



D4.30 Report on the OHEJP exercise (SimEx) – planning, conduction and evaluation

WP 4 – Joint Integrative Projects

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Contents

1. Summary of the work carried out in the project	5
2. Background.....	5
3. Aim and objectives	6
3.1 Part one: Role and functionality.....	6
3.2 Part two: Data sharing	7
3.3 Part three: Communication	7
4. Organization	7
4.1 OHEJP SimEx Project Team.....	7
4.2 OHEJP SimEx Steering Board and OHEJP SimEx Advisory Board	8
4.3 National teams.....	8
5. Exercise format.....	9
5.1 From full scale command post exercise to table-top exercise	9
6. Planning of the OHEJP exercise	10
6.1 Overview	10
6.2 NEL and LEL Preparatory workshop	11
6.3 Scenario.....	11
7. Conduction.....	13
8. Evaluation	14
8.1 Overview	14
9. Results from national conduction	16
9.1 Summaries from participating countries	16
9.2 Compiled results from all participating countries	20
10. Discussion and recommendations	21
11. Conclusions	21
12. Deliverables and milestones.....	22
13. Publications and other output	24
14. Data Management Plan.....	24
Appendix I: Report template for NEL and LEL	25



Abbreviations

AMR	Antimicrobial Resistance
AH	Animal Health
ECDC	European Centre for Disease Prevention and Control
EFSA	European Food Safety Authority
ET	Emerging Threats
FAO	Food and Agriculture Organization of the United Nations
FBZ	Foodborne Zoonoses
FS	Food Safety
JIP	Joint Integrative Projects
JRP	Joint Research Projects
LEL	Local Exercise Leader
NEL	National Exercise Leader
OH	One Health
OHEJP	One Health European Joint Programme
OHEJP SimEx	OHEJP Simulation Exercise
PH	Public Health
PL	Project Leader
PMC	Programme Managers' Committee
PMT	Programme Management Team
POC	Programme Owners' Committee
SIS OT	Surveillance & Information Sharing Operational Tool
SSB	Scientific Steering Board
SVA	National Veterinary Institute, Sweden
WHO	World Health Organization
WOAH (former OIE)	World Organization for Animal Health



REPORT ON THE OHEJP SIMEX

1. Summary of the work carried out in the project

Zoonotic foodborne outbreaks continue to occur every year, evidencing the need for the public health (PH), animal health (AH) and food safety (FS) authorities to embrace a One Health (OH) approach. Simulated response exercises are useful for the improvement of crisis management plans, providing an opportunity to test practical methodologies in a controlled environment. The One Health European Joint Programme simulation exercise aimed at practicing the OH capability, capacity and interoperability across the three OH sectors within eleven different European countries. The simulation exercise replicated a national *Salmonella* outbreak investigation, involving both the food chain and the raw pet feed industry. The scenario includes the use of a tracing tool, which was well received by the participants. Evaluation of the national exercises identified common gaps and strengths in current OH strategies, from which recommendations were produced for any country aiming to improve their OH strategy. The recommendations are aimed to support policy makers achieve a successful and robust OH strategy enabling a rapid, effective response to future zoonotic foodborne outbreaks. Additionally, the need for future OH focused exercises was identified. Therefore a set of recommendations have been provided to assist future development.

2. Background

The One Health European Joint Programme (OHEJP) is a co-funded initiative under the EU Research and Innovation programme Horizon 2020. The consortium has the primary goal of promoting international and interinstitutional collaboration by reinforcing the transdisciplinary collaboration of the One Health sectors through education and training in the fields of Foodborne Zoonoses (FBZ), Antimicrobial Resistance (AMR) and Emerging Threats (ET). The outcomes from the different Joint Research Projects (JRP) and Joint Integrative Projects (JIP) are integrated back in partner institutes to implement changes that are aligned with the programme's objectives. The OHEJP extends across 22 European countries and has 44 partners, including the Med-Vet-Net-Association.

The OHEJP is structured into seven work packages (WP), and runs between 2018 and 2023. Each of the work packages is designed to address objectives and reach different targets. The OHEJP simulation exercise (OHEJP SimEx), was developed as a part of WP4, Joint Integrative Projects, which aims at developing common work methodologies across the three domains of the OHEJP (FBZ, AMR and ET) through capacity building within the disciplines defined by the Integrative Strategy Matrix (Figure 1).

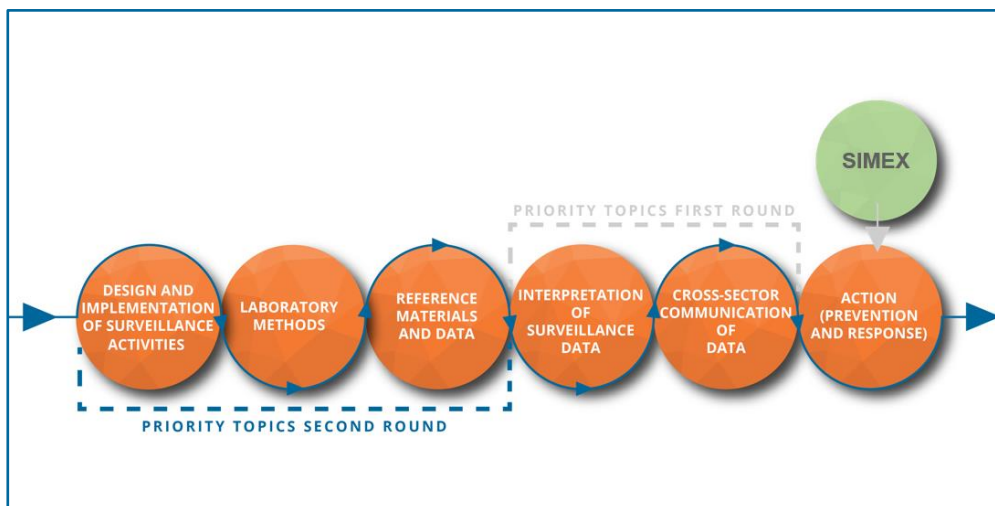


Figure 1. Illustration of the Integrative Strategy Matrix.

