D4.17 Second periodic report on JIPs

WP4 Joint Integrative Projects

Responsible Partner: SVA

Contributing partners: INSA

GENERAL INFORMATION

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1. Introduction

The joint core mission of partners in the One Health EJP is to provide expertise and services to appropriately prevent, detect and respond to societal challenges such as foodborne zoonoses, antimicrobial resistance and emerging threats shared by people and animals. The chain of actions from prevention via detection to response defines a series of capacities that need to be maintained and kept up to date by these expert institutes. These pertain to their capacity to design and implement surveillance activities, develop high quality laboratory methods, access relevant reference materials and data, as well as to their ability to interpret and communicate surveillance information in a timely and appropriate manner, as well as to provide guidance to risk managers about relevant actions, both for prevention and response. Similarly, the purpose of integrative activities and projects within the OHEJP is to strengthen the joint preparedness of partners to prevent, detect and respond to hazards within their joint remit, both nationally and in collaboration within other EU institutes and -agencies. Due to the legislated landscape in which OHEJP partners operate, and due to the close relationship and collaboration with EFSA and ECDC, there are already many strategies, initiatives, activities and systems in place to develop the capacity to respond to joint hazards within the field of foodborne zoonoses, antimicrobial resistance and emerging threats.

The objective of Joint Integrative Projects (JIPs) is not to replicate, but to strengthen existing, well-functioning systems. The guidance and insight of EFSA and ECDC is of major importance to help such alignment. The objective of JIPs is also to bridge the gap between the sectors by successively focusing on the inter-sectoral mechanisms along the chain from preparedness to response, and to investigate and improve how the work processes of microbiologists, epidemiologists and information specialists function across the Med-Vet interface at the national level. Strengthening of inter-sectoral mechanisms at the national level will subsequently benefit the supra-national level.

Consequently, the ambition of the integrative activities of the One Health EJP is to develop structures, work processes and platforms that bridge inter-sectoral division within the domains defined by the OHEJP scope, resulting in ONE single European surveillance community. This integrative development should be aligned with European priorities, accommodate and be adapted to existing EU initiatives and support long-term sustainability in the improved joint capacity. Operational integration is promoted by means of several different instruments, the primary instrument being the implementation of Joint Integrative Projects. Prioritised needs regarding joint collaborative resources were identified in the strategic research agenda (SRA) for 2018-2019, developed during 2016 in the context of the EJP proposal. These priorities are reflected by the first two JIPs - ORION and COHESIVE. COHESIVE focuses on the ability to pick up, share and communicate signals as well as the ability to conduct joint risk assessments. ORION focuses on the semantic and technical interoperability between the sectors, with focus on surveillance information. During year 2, a second call for joint research and integrative projects was launched. Research groups among the beneficiaries of the One Health EJP consortium were invited to submit proposals related to the priority topics developed for steps in the prevent-detect-respond chain that were not covered in the first call. The four topics for JIPs were 1) Joint databases of reference materials and data, incl. metadata, 2) Harmonised protocols and common best practice, 3) Common frameworks for designing and implementing surveillance and control activities, and 4) Sharing best intervention practice – twinning and simulation exercises. Three new JIPs were approved; CARE, OH-Harmony-CAP and MATRIX addressing topics 1-3. CARE (topic 1) will focus on developing new One Health concepts for proficiency testing of laboratories, reference materials and quality/availability of demographic data. OH-Harmony-CAP (topic 2) aims to collect information on current capabilities, capacities and interoperability at both the National Reference Laboratory and the primary diagnostic level. MATRIX (topic 3) aims to extend the efforts of COHESIVE and ORION and to advance the implementation of One Health surveillance in practice, by building on existing resources, adding value to them and creating synergies

among the sectors. A kick-off meeting for all approved second call JRPs and JIPs was held in November in Berlin. The projects started in January 2020.

Clearly, since the joint EU capacity is a function of each member state's capacity, the JIPs are expected to make their developments accessible to all partners and ensure there is transfer of skills and knowledge and promote harmonised approaches wherever it is relevant. In this way, the JIPs will serve to strengthen the scientific capacity within the EJP, as well as the future prevention, preparedness, detection and response of the EU to foodborne and other emerging threats across human-animal-environmental sectors.

WP4 is responsible for supervision and evaluation of the JIPs. The body of this report is based on the 12-month reports for year 2 provided by the two projects, with an initial introductory chapter summarising their operational performance in the second year.

