to integrate pet-related cases into the discussion. Additionally, the participants felt that the injects were not delivered in a way that simulated a real-life outbreak situation.

Based on the challenges faced during the SimEx exercise in Portugal, the following recommendations can be made for future OH exercises: 1) ensure that the exercise is adapted to the national, regional, and/or local context, taking into account the country's specific challenges and resources; 2) develop scenarios that closely mirrors real-life outbreak situations, such as utilizing role-playing or interactive simulations to enhance the participants' engagement and immersion; 3) recruit participants with diverse skills and backgrounds to ensure that the exercise is complete and that multiple points of view are considered; 4) multidisciplinary approach involving professionals from various sectors, including environmental health, to foster collaboration and enhance understanding of the interconnectedness; and 5) evaluate the exercise outcomes and lessons learned to identify areas for improvement and inform future planning and preparedness efforts.

6. Conclusion

Overall, the main objectives and goals of the Portuguese OHEJP SimEx were achieved, regardless of the fact that, for the majority of the participants, it was the first time they were challenged to approach an outbreak from an OH perspective. However, there is still a long way to go, as an OH approach needs not only the awareness of the "field experts", which was achieved with the OHEJP SimEx, but also political and organisational willingness and commitment. Indeed, leadership, governance, financing, and accountability have been described as systemic factors that can enhance intersectoral collaboration in OH [16–20]. In conclusion, our results reinforce the need for several strategic solutions to overcome these challenges, namely: 1) engaging partners and stakeholders in OH initiatives at an early stage; 2) improving the understanding of institutional missions, capacities, roles, and responsibilities; 3) developing policies and legal frameworks that support intersectoral collaboration; and 4) building capacity for intersectoral collaboration through training programmes and workshops that focus on OH principles and practices.

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Ethics statement

No ethical approval was required for this specific study.

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CRediT authorship contribution statement

Vera Manageiro: Conceptualization, Investigation, Visualization, Writing – original draft, Writing – review & editing, Supervision, Funding acquisition. **Ana Caria**: Investigation, Visualization, Validation, Writing – review & editing. **Cristina Furtado**: Investigation, Visualization, Validation, Writing – review & editing. **SimEx Portuguese Team**: Investigation, Writing – review & editing. **Ana Botelho**: Writing – review & editing. **Mónica Oleastro**: Investigation, Writing – review & editing. **Sandra Cavaco Gonçalves**: Conceptualization, Investigation, Visualization, Writing – original draft, Writing – review & editing, Supervision, Funding acquisition, Project administration.

Declaration of Competing Interest

The authors have no conflicting interests related to this manuscript.

Data availability

No data was used for the research described in the article.

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