The OHEJP SimEx (WP4 task 4.6) consisted of the development, planning, conduction and evaluation of a foodborne zoonosis outbreak simulation exercise, based on existing methodologies, practises and guidelines, adapted to emphase the One Health approach and to be relevant to all conducting countries. The ambition for the task was to offer a unique opportunity for participating countries to practice intersectoral communication and increase understanding between the PH, AH and FS authorities and actors regarding e.g. diagnostic laboratories, outbreak management, tracing and data sharing.

3. Aim and objectives

The overall aim of the OHEJP SimEx was to bring together and practice the One Health capability, capacity, and interoperability of authorities in PH, AH and FS. This project was developed taking into consideration objectives at OHEJP level, and thus being designed to further increase knowledge and understanding of the One Health perspective, improve communication and data sharing in an outbreak situation and explore the functionality of currently available systems. In addition, participating countries were encouraged to define specific objectives at national level and adapt the scenario accordingly so the most could be gained from the exercise.

To facilitate the delivery of such objectives, as well as helping participating countries to easily identify any shortcomings of their national outbreak preparedness plans, the overall aims were broken down into a series of smaller objectives distributed among the different parts of the exercise.

3.1 Part one: Role and functionality

The objective was to highlight the role and functionality of relevant systems and of each sector in an outbreak investigation. Following this part of the exercise the training audience was expected to have:

1. improved their knowledge on how and when collaboration takes place at national, regional and local level in the event of a zoonotic outbreak.
2. a better understanding of their and other actors' roles and responsibilities during a zoonotic outbreak.



3. gained an increased understanding of currently available early warning systems and when they should be activated.

3.2 Part two: Data sharing

The second part of the exercise was designed to emphasize the importance of data sharing in an outbreak situation. After the conduction of part two of the exercise the training audience would have:

1. an increased understanding of the benefits of creating harmonized databases and data sharing.
2. identified possible flaws in the cohesiveness of data collection and realized its importance in allowing intersectoral data analyses for the detection of clusters and outbreaks and suggested links with potential sources.

3.3 Part three: Communication

The last part of the exercise was created with the main objective of promoting intersectoral cooperation and communication in an outbreak situation. Following this part of the exercise the training audience would have had the opportunity to:

1. increase their understanding of the benefits of a One Health perspective during a zoonotic outbreak.
2. better understand how to create common main messages and identify different perspectives.
3. improve their knowledge of how to use guidelines, tools, and practices available, with focus on those developed within the OHEJP.

4. Organization

4.1 OHEJP SimEx Project Team

The OHEJP SimEx Project Team consisted of an international team (i.e., with representatives from France, Germany, Portugal, Sweden, and United Kingdom) of nine specialists with complementary expertise in the areas of PH, AH and FS and knowledge on simulation exercises. The members of the team were recruited amongst the different OHEJP partner institutes. The team had support from the OHEJP Communication Team throughout the project.

The team was responsible for planning, supporting the national conduction, evaluating the outcome of the national exercises, and dissemination of the outcomes as well as fulfilling the project's deliverables and milestones. The project started in September 2021 and was completed in December 2022. The team was in close contact with all contact points at institute and national level that had announced their interest to participate in the OHEJP SimEx. Each member of the OHEJP SimEx Project Team contributed with scientific and expert knowledge and their time in accordance with the agreed engagement.



4.2 OHEJP SimEx Steering Board and OHEJP SimEx Advisory Board

The OHEJP SimEx Project was governed by the OHEJP SimEx Steering Board consisting of four representatives from the OHEJP Project Management Team (PMT) from four different European countries (Belgium, Denmark, Sweden, and United Kingdom). The OHEJP SimEx Steering Board provided the OHEJP SimEx Project Directive, was responsible for providing advice and making decisions on important matters regarding the OHEJP SimEx throughout the project and approved the policy documents created by the SimEx Project Team.

The OHEJP SimEx Advisory Board consisted of representatives from the OHEJP Programme Managers Committee (PMC), OHEJP Scientific Steering Board (SSB), OHEJP JIP, and representatives from the OHEJP Stakeholders (i.e., ECDC, EFSA, FAO, WOA, WHO and WHO-Euro). The Board was responsible for giving advice and educating the OHEJP SimEx Project Team throughout the project.

4.3 National teams

Each country and institute designated a National Exercise Leader (NEL) and Local Exercise Leaders (LEs). Each national team was composed of a NEL, LEs, Local Evaluators (LEs) and a Training Audience (TA). The role of the LEL was based upon the 'exercise director/controller' role found within the ECDC Simulation Exercise handbook (<https://www.ecdc.europa.eu/sites/default/files/documents/simulation-exercise-manual.pdf>).

There was one LEL per sector (i.e., AH, FS and PH), and in most cases one of the LELs had the additional role of NEL. Based on the guides and instructions provided by the OHEJP SimEx Project Team, the NEL was responsible for leading and coordinating their own country's participation together with assistance from the LEs. The LEs were responsible for the national evaluation during and after the conduction. One LE per sector was appointed to observe the conduction and together with the NEL, the LEs were responsible for writing the final national report. The TA was identified and invited by the LEL for each sector. As the scenario was an outbreak of a foodborne zoonosis and focus was on increasing mutual understanding across sectors (i.e., AH, FS and PH), identifying collaboration gaps, and finding new ways to cooperate, the TA consisted of people that normally work in an outbreak related position.

4.3.1 Recruitment of participating countries

All OHEJP partner institutes were invited to participate in the OHEJP SimEx. In addition, the institutes were encouraged to invite other institutes from outside the OHEJP consortium, e.g., to cover up for missing sectors or to better represent the national outbreak management. Participation was on a voluntary basis both for the OHEJP partner institute and the country. The original request and subsequent reminders to participate in the exercise were sent out by email to the following groups within the One Health EJP: SSB members, PMC representatives and Project Leaders. Information and updates regarding the exercise were also presented at all Project Management Team meetings during the Spring 2021. At the SSB meeting in September 2021 the recruited institutes were presented and a request to reply was announced to the remaining institutes. At the POC-PMC meeting in November 2021 the SimEx Project Team announced that 27 partner institutes and four external institutes from 15 countries had signed up for the exercise.



All partner institutes that decided to participate in the OHEP SimEx selected a contact person who become the link between the institute and the OHEJP SimEx Project Team. The contact person from each institute was then fully involved in the decision-making process about participation.