2. Summary of the performance of the Joint Integrative Projects

2.1. Milestones and deliverables

During the second year, the two joint integrative projects COHESIVE and ORION had listed eight milestones. Seven have been achieved and one is delayed and is expected to be achieved by month 33 (September 2020). This milestone is connected to a delayed deliverable.

The JIPs had planned to submit a total of 17 deliverables during Y2 (see table below). All except two have been reported to the OHEJP WP4 management and uploaded to the private area of the OHEJP website. Of the 15 deliverables reported in the second year, three were delayed (between 1 to 6 months) but submitted within the year. The two deliverables that were not reported have been postponed to the third year (month 26 and 30, i.e. February and June 2020). One of the postponed deliverables (D-JIP2-3.3 Pathway analysis of exchanging signals) is delayed from Y1 and national as well as joint thematic analysis is ongoing. The other (D-JIP2-3.5 System analysis of detection of outbreaks) is delayed from Y2. The system analysis was completed in one country in December 2019, but adjustments to other countries need to be made.

	Total	Finalized and submitted on OHEJP website	Delayed to 2020
ORION	7	7	0
COHESIVE	10	8	2

For the first and second year of the first call JIPs, a total of 29 deliverables was expected. By the end of year two, all except two have been delivered (see table below). Nine (31%) of the achieved deliverables were delayed between 1 to 12 months.

	Total	Finalized and submitted on OHEJP website	Delayed to 2020
Number of deliverables	29	27	2
Percentage	100	93	7

Actions resulting from the follow up of milestones and deliverables:

- The projects will be requested to make sure that the specifications of the final deliverables (title, number) match the specifications stated in the project description. If there are any modifications, they should be carefully described in order to facilitate the traceability to the original title and number of the deliverable.
- The projects will be reminded to upload the deliverables to the OHEJP website as soon as they are finalized. The same regards the uploading on Zenodo. WP4 will provide some guidance for the JIPs on how to do this during year 3.
- The projects will be instructed to follow the Scientific Publication Policy and the Scientific Dissemination Procedure, which were published in the end of year 2. These documents aim to formalise and harmonise the publication and dissemination processes.
- There is a need for additional integrative activities, which can attract OHEJP partners outside the JIPs to take part of the results and outcomes. A proposal has been developed by OHEJP WP4 and this was presented at the SSB meeting March 19, 2020. New activities are depending on a reallocated budget on a co-fund basis.

2.2. Publications

As the integrative projects are more development-oriented and a natural part of the alignment process, scientific publications are not an expected major outcome of the projects. However, ORION has published one peer-reviewed paper during 2019.

2.2.1. Peer-reviewed scientific paper

S. Stelzer, W. Basso, J. Benavides Silván, L.M. Ortega-Mora, P. Maksimov, J. Gethmann, F.J. Conraths, G. Schares, Toxoplasma gondii infection and toxoplasmosis in farm animals: Risk factors and economic impact, Food and Waterborne Parasitology, Volume 15, 2019, e00037, ISSN 2405-6766,

Doi reference:	https://doi.org/10.1016/j.fawpar.2019.e00037
Repository link:	https://www.openagrar.de/receive/openagrar_mods_00048514
Golden open access:	Gold
Public:	Public

2.2.2. Other published outcomes

- The NGS handbook, under construction: https://orion-handbook.readthedocs.io/en/latest/index.html#
- A list of tracing tools for food supply chains : https://socialcompare.com/en/comparison/tracing-tools-for-supply-chains-4lh89xq0
- Contributions to The FoodChain-Lab project https://foodrisklabs.bfr.bund.de/foodchain-lab
- The development of a framework of One Health Surveillance faces varied data interoperability challenges http://bioportal.bioontology.org/ontologies/HSO

- An Excel plugin to provide light-weight translation from OWL to XLS, and from XLS to RDF, to enable linked data generation from existing Excel-based tools and workflows: https://karlhammar.com/ExcelRDF/
- The One Health EJP glossary, a collection of One Health related terms and definitions in the public health, animal health and food safety sectors: https://aginfra.d4science.org/web/orionknowledgehub/catalogue
- The One Health Surveillance Codex, aiming at establishing a high-level framework that supports mutual understanding and information exchange between One Health surveillance sectors: https://oh-surveillance-codex.readthedocs.io/en/latest/index.html
- The publication "OH integration in surveillance – inspiration and ideas": https://www.food.dtu.dk/english/-/media/Institutter/Foedevareinstituttet/Publikationer/Pub-2019/Rapport-One-Health-Integration-in-Surveillance.ashx
- Improved One Health integration of data and interpretation in the publication "DANMAP 2018 - Use of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from food animals, food and humans in Denmark", chapter 6., Campylobacter: https://www.danmap.org/-/media/arkiv/projekt-sites/danmap/danmap-reports/danmap-2018/danmap_2018.pdf?la=en
- The ontology, as well as extensive supporting documentation, are publicly available and can be found in the ORION knowledge Hub (orion.onehealthejp.eu)
- Within COHESIVE, a prototype decision tree has been developed to help select the most appropriate risk assessment tool to support risk assessments. The prototype tool is now available online for the partners to access and trial (https://rawcdn.githack.com/RDewar/Decision-support-tool-EJP/11dc62078461ce5f1508cbed8f1e7c427fa22186/Workingtool1.html)

The work and outcomes of the JIPs has also been presented at POC and PMC meetings, at the ASM 2019 and in the OHEJP Newsletters.

2.3. Interactions with other JRPs/JIPs, European, international and national projects

The JIPs are in themselves integrative projects. In addition, OHEJP WP4 arranges cogwheel workshops to facilitate interactions between the JIPs and other projects and initiatives. Some highlights are provided here. Additional and more detailed information can be found in the ORION and COHESIVE technical reports.

2.3.1. Interactions initiated by JIPs with international focus

During year two different tools supporting and facilitating a harmonized work between authorities on the public health, food and animal health areas have been completed and made available. An OHEJP Glossary has been developed by ORION in collaboration with COHESIVE and the JRP NOVA. In collaboration with representatives of EFSA and ECDC, details and applicability questions of this resource were discussed. It was agreed to extend the list of concepts covered further with support from EFSA and ECDC in year 3. In ORION, a first version of the "OH Surveillance Codex" (OHS Codex) has been finalized. The OHS Codex complies with and extends the "Tripartite Guide to Addressing Zoonotic Diseases in Countries" as it has evolved into a guidance document that provides practical recommendations and solutions. In cooperation with ORION and the JRP RaDAR, the assessment of the systems (surveillance and monitoring) that provide data for risk assessments are given. There is also a close collaboration between COHESIVE and EFSA with focus on tracing solutions in the framework of an EFSA-BfR Framework Partnership Agreement. Both JIPs deals with different aspects of NGS and an NGS handbook is in development. A first version has been published by ORION. The scope of this NGS handbook, and how it would relate to the scheduled EFSA/ECDC Technical Report on the collection and analysis of sequencing data for food-borne pathogens, has been discussed with EFSA and ECDC. NGS tools and pipelines for food-borne pathogens are now tested nationally.

Through contacts with FAO the SISOT (the Surveillance and Information Sharing Operational Toolkit that is being developed by OIE, WHO and FAO) working group is approached and the application of the "A Tripartite Guide to Addressing Zoonotic Diseases in Countries" has been discussed for a European setting. Both JIPs are in contact

with FAO; COHESIVE is collaborating with FAO to find synergy in making sure that guidelines can be used in operation and ORION focuses on the synergies between the SISOT tool and the OHS Codex resource.

2.3.2. Interactions initiated by JIPs with national focus

There are several pilots and tests going on at a national level, most initiatives led by the JIP partners of the specific country. Among national pilots, there are a Norwegian pilot focusing on infrastructure, data management, analysis platforms and cross-sector analysis of Listeria, a Danish pilot on cross-sector real-time outbreak investigation of campylobacteriosis and a UK pilot on cross sector collaboration regarding *Salmonella*. Additionally, a first version of the COHESIVE prototype information system (CIS) is tested in Italy, The Netherlands and Norway. In Sweden, the OH-ness of the yearly report on surveillance of infectious diseases in animals and humans has been improved by introducing "OH highlight" boxes in each chapter. In COHESIVE, several pilots are in preparation. Belgium, Norway, Italy and Portugal are participating. The countries are aiming to make improvements in a One Health approach in relation to signalling, response and control of zoonoses. Three new institutes have joined COHESIVE during 2019, INIAV from Portugal, VRI from the Czech Republic and ANSES from France.