At the time of the workshop for the NELs and LELs in March 2022 two countries had decided to withdraw due to the Covid-19 pandemic and the increase in cases of Avian Influenza. Another country withdrew due to difficulties to involve all sectors, but still participated in the workshop. Finally, one country withdrew due to changes in leadership, but still decided to participate in the workshop. For more information on the workshop see section 6.1.

At the time of conduction (May to September 2022), eleven countries (Belgium, Denmark, Estonia, Finland, France, Italy, the Netherlands, Norway, Poland, Portugal, and Sweden) had signed up for the OHEJP SimEx.

5. Exercise format

An essential tool within emergency preparedness plans is the conduction of simulation exercises, exposing existing gaps in a controlled environment and assessing the current crisis management strategies without the negative consequences of a real-life emergency. Improvement plans drawn up after such an exercise provides detailed and tangible documentation for each sector and motivation to deliver the improvements required. The nature and scale of the exercise may vary depending on the aims and objectives, budget, and resource availability, ranging from discussion-based exercises (orientation exercise; table-top exercise) to more complex operation-based exercises (drill; functional or command post exercise; full-scale exercise). Table-top exercises are a common format for simulation exercises, offering the opportunity to be completed in an informal and stress-free environment where the participants are guided by a facilitator and encouraged to engage in a roundtable discussion based on a simulated scenario. A series of scripted injects are given to the participants, presenting the problems that need to be tackled. This type of exercise stimulates the participants' problem-solving capacities and develops the communication strategies required to respond effectively in the event of an actual disease incursion. Although table-top exercises lack the full realism of functional or full-scale exercises, they provide an effective and efficient way to become familiar with procedures and policy. Moreover, this format is not necessarily timebound, therefore allowing the participants to allocate time to focus on the critical elements of the scenario.

5.1 From full scale command post exercise to table-top exercise

According to the original proposal by the OHEJP PMT it was stated that the OHEJP exercise should be *“a command post exercise, where the exercise management simulate reality as much as possible, most of the institutes' functions are involved, and it is limited only by the ambition of the country.”* It was also stated that the Project Team should have enough time to engage, plan, execute and evaluate the exercise, and that the project needed to start the planning during 2020 in order to be ready for a command post exercise during 2022.

The foundation phase started in 2021 with the recruitment of a Project Leader. The OHEJP SimEx Project Team was allocated and ready to start working in September 2021. Within the



initial meetings of the OHEJP SimEx Project Team it became evident that adjustments were required to successfully deliver the task. Within the confinement of the overall OHEJP project there was not enough time left to prepare, execute, and evaluate a full command post exercise.

A full command post exercise is complex, even in its simplest form; when planning and execution is within just one country, only regarding their own prerequisites. A full-scale simulation requires a very detailed scenario, correctly reflecting laws, regulations, procedures, policies, institutes, responsibilities, capabilities, capacities etc. Since the OHEJP SimEx was planned to be conducted in multiple countries with completely different prerequisites, a generic part, with a scenario written in such an unspecific way that each country could have adapted it to its own requirements would be needed. The result would have been 11 similar, yet separate exercises.

The aims and objectives of the project could be achieved using a different exercise format – a table-top exercise. Most institutes have previous experience in completing table-top exercises, and therefore have a better understanding of the exercise requirements and benefits. The change of exercise format was approved by the OHEJP SimEx Steering Board (October 22, 2021), the OHEJP PMT (October 22, 2021), and the OHEJP Programme Owners' Committee/Programme Managers' Committee (November 24, 2021). Counselling in the matter was provided by ECDC and the Swedish Civil Contingencies Agency.

6. Planning of the OHEJP exercise

6.1 Overview

Pre-work and organization of the OHEJP SimEx Project started in January 2021 and the SimEx Project Team was ready to start in September 2021. Prior to the exercise implementation, the OHEJP SimEx Project Team was responsible for all tasks related to scenario building and exercise organization. Tasks included defining a timeline and identifying problematic areas that needed to be addressed, defining the aims and objectives for the exercise, creating, and developing a challenging scenario that met the project objectives and developing all the necessary documents and materials for the exercise implementation. Further, the OHEJP SimEx exercise was built following the ECDC guidelines on simulation exercises (<https://www.ecdc.europa.eu/sites/default/files/documents/simulation-exercise-manual.pdf>).

Exercise planning involved an active role and engagement from each participating country. The first step was assembling national exercise teams, including representatives from PH, AH and FS. Each national team was composed by a NEL, LELs, LEs and a TA. Both the NEL and LEL assumed a crucial role in preparing the exercise implementation at national level, liaising with the OHEJP SimEx Project Team. The NEL and LELs were responsible for selecting a date within a given timeframe and venue for conduction, adapting the scenario and adding national objectives (if deemed necessary) and leading the conduction of the exercise at a national level.

The final step in the project planning was the creation of the evaluation plan and the project deliverables. For the participating countries the evaluation tasks included having one or more LEs present throughout the conduction to observe and take notes; conduct a hot debrief after each part of the conduction and fill out a post conduction survey.



The LEs were invited to take part in a preparatory meeting organized by the OHEJP SimEx Project Team on the 5th of April 2022.

6.2 NEL and LEL Preparatory workshop

As part of the OHEJP SimEx Project planning a preparatory workshop was organized for the NELs and LELs. This initiative was conceived as an opportunity to introduce the participants to the OHEJP SimEx Project and to clarify their role in the implementation of the exercise at national level. The workshop took place from the 21st to the 23rd of March 2022 and covered two main topics: the exercise scenario and the evaluation process. While most of the workshop was organized as an information delivery event, it was also a great opportunity to establish an open channel of communication between the OHEJP SimEx Project Team and the NELs and LELs.

The first day of the workshop was dedicated to the introduction of the One Health approach to simulation exercises and introducing the OHEJP SimEx Project. The second and third days of the workshop were exclusively dedicated to the NELs and LELs, focusing mainly on the conduction procedure, scenario, OHEJP tools, and the responsibilities of NELs and LELs.