2.3.3. Cogwheel workshop

During the second year (September 2019), COHESIVE and ORION representatives participated in a so-called cogwheel workshop arranged by OHEJP WP4. The purpose of the cogwheel workshops is to identify synergies, joint priorities and opportunities for collaboration within the OHEJP or with other EU initiatives.

The targets for the workshop were three projects external to the OHEJP; INNUENDO, IRIDA and COMPARE. ECDC, EFSA and CDC were also represented at the workshop, as well as the OHEJP Joint Research Projects ARDIG and BeONE. INNUENDO is an EFSA-funded project aiming to design an analytical platform and standard procedures for the use of whole-genome sequencing in surveillance and outbreak investigation of food-borne pathogens. IRIDA is a Canadian-led initiative to provide an open source, end-to-end platform for public health genomics. COMPARE is an EU funded project aimed to develop an analytical framework and information sharing platform that enables identification, containment and mitigation of emerging infectious diseases and foodborne outbreaks. The workshop was an opportunity for developers to present the available technical structure for WGS-based surveillance, and allowed for a fruitful discussion on the models of collaboration and the need for cooperation into a "ecosystem of solutions", rather than a "one fits all" solution. ORION and COHESIVE suggested that a workshop encouraging bioinformaticians and epidemiologists from veterinary, public health and food sectors to work together to produce workable, programmable definitions of clustering would be an important first step to turning WGS data into actionable information and encourage harmonisation across European partners.

2.4. Critical risks

The risks identified in the projects' 12-month report are summarised in the table below. The colour code categorisation is based both on what the projects report themselves, and on an overall assessment of WP4.

	ORION	COHESIVE
Loss of key persons (staff and / or leaders)	X	X
Delay in work plan execution	X	X
Conflicts within the consortium		
Lack of commitment of partners		X
Delay in duties, tasks or reporting		X
Poor intra-project (JRP) relationship		

Potential entry/exit of partners		X
Other risks (please describe)		X

Green: Minor delays, other risks (conflicts, loss of key persons etc.) have been sorted out
Yellow: Delays and other risks don't have an impact on the project but should be followed up
Orange: Delays and other risks might have an impact on the project
Red: Delays and other risks will have a significant impact on the project

Some critical risks have been managed during Y2. There are delays in the COHESIVE work plan execution due to unforeseen crises and outbreaks in partnering countries, which has led to delays in achieving the milestones. Up to this point, this is not expected to cause problems in the final results/products. Public Health England (PHE) has withdrawn from the project due to retirement of key-personnel. This resulted in the loss of some unique expertise, but this was not crucial for the project. No other exits are foreseen. COHESIVE also experienced the demise of a key person. His tasks have been taken over within IZS-AM, Italy. Other risks are that several modules to be integrated into the tracing portal are developed in the framework of other projects. If such a project fails to develop a usable module, the respective module cannot be integrated into the COHESIVE tracing portal. For ORION, several changes in personnel has led to a delay in work plan execution. However, all deliverables and milestones this far have been reached. It is expected that a project extension until June 2021 will allow all partners to achieve their specific project goals. An extension will also open up for additional opportunities to disseminate project results to and beyond EJP partners.

In late 2019, the COVID-19 outbreak started. According to the current development we foresee a risk of delays due to engagement in the outbreak, travel restrictions, sick leaves and lack of equipment and reagents.

2.5. Ethical Assessment

Ethical implications that have been identified are being managed. Regarding the issues addressed by the ethical reviewers to the ORION project about that the applicants must confirm the compliance with GDPR and that the applicants must specify whether human genome will be sequenced, ORION has verified the compliance with GDPR rules and has informed that no human genome will be sequenced in any of ORION's pilot studies.

3. JIP – ORION

3.1. Summary of the work carried out

The ORION project progressed successfully from the "Inventories and requirement analysis" phase into the "Improvements and new resources" phase as described in the PERT chart of the project proposal. This second phase includes the preparation of dedicated WP-specific/ country-specific One Health (OH) pilots as well as the development of new resources identified as urgently needed during the requirement analyses carried out in year 1.

In WP1 the conceptual design phase of the overarching ORION "OH Surveillance Codex" (OHS Codex) has been completed. The OHS Codex complies with and extends the "Tripartite Guide to Addressing Zoonotic Diseases in Countries" as it evolved into a guidance document that provides practical recommendations, solutions and resources from all ORION WPs. WP1 further developed / extended the OHEJP Glossary (previously referred to as ORION glossary) based on extensive curation and review work from OH experts of each sector (animal health, public health and food safety). In WP2-Epi the general structure of the OHS Knowledge Base Epi was drafted and first technical implementations were accomplished. The work on improving the content of the Knowledge Base Epi started including the research on advanced methods (Rasch model) for analysis of questionnaire data. WP2-NGS focused on building the basic conceptual and technical framework for the OH NGS handbook and on organizing a round of request for comments. WP2-Integration continued to provide

integration opportunities between WPs specifically supporting the designs and preparation phase of the pilots carried out by WP1-WP3. WP3 focused on developing new harmonisation infrastructure to support data interoperability among OH surveillance agencies. This covered the areas of understanding the use of surveillance data for decision making in surveillance practice, promoting collaboration between sectors, the development of a knowledge model to annotate surveillance data which enables semantic interoperability, and the development of tools to support adoption of semantic resources in the process of report generation.

Finally, all ORION WPs finalized the preparations of their WP-specific / country-specific OH pilot projects. The aim of these pilots is to illustrate and validate the usefulness and added value of various ORION results and concepts in year 2 and 3 of the project.

The project coordination established shared project management resources including a shared space for documents, an online mailing list and several other features. The project holds trimonthly web meetings for the whole ORION consortium (including stakeholders and interested EJP members) and a monthly call for the WP leaders & deputy leaders. The project organized and performed joint web meetings with EFSA and ECDC, contributed to the EJP DMP and initiated collaborations and information exchange with other EJP projects and non-EJP experts. Members of the project presented ORION and its work at several international conferences, published an article in a peer-reviewed journal and in several white-papers. Great effort has been taken to share ORION knowledge via innovative web technologies, specifically as webinars.

3.2. Work carried out in the JIP, scientific results

3.2.1. WP1: "OH Surveillance Codex"

JIP1-WP1-T1: Inventories and requirement analysis for "OH Surveillance Codex" (M1-M12)

This task has been completed; please see annual report 2018, or deliverable D-JIP1-1.1.

JIP1-WP1-T2: Development of "OH Surveillance Codex" (M13-M24)

The first draft for the OHS Codex has been finalized. The OHS Codex aims at establishing a high-level framework that supports mutual understanding and information exchange between OHS sectors, which are a requisite for integrated OHS data analyses. To bring this framework into "action" the OHS Codex postulates a set of four high-level principles as well as a description of resources (e.g. tools, technical solutions, guidance documents) and example implementations supporting the adoption of each OHS Codex principles. Users of this guide are invited to take the provided resources as practical examples that can be adapted to their contexts, needs, and requirements. Results from national pilot studies carried out in the context of ORION will be included later in the lessons learned section of each principle. Details are described in Deliverable "D-JIP1-1.2 Draft on OH Surveillance Codex"

JIP1-WP1-T3: One Health pilot (M7-M30)

JIP1-WP1-T3-ST1: Selection of the OH pilot study topic (M7-M12)

This task has been completed; please see annual report 2018, or deliverable D-JIP1-1.1.

JIP1-WP1-T3-ST2: Planning and performing work necessary to prepare the execution of the OH pilot (M13-M18)

The WP1 OH Pilot will specifically test and improve two new resources that are available from within the OHS Codex: OHEJP Glossary (formerly ORION Glossary) and the One Health Consensus Report Annotation Checklist (OH-CRAC). The OHEJP Glossary was made publicly available in M17 at http://orion.onehealthejp.eu/ and is developed and maintained as a collaborative effort of three EJP projects, namely ORION, NOVA and COHESIVE, with support from OH experts of EJP stakeholders. The OH-CRAC was developed to support harmonized reporting of surveillance metadata in future sector-specific or OHS data reports. The OH-CRAC can be used as a generic "checklist" that gives advice on what meta-information should be provided in future sector-specific

or OHS data reports. This resource is still under development.

In addition to the originally planned national WP1 pilot the ORION WP1 and WP3 agreed to pursue together a so-called "EJP ORION WP1 & WP3 supra-national pilot with EFSA & ECDC". This pilot aims at testing the uptake-potential of WP1 and WP3 solutions by EFSA and ECDC.

JIP1-WP1-T3-ST3: Execution of the OH pilot - applying the "OH Surveillance Codex" guide (M19-M30)

Due to changes in key WP1 personal and delays in hiring new staff the execution of pilots has not yet started. However, these issues will be solved by January 2020, so that pilot execution will start then.