Attendees were asked to fill in an evaluation form to assess the workshop's delivery and content. One of the most important points of evaluation was determining the initiative's usefulness in clarifying and preparing the NELs and LELs for their role in the OHEJP SimEx. The survey results showed that 78% of the participants stated feeling either very confident or confident on their duties. All the participants who felt rather unconfident before the workshop (28%) indicated an improved confidence by the end of the workshop. Additionally, the majority of the participants found it either beneficial or very beneficial to go through the different parts of the scenario (100%) and evaluation (94%) with the OHEJP SimEx Project Team.

The detailed information regarding the workshop content can be consulted in the “*Report on the OHEJP SimEx Workshop*” (<https://zenodo.org/record/6973630#.Y5q7p3bMI2w>).

6.3 Scenario

6.3.1 Overview

The scenario of the OHEJP SimEx (“*OHEJP SimEx Scenario*”, <https://zenodo.org/record/7843626>) was designed to replicate a *Salmonella* outbreak at a national level involving both the food chain and the pet feed industry. The scenario covered various stages of a zoonotic foodborne outbreak and included different routes of transmission between humans and companion animals. All the aspects of the scenario were designed to encourage intersectoral communication and information sharing between authorities working within the PH, AH and FS sectors. Similar to a real-life situation, the information in the initial stages of the scenario was scarce and dispersed but as the outbreak progressed, the TA was challenged with a sequence of injects noting a growing number of infections and additional epidemiological and laboratory information. Each inject was designed in a way that triggered discussion and challenged the different sectors to work together showcasing the added value of employing the One Health approach in a zoonotic outbreak situation. The scenario was provided to the NEL and LEL prior to conduction for review and adaptation, and when needed, translated to native language. Even though the overall scenario content was not suitable for



major adaption, to prevent losing some of the key stones of this initiative, the participant countries were encouraged to propose any adaptation that they considered would bring the exercise closer to their national situation. All countries were given the freedom to add further institutional or national objectives to the exercise, thus allowing each country to achieve the most out of the OHEJP SimEx.

6.3.2 Pathogen choice

The SimEx Project Team decided to build the scenario using *Salmonella* Typhimurium as the implicated pathogen. This choice was based on the data from the latest EFSA zoonoses report (<https://www.efsa.europa.eu/en/publications>) noting a stable (flat) trend in the numbers of reported *Salmonella* outbreaks in the European Union (EU), accounting for about 20% of all foodborne outbreaks in 2020. In addition, the team identified an opportunity to explore alternative transmission routes other than poultry, where production units are already subjected to strictly regulated control programmes. Egg and egg products are the most common reported sources of *Salmonella* outbreaks in humans. Other foodstuffs such as meat products are also important sources, which are not so highly regulated or considered when identifying *Salmonella* sources and routes of infections. Using OHEJP SimEx as an opportunity to explore alternative routes of infection it was decided to include not only the pet feed as a vehicle of transmission but also a less commonly involved food producing animal source such as cattle to spark discussion and enable the participants to explore how they would respond in a situation with a less common source for *Salmonella* outbreaks.

6.3.3 Structure

The OHEJP SimEx compacted a two month long foodborne outbreak into a two-day exercise due to time and logistic constraints. The OHEJP SimEx was delivered through a sequence of 15 injects divided into three parts which closely align with the objectives in section 3, Aims and objectives: Part one: Who does what? (Role and functionality), Part two: Sharing is caring (Data sharing) and Part three: Let's work together (Communication). For each of these parts specific objectives were proposed, reflecting the different phases of an outbreak investigation.

6.3.3.1 Part one – Who does what?

The first part of the exercise represented the initial phase of a *Salmonella* Typhimurium outbreak, covering the first human cases report and genotyping results as well as the initial steps of an epidemiological investigation (i.e., the results from the interviews with the first cases). This part of the exercise focused on providing an opportunity for the different sectors to get familiarized with the role each one assumes in case of a zoonotic foodborne outbreak. The three injects included in this part were designed with the aim of encouraging discussions around early outbreak signalling and detection mechanisms both at national and international level.

6.3.3.2 Part two – Sharing is caring

In the second part of the scenario the TA was under increasing pressure as the number of confirmed *Salmonella* Typhimurium infections started to increase and the outbreak begun to spread nationally, with multiple regions within the country reporting outbreak related cases. The focus of discussion moved towards the foodborne nature of the pathogen and to the sharing of data between PH, AH and FS authorities. Part two included six injects which required the TA to work together revealing any existing gaps that hindered a harmonized



approach to zoonotic outbreaks. Isolates from animal and food sources were included in the clustering analysis to try and establish a transmission chain.

The added value of having a combined approach to a zoonotic outbreak was highlighted in this part, with the different authorities being compelled to question their data collection practices, thus raising awareness to the importance of data availability and harmonization. The epidemiological investigation deepened with the TA being asked to suggest questions for a rapid risk assessment and to interpret the results of a case-case study. Throughout the second part of the exercise the pressure gradually intensified as the number and severity of cases increased and when the outbreak reached the media, the efforts of the outbreak management team started being questioned by the public.

6.3.3.3 Part three – Let's work together

The last part of the exercise was scheduled for the second day of conduction. By this time the communication office was expected to be included in the exercise. Part three of the exercise started with an outbreak team meeting where the TA was asked to discuss and decide on the main message they wished to convey, identification of the different stakeholders and how to address their needs as well as agreeing on the best communication strategy. The six injects composing this last part of the exercise were designed to challenge the team into creating a common message and raise awareness to the advantages that come from having a good communication plan during an outbreak. Apart from communication, tracing and rapid outbreak assessments were also explored during this part of the scenario. In order to include a practical tracing exercise, the FoodChain-Lab (FCL) Web was integrated into the scenario. This software allows to visualise and analyse complex food supply chain networks during foodborne incidents, allowing the TA to establish possible contamination sources and transmission chains. The tracing exercise granted the TA with the opportunity to work on tracing in the food chain and, by including people who would normally not be involved in this part of an outbreak management, highlighting the advantages of having an intersectoral organisation in the implementation of control measures.

The remaining injects covered a series of investigation and control measures like product sampling and recall. At the end of the exercise the TA was asked to have a final outbreak meeting to identify any gaps in the outbreak management and highlight the role played by the different authorities throughout the different stages of the outbreak. To help the team summarize all the information gathered during the exercise, they were requested to finalize a Rapid Outbreak Assessment.