3.2.2. WP2: Epi

JIP1-WP2-T1: Inventories and requirement analysis for OH Knowledge Base Epi (M1-M12)

JIP1-WP2-T1-ST1 – literature review

This task has been completed, see annual report 2018.

JIP1-WP2-T1-ST2 – requirement analysis workshop

This task has been completed, see annual report 2018.

JIP1-WP2-T1-ST3 - Survey and/or interviews with internal / external experts

In the fall of 2018, a survey was sent to all EJP members. The response rate was very low. Considering the amount of parallel activities and input gathering going on within the project at the same time, rather than push on this EJP survey, we decided to take the time to consolidate all input from project members, and then review results with key stakeholders (EFSA and ECDC). In June 2019, we had a workshop at EFSA (Parma) to discuss the results and improve the inventories. ECDC joined this meeting by Skype conference. As an outcome of this meeting we changed the inventory of animal health and feed and food according to the existing data structure of EFSA. This led to a more mature version of the tables for inventory of surveillance systems, and we will conduct another round of questions when sending out those inventory tables.

JIP1-WP2-T1-ST4 – first version of the OH knowledge base-epi

A general structure for the knowledge base was drafted for presentation in the prioritization workshop planned for month 13. It was decided that the structure will be a collection of 3 inventories: an inventory of surveillance data sources available among partners; an inventory of surveillance activities related to One-Health. Furthermore, an inventory for material and methods was developed. First versions of the knowledge base are available as Excel sheets as well as Shiny web apps. Guidance documents were developed to explain the knowledge base. The knowledge base is a living document that can be continuously updated by the WP members. The shiny web-app allows a barrier-free access and justices to the idea of knowledge integration

JIP1-WP2-T2: Improving OH Knowledge Base – Epi (M13-M24)

After discussions initiated in the prioritization workshop (M13), it was decided to work in small groups, to fine-tune the three inventory tables, within each health sector. Each sector needs to define the concepts lists (which will be drop-down lists of options in the inventory forms) for the respective fields and complete those according to existing EFSA and ECDC lists and guidelines. We also created a handbook file for each table with descriptions on what information is needed in the individual fields.

We collaborated with representatives of EFSA and ECDC on the details and sustainability questions of the inventories. A specific discussion meeting was carried out at EFSA on M19. We revised the knowledge base and the handbook for the tables.

The technical specifications and options to publish the inventories with the given platforms have been evaluated. Publishing in the EJP website proved more challenging than anticipated, and therefore an alternative solution is under development. We decided to create shiny web apps. First versions of the web

apps are ready; the technical specifications are developed and have to be tested now before it can be published.

JIP1-WP2-T2-ST1 - Data collection and integration

A preliminary data collection was performed in M4. The final data collection has not been started yet as we had to consolidate all internal input, and input from ECDC and EFSA. The current tables will be shared with the partners within and outside EJP Orion within the next month.

JIP1-WP2-T2-ST2 - Data analysis and validation

A data analysis model (Rasch model) was developed and tested with data from preliminary data collection. The Rasch model is used to quantify properties that cannot be ascertained directly but only indirectly, for example by means of questionnaires. The Rasch model is a probabilistic model with which latent variables are inferred. We can use the Rasch model the more successful the more complete the questionnaire response will be.

JIP1-WP2-T2-ST3 - Knowledge integration and Decision support

In the OH context we are dealing with a transdisciplinary process, and knowledge integration aims at the integration of two types of knowledge: the theoretical and abstract knowledge of the sciences and the concrete and empirical knowledge of practice. The integration of science and practice ensures that both political decisions are based on scientific knowledge and insights and that questions of science are directed to decision-relevant aspects of practice. Especially with regard to the fundamental uncertainties that run through the entire context of the OH approach, integration in the sense of mutual learning is relevant.

The knowledge integration is realized in the knowledge databases, because besides the pure listing of theoretical knowledge also the context is given in which this knowledge was generated. Further links to literature and application examples are provided for this purpose.

JIP1-WP2-T3: Epi - OH pilot studies (M7-M30)

A detailed description of all WP2-Epi pilots is available via the public ORION Knowledge Hub group: https://onehealthejp.eu/groups/orion-knowledge-hub/documents/

JIP1-WP2-T3-ST1: One Health Pilot 1: Toxoplasma gondii (carried out by FLI and BfR, Germany) (M7-M30)

In this pilot study, the first step will be an analysis of currently available data on T. gondii surveillance from reports of the different sectors. This will be followed by a literature review on seroprevalence data and risk factors for the infection with T. gondii in the relevant livestock species. The study on the risk factors was published in January 2019 (Stelzer et al. 2019).