7. Conduction

The exercise conduction was planned to take place during two full days from the beginning of May to the end of July 2022. One country decided to conduct their exercise in September 2022. Each participating country was given the freedom to choose the dates that best fit the availability of the NELs, LELs, LEs and TA. Conducting the OHEJP SimEx as a physical event facilitated communication and networking between individuals from different sectors, promoting the establishment of tighter interpersonal and professional connections which can be extended to a stronger connection at an institutional level. For the exercise purposes the national teams were advised to arrange the TA at two separate tables (one for the PH authorities and another for the AH and FS authorities) so discussion could take place



separately on the first place and move on to a common discussion afterwards. Anyhow, total freedom was given in the organization of conduction so it could be carried out in a way that best represented each national reality. Exercise conduction was adapted by the NELs of each country to better reflect the internal organization of the health-related systems, to represent all relevant authorities and their interinstitutional organization. In addition, some countries decided to invite other institutes/authorities from outside the OHEJP consortium to take part in the exercise. Even though the representation of all relevant sectors was encouraged by the SimEx Project Team, some countries could not fulfil this requirement. While most injects targeted the TA as a whole, some of the preliminary information was directed towards a specific sector. This was not only a more realistic approach but also allowed to assess how information flows between authorities.

During conduction the injects were introduced consecutively by the NEL/LEs, who were responsible for keeping the exercise on track, moderation of debates and facilitation of discussions. Each inject consisted of two parts: one for the NEL/LEs covering the purpose of the inject, the expected outcomes and some follow up questions to be used in case the discussion was not forthcoming or was ending prematurely, and one for the TA with the event explained clearly for them to follow. To give support to the NELs and LEs, two SimEx Project Team members were appointed to each country during the two days of conduction as an easy to reach contact point to help with any problem that fell beyond the scope of the LEL's role.

The LEs performed a hot debrief after each part of the conduction, which gave an opportunity for participants to go over the exercise and discuss their overall opinion, identify any issues, and share their reflections on the initiative. The hot debrief also provided an opportunity for the LE to observe the first-hand opinion of the TA and include all relevant information in the national report on OHEJP SimEx conduction.

8. Evaluation

8.1 Overview

Evaluation is an essential part of an exercise and should be thought out from the beginning and designed according to the aims and objectives of the exercise. The primary role of an exercise evaluation must be to describe what happened and identify what it led to. Considering the OHEJP SimEx's overall objectives focused on identifying strengths and weaknesses regarding data sharing, developing intersectoral communication strategies and increase the mutual understanding on each sector's prerequisites and organisation, the OHEJP SimEx evaluation assessed if these objectives were met while also providing evidence to support the improvement of the participating countries' response to foodborne outbreaks under the One Health approach.

A considerable amount of time was allocated to organization and planning the evaluation process. Each participating institute or sector was asked in advance to appoint a skilled evaluator to overlook the exercise conduction and work together with the remaining evaluators and the NEL on the final national report. After the selection of the LE, a training session was delivered by the OHEJP SimEx Project Team (5th April 2022) covering the evaluation process, the aims and objectives of the exercise and the role of the LE. Apart from the active evaluation during and after the national conduction, the LEs worked alongside the NEL/LEs in the



preparation of the exercise material. To aid the LEs fulfilling their role, a carefully prepared evaluation handbook (“OHEJP SimEx handbook for evaluators”, <https://zenodo.org/record/7843700>) was provided by the OHEJP SimEx Project Team covering all the injects, the expected outcome and space for notes. These personal notes from the LEs were then integrated into the final national report.

8.1.1 Structure (hot debrief, evaluator’s summary, post exercise survey)

Immediately after the conduction of each part of the scenario, approximately 15 minutes were allocated for a hot debrief. The OHEJP SimEx Project Team had prepared a set of questions for each part of the exercise to help the LE guide the discussion (“OHEJP SimEx handbook for evaluators”, <https://zenodo.org/record/7843700>). Hot debrief meetings are an important part of an exercise evaluation process providing participants with the opportunity to share their thoughts while the experience is still fresh, thus avoiding missing relevant details.

As a second step of evaluation, the LEs were advised to compile a chronological narrative of the discussion focusing on the most relevant decisions considering the exercise objectives and highlight the strengths and weaknesses evidenced during conduction.

Post-conduction, a link to a survey was sent to all participants (i.e., NEL/LEs, LEs and TA) to provide the OHEJP SimEx Project Team with invaluable feedback on their experiences. The survey is found in the “OHEJP SimEx Handbook for Evaluators” (<https://zenodo.org/record/7843700>). Data were collected anonymously using the EU Survey platform, complying with the General Data Protection Regulation (GDPR) (<https://ec.europa.eu/eusurvey/home/welcome>). To guarantee a representative value, a minimum response rate of 80% was aimed for. The majority of questions were posed according to the Likert scale with four different options: strongly disagree, disagree, agree, strongly agree. To facilitate the interpretation of the feedback, these options were reduced into two categories: disagree and agree. Answers were processed in Microsoft Excel and presented as descriptive statistics. The post exercise survey aimed at identifying the lessons learned after the participants had had time to process all information and acquiring feedback at an operational level.

The LEL of each sector was responsible for analyzing their own outcomes which were then combined by the NEL to deliver a national report covering the experiences of the conduction, main lessons learned and recommendations for future improvement. The OHEJP SimEx Project Team provided a template for the national report (“OHEJP SimEx Report template for NEL and LEL”, see appendix I) to ensure a level of consistency in the information provided. Subsequently, the SimEx Project Team analyzed each individual national report in order to identify common problems, major gaps and best practices across the different countries. By sharing a report covering all the acquired information all countries will, hopefully, be able to benefit from this initiative.



9. Results from national conductions

9.1 Summaries from participating countries

Summaries from each participating country were copied (thus no changes in text or layout were made), with permission, from each country's national report on OHEJP SimEx conduction and listed below in alphabetical order of the country that participated. The author(s) of the national reports on OHEJP SimEx conduction were instructed to write the summary as a standalone text. The summary should be 100-200 words in length with a focus on national aims and lessons learned. The national reports on the OHEJP SimEx conduction in themselves will not be made public, but the OHEJP SimEx Project Team have used the results, for dissemination events, and publications, all of which are publicly available.

9.1.1 *Belgium*

For Belgium, the SimEx on foodborne outbreaks was held on 7 and 8 September 2022 in the headquarters of Sciensano in Brussels. About 35 participants of 5 federal and regional agencies involved in public health and safety of the food chain participated. The objectives were threefold: to gain an in-depth understanding of each agency's role and way of working in order to improve cooperation; to finetune the national plan on foodborne outbreaks which is being finalized, and to build capacity on management of foodborne outbreaks within each agency. The exercise confirmed that many of the more senior participants know each other and work well together during outbreaks. In the Belgian context, an intersectoral (OneHealth) approach is systematically taken because of the integration of human health and food chain safety in two of the main partners involved. However, the exercise allowed for a thorough analysis of the outbreak management process and identify a few points of improvement: in case of a large outbreak, systematically appoint an outbreak management team with a designated lead and technical support for studies (questionnaire, case control studies); informing communication departments early in the outbreak; installing a shared platform for safe information exchange and communication would facilitate cooperation.

9.1.2 *Denmark*

In Denmark, SimEx conduction took place on May 30-31, 2022. Statens Serum Institut (SSI), the National Food Institute at the Technical University of Denmark (DTU-FOOD) and the Danish Veterinary and Food Administration (DVFA) - all three organisations that participate in the Central Outbreak Management Group (COMG) - participated in the exercise. The Training Audience included representatives of communication teams from each of the three organisations. The national aims were i) to improve the existing collaboration in COMG and increase understanding about roles and responsibilities among the involved organisations, and ii) to strengthen the national communication of foodborne outbreaks to different target groups and stakeholders. SimEx conduction highlighted the unique strengths of the well-functioning COMG. The exercise was excellent for networking, which supported the first national aim. The atmosphere was excellent from the start, and discussions were lively. GDPR challenges in data sharing were among the key timely topics that came up in the discussions. The focus on communication was considered useful, and key outcomes from SimEx in Denmark include more explicit integration of communication aspects to the structure and workflow of COMG.

9.1.3 *Estonia*

No summary from Estonia.



9.1.4 Finland

The SimEx exercise was conducted in cooperation with the Finnish Food Authority representing the food safety (FS) and animal health (AH) sectors, and the Finnish Institute of Health and Welfare representing the public health (PH) sector. These are the two central authorities in Finland taking care of the management of food-borne outbreaks. During the exercise, experts from these two authorities were asked to join and contact to other relevant parties was only mentioned. The SimEx was conducted as a remote exercise to simulate the probable real-life food-borne outbreak situation with experts not working in the same office. Thus, the participants had to notify relevant people to join the meeting during the exercise. However, a general notification, including schedule, of the exercise was sent beforehand to relevant people of both authorities to ensure adequate participation. The staff of both institutes involved in the exercise didn't obtain prior information. The first inject was delivered to the PH laboratory, and their epidemiological unit was notified, and experts joined the meeting. The outbreak was quickly recognized and experts from FS were notified after the possible connection to food was decided. These people, who work with foodborne outbreaks, formed the core group of outbreak management group during the exercise. During the exercise experts from several other units who specialized in factors emerging during the progress of the exercise were contacted to join the outbreak management group. These experts were identified and reached easily. The management and investigations proceeded smoothly. The exercise revealed that co-operation between sectors worked well due to the long history of working together between these two institutes. The scenario was realistic and similar cases have also been managed previously. However, resources in all sectors are limited and staff substitutes are lacking. In addition, the exercise showed that there is a need for a data secure shared platform between PH and FS and that the FoodChainLab-tool would need more testing in real-life.

9.1.5 France

The SimEx Project initiated by the "One Health (OH) European Joint Program" consortium was set up to promote the OH approach by carrying out national tabletop simulation exercise for the investigation of food-borne health warnings. The French Agency for Food, Environmental and Occupational Health & Safety coordinated the exercise in France on 7 and 8 June 2022. All the institutions usually involved in the national health alert management process contributed to the success of the exercise. Participants exchanged on food-borne outbreak situations, focusing on cross-sectoral cooperation (public health, animal health, food safety), communication and information sharing, through a fictional scenario. The choice of *Salmonella* as the hazard targeted proved to be appropriate to get as close as possible to the real context of the investigations, benefiting from a well-developed French organisation and rich inter-institutional experience. This confirmed that known procedures are already in place and working, with players whose expertise is proven. The whole genome sequencing is a powerful method producing useful data on circulating strains throughout the food chain, but its deployment should be accompanied by training on fields. The FoodChain-Lab software has proven useful in clearly visualizing traceability data, but its usefulness in emergency situations remains questionable. This exercise also achieved an incidental team-building goal in addition to strengthening the collective knowledge of French public players involved in food crisis management.



9.1.6 Italy

The Simex exercise was conducted in Italy in three subgroups, each coordinated by a different OHEJP partner (IZSLER, IZSAM, ISS). The exercise involved a total of 40 trainees recruited among employees of the National Health System (NHS) including experts in public health (N= 16), food safety (N= 25), animal health (N= 4). The scenario was adapted to the Italian context and the general organization of the NHS. All injects were translated in Italian. Original supplementary materials was realised to support participants on the EFSA criteria for evidence assessment in outbreak; characteristics of the food production chain being investigated (kebab); Characterisation methods based on WGS and cgMLST cluster analysis; alert and communication system in EU. All groups agreed on the importance of close intersectoral, interdisciplinary and interinstitutional collaboration for an optimal management of outbreaks and the need of strengthening the capacity building for outbreak management, in peace time. Particular attention was dedicated to the hierarchical functional coordination among actors and sectors involved in outbreak crisis as well as to communication, both internal and external. Post exercise survey revealed that the SIMEX was very well evaluated by participants who acknowledged the importance of regularly running table-top simulation exercises as part of training for One-health outbreak preparedness.

9.1.7 The Netherlands

SIMEX is conducted in the Netherlands from 31 May – 1 June 2022. Eleven participants, with background in epidemiology, microbiology, or food safety, joined both days. The participants were representing institutes NVWA (FS), WFSR (FS), RIVM (PH) and WBVR (AH). During the two days the management of foodborne outbreaks in the Netherlands, including collaboration and data sharing between institutes, was discussed. The institutes mainly responsible for managing foodborne outbreaks are RIVM (human patients) and NVWA (tracking/tracking food products), WBVR currently has a minor role. The discussions were very informative (especially for people from WBVR) and it was concluded that in general foodborne outbreaks are well managed, and collaboration and communication between institutes goes well, thanks to short communication lines. Sharing of data is sometimes difficult given the restrictions to share metadata. The role of WBVR in sharing animal isolates could be more prominent, which might in future result in a database including human, food and animal based WGS data enabling to find clusters between different reservoirs.

9.1.8 Norway

The overall experience of the exercise conduction was positive, the participants were engaged throughout the scenario and discussions during the hot debriefs were constructive and fruitful. The aim of SimEx was to increase understanding of the benefits of a OH perspective, and to identify gaps and needs among and between organisations. The conduction confirmed a well-functioning outbreak response to zoonoses and good communication between the public health, animal health and food safety sectors. Roles and responsibilities were highlighted, new ideas shared and collaboration between the sectors strengthened. Capacity building for the junior staff participating was an added value.

The exercise identified lessons learned to further improve the OH approach:

- There is a need for stronger data sharing capacities between the key OH stakeholders to deal with delay in data sharing. Technical solutions should be established, some are already under discussion and development.



- Identifications of lessons learned from past outbreaks would ensure continuity of strengthening the OH system. Regular multi-sectoral meetings to evaluate the response to recent outbreaks and to find areas for improvement are recommended.
- Food Chain Lab could potentially enhance outbreak response and trainings for relevant stakeholders are already planned.

9.1.9 Poland

SimEx simulation exercise was held on 26-27 May 2022 in a remote format. It was attended by a total of 13 people from two units (National Veterinary Research Institute, Pulawy and General Veterinary Inspectorate, Warsaw). These people represented 2 of the 3 needed sectors: Animal Health and Food Safety of animal origin. Unfortunately, due to the lack of participation in OHEJP of a representative of the Public Health sector, the exercise lacked such individuals. Participants in the Animal Health/Food Safety sector were well aware of their roles and responsibilities in investigating the source of *Salmonella* contamination. They are also well aware of the legal considerations for controlling *Salmonella* infections in animals. The SimEx scenario focused mainly on public health activities, in our view little reflecting what is happening in countries with high salmonellosis prevalence in sectors other than cattle and low beef cattle production. Opportunities to change the scenario would not have improved the overall perception of the exercise. In order to adapt the obtained scenario to Polish conditions it would require too many changes and the involvement of people from many fields, which was not possible at that time.

9.1.10 Portugal

The SimEx conduction in Portugal took place between 21st and 23rd of June 2022, at a conference room of the National Institute of Agricultural and Veterinary Research (INIAV), Oeiras. The conduction was carried out in person with the training audience being organized around a table to help facilitate discussion. During the SimEx, the feedback from the training audience was positive, having mentioned that the scenario was relevant and fitted the exercise purpose and objectives. This discussion helped to raise issues in the way the different institutions/sectors communicate and provided an opportunity for people to clarify how they normally approach a situation like this, which seemed unclear from the point of view of other sectors. The training audience agreed on the areas that need improvement, namely the lack of inter-sectoral communication practices, common databases, and guidelines for coordination in cases of an outbreak.

9.1.11 Sweden

On June 14-15 2022, the SimEx exercise was held in Uppsala, Sweden, at the Swedish Food Agency (SLV) with participants from the SLV, the National Veterinary Institute (SVA), the Swedish Board of Agriculture (SJV) and the Public Health Agency of Sweden (Fohm). The exercise aimed at improving the participants' knowledge and understanding regarding the roles and responsibilities of different authorities, how collaboration occurs during an outbreak with a zoonotic disease, and how different authorities work with an outbreak. In addition, the exercise aimed to increase the understanding of the benefits with a One Health approach during outbreak investigations, and of creating a common situational picture to facilitate communication between and from the different sectors. The exercise gave ample time for networking, thus facilitating future collaboration. Furthermore, the exercise enabled the sharing of information about tools and guidelines as well as platforms for collaboration used by the different authorities. A major outcome from the exercise was the realisation that personal contacts are



very important in the initial phases of an outbreak, which both entails a close collaboration but can also mean a vulnerability when key people for the contacts are absent.

9.2 Compiled results from all participating countries

In total, 255 participants in 11 countries (Belgium, Denmark, Estonia, Finland, France, Italy, Norway, Poland, Portugal, Sweden, the Netherlands) completed the OHEJP SimEx. Of these, 205 answered the post-conduction survey. Four countries achieved the desired 80% response rate, and all countries had response rates above 60%. The overall response rate was 80% (n=205), confirming that the results can be considered representative.

All results from the post-conduction survey are available in the OHEJP SimEx scientific publication: <https://doi.org/10.3389/fpubh.2023.1121522> and <https://zenodo.org/record/8093285>. Below there are some opinions from the participants.

"Will use the experience acquired during the exercise to improve intersectionality of real-life situations."

"It would have been good if SimEx team had had time to pilot the exercise before sending it out to participating countries. Otherwise well done."

"The role of communication processes within and between sectors was emphasized. Let's see if shared news items between sectors become more common in the future."

"It has been an excellent educational moment."

"The exercise allowed me to get to know in person some of the different stakeholders in the decision-making chain and to better understand the roles, capacities and limitations of each one of them (us)."

"The LELs were really prepared and walked us through the exercise masterfully."

"The difficulties in making food-chain epidemiological information and sequences available early enough during outbreak investigations. We learnt the importance of getting them involved as soon as possible, as their response will be slow for the many bureaucracies implied."



10. Discussion and recommendations

Regardless of the topic and scope, a successful outbreak exercise requires detailed planning and organization. This begins with recruiting a team and setting up detailed aims and objectives. Thereafter, creating a realistic scenario and planning the conduction are important steps. The length and complexity of these stages depends on the nature and scale of the exercise. Considering the OHEJP SimEx was primarily a discussion-based exercise, the major challenge was to meet the expected needs of eleven countries that had different prerequisites. The scenario had to be generic enough for the exercise to be relevant to each country's response framework and organisational structure yet detailed enough to be realistic and capable of resulting in relevant discussions.

The One Health EJP is composed of public institutes in the AH, PH and FS sectors and therefore has close collaboration with national and international stakeholders, including those represented in the OHEJP SimEx Advisory Board. This collaboration has enabled sharing the experiences from OHEJP SimEx to policy makers, whose support is essential for establishing and strengthening the structures needed to implement a OH approach to investigation and management of outbreaks. For the successful implementation of the actions identified they need to be assessed taking into consideration each national reality and adapted accordingly. There are several tools and resources available to support decision makers in making the transition to better OH structures and support them in drawing national action plans that can address the major gaps.

The complete discussion and recommendations on the OHEJP SimEx are described in the OHEJP SimEx scientific publication: <https://doi.org/10.3389/fpubh.2023.1121522> and <https://zenodo.org/record/8093285>.

11. Conclusions

The OHEJP SimEx was a successful multi-country national simulation exercise. The results revealed the need for initiatives that can support countries in the practical implementation of One Health. With the continual risk of zoonotic foodborne outbreaks there is a need to invest in prevention and contingency, as well as building capacity to respond to a health emergency, using a OH approach.

Future OH simulation exercises can build on the OHEJP SimEx structure and experiences and should try to address the identified limitations. All participants acknowledged the essential tasks to engage with stakeholders and policy makers in order to ensure the framework of practical implementation of a OH approach is supported.



12. Deliverables and milestones

Deliverables

Project deliverable number	Deliverable name (Original name, if different from the actual one)	Delivery date	If deliverable not submitted: Forecast delivery date (month)	Comments <i>Please mention: public or confidential, the Zenodo reference, reason and justification of delay (for instance COVID), other comments</i>
D4.30	Report on the OHEJP exercise (SimEx) - planning, conduction and evaluation	M63	M63 (short version) M66 (full version)	Public The full version was confidential until the scientific article was published. https://zenodo.org/record/7843557



Milestones

Milestone name	Delivery date	Achieved (Yes/No)	If not achieved: Forecast achievement date	Comments
Set date and venue for Workshop	M48	Yes		
Assigned LEL and NEL	M48	Yes		
Questions for Hot Debrief ready	M50	Yes		
SimEx Workshop	M51	Yes		
Digital Evaluation Instruction ready for Local Evaluators	M52	Yes		
National Report Template Ready	M53	Yes		
All exercises conducted	M56	No	M57	One country asked to conduct the exercise in M57.
Reports submitted to OHEJP exercise team	M57	No	M58	One country submitted the national report in M58.



13. Publications and other output

Publications

Publication title, DOI reference and Zenodo reference	Is OHEJP acknowledged?	Is it a Green Open Access? If yes please provide the embargo length and the manuscript release date	Is it a Gold Open Access? If yes please provide the processing charges (in €)
A multi-country One Health foodborne outbreak simulation exercise: cross-sectoral cooperation, data sharing and communication. https://doi.org/10.3389/fpubh.2023.1121522 https://zenodo.org/record/8093285 https://www.frontiersin.org/articles/10.3389/fpubh.2023.1121522/full	Yes		Yes 3200 €

Additional output

- “*Harnessing the benefits of a One Health approach in foodborne outbreaks*”, poster OHEJP Annual Scientific Meeting 2022 <https://zenodo.org/record/6463306>
- Report on the OHEJP SimEx Workshop <https://zenodo.org/record/6973630#.Y2y6Y3bMI2w>
- One Health EJP Report on the Joint SimEx/Dissemination Workshop (with WP5 – Science to Policy) <https://zenodo.org/record/7660178>

14. Data Management Plan

<https://zenodo.org/record/8075217>

Appendix I: Report template for NEL and LEL



Report on SimEx Conduction

Country

**Dates of conduction (DD-
MM-2022)**



This report is based on the outcomes of a tabletop exercise developed by the One Health EJP SimEx Project Team. The exercise scenario was entirely fictitious and was intended for training purpose only. The exercise was only used to challenge and improve intersectoral collaboration between organisations under the One Health approach in a country that has a partner(s) participating in the One Health EJP.

The report in itself will not be public, but the SimEx Team will use the results for their final report, which will be public. Quotes may be used.



REPORT ON SIMEX CONDUCTION

Summary

This part will be used and published in other One Health EJP (SimEx) reports, for instance the final report of the One Health EJP. It should therefore be a standalone and clear as a separate document. About 100-200 words with focus on national aims and lessons learned.

Organizers and participants

*What was the venue for the conduction (name of institute or virtual/hybrid meeting)?
Please fill in the information in the table below.*

Name	Role*	Institute	Sector**

* Role: National Exercise Leader (NEL), Local Exercise Leader (LEL), Local Evaluator or Training Audience.

** Animal Health (AH), Public Health (PH) and/or Food Safety (FS).

Planning

- *Possible adjustment of the scenario to make it suit national prerequisites and needs.*
- *Possible translation of documents.*
- *Description of selection of the training audience.*
- *Specification of national/institutional objectives.*
- *Other comments (voluntary).*

Conduction

- *Dates and venue chosen for the conduction of the exercise.*
- *What worked well with the preparation and the different stages of the conduction?*
- *What did not work?*
- *Other comments (voluntary).*

Evaluation

This part should be based on the notes taken during conduction by the Local Evaluator(s) and on the results from the After-Action Reviews and the post exercise survey. For each part of the scenario, there is a main objective. Please report if the objective was achieved by the training audience and which were the major challenges the team faced during conduction. For more information about how to write this part, please see the Evaluation document. For a detailed description of the objectives, please see the General Information document.



Scenario Part One

Main objective: Role and functionality of relevant systems.

Scenario Part Two

Main objective: Data sharing

Scenario Part Three

Main objective: Cooperation and communication in an outbreak situation.

Evaluation Conclusions

Discussion

- *What was your overall experience of the conduction of the exercise?*
- *Did the outcome of the exercise reveal strengths or weaknesses at participating institute(s) and/or national level?*
- *Are there outcomes of the exercise that are already discussed or even implemented and in use at participating institute(s) and/or at national level?*
- *Other comments (voluntary).*

Lessons learned from a One Health perspective

- *Did the SimEx help to identify issues related to a One Health approach?*
- *Did the SimEx build and/or strengthen the collaboration between sectors?*
- *Other comments (voluntary).*

Additional information

- *Other comments (voluntary).*