JIP1-WP2-T3-ST2: One Health Pilot 2: Salmonella (M7-M30)

The plan for the pilot study has been developed and agreed. A document detailing experiences regarding whole genome sequence data sharing processes and lessons learnt from experiences during 2019 is in development which will be used to develop recommendations for the final project outputs. A data sharing protocol and draft Memorandum of Understanding is in development.

JIP1-WP2-T3-ST3 One Health Pilot 3: Hepatitis E (carried out by WBVR and RIVM, the Netherlands) (M7-M30)

Currently, the pilot study is in the phase of planning with objectives and expected outcomes being defined. Data about hepatitis E gathered in PH and AH are hardly combined at the moment. One of the goals is to set up a collaboration between several parties/institutions. Aims to be considered are the needs for a good (hepatitis E) surveillance and collaboration and perform epidemiological and NGS data analyses in a concerted action.

JIP1-WP2-T3-ST4 One Health Pilot 4: AMR (carried out by Sciensano, Belgium) (M7-M30)

The plan for the pilot study was developed. The plan includes the objectives, the expected outcome as well as information on collaboration and reporting of the results.

JIP1-WP2-T3-ST5 One Health Pilot 5: Surveillance properties (carried out by BfR, Germany) (M7 – M30)

Application of Rasch model on data collected in questionnaires (see above JIP1-WP2-T2-ST1 - Data collection and integration) Based on the questionnaires describing the properties of surveillance projects a set of quality scores are planned to be calculated by the use of a Rasch model . By this application of a method developed and validated in JIP1-WP2-T2-ST2 - Data analysis and validation on data collected in JIP1-WP2-T2-ST1 - Data collection and integration we optimize the information gain and further examine the practical applicability of the method collection. With the results we provide a base for a ranking of surveillance systems and for the discussion of the properties of recent surveillance projects under the framework of one-health. Project status: Model is coded and validated. Results will be calculated immediately after feedback of questionnaires

3.2.3. WP2: NGS

JIP1-WP2-T4: Inventories and requirement analysis for OH Knowledge Base – NGS (M1-M12)

This task has been completed, please see annual report 2018, or deliverable D-JIP1-2.2.

JIP1-WP2-T5: Improving OH Knowledge Base – NGS (M13-M24)

The main goal for this work package is to create a One Health Knowledge Hub (OHKH) for NextGen analytical data, methods, analyses and systems. The goal of the tasks in this work package in 2019 has been on establishing a framework for the handbook, as well as on exploration of data management and analysis tools and other infrastructure related issues. The WP has chosen to use ReadTheDocs as a platform for the handbook. ReadTheDocs is a web platform that can take the contents of a Github repository and convert that into an easy to navigate website. ReadTheDocs was chosen as a platform since is widely used in the bioinformatics community for documentation and training and thus would be a familiar and fairly easy platform to use for the target audience of our WP. We currently have a working website and are in the process of filling the website with content. In addition to establishing this platform, we have worked primarily on exploring data management and analysis platforms. We have primarily focused on the platforms IRIDA and INNUENDO. To evaluate these, we have conducted interviews with both developers and users, reviewed documentation, and also performed test installations and test runs. This work is currently in the process of being documented in the handbook.

JIP1-WP2-T6: NGS OH pilot studies (M7-M30)

Three pilots are connected to this work package: A Norwegian pilot focusing on infrastructure and data management and analysis platforms and on cross sector analysis of Listeria, a Danish pilot on cross sector real-time outbreak investigation of campylobacteriosis, and a UK pilot on cross sector collaboration regarding Salmonella. The WP has currently held one pilot coordination meeting and will continue holding regular coordinating meetings as the work proceeds. It is evident that the work done in the pilots will contribute significantly to the handbook. The Norwegian pilot will for instance be able to help describe possible infrastructure solutions, and also describe what personnel and competence is needed to run the suggested infrastructure solutions. The three pilots will also describe current analysis practices for the pathogens in question.

3.2.4. WP2: Integration

JIP1-WP2-T7: Inventories and requirement analysis for OH Knowledge Base – Integration (M1-M12)

The inventory report was completed and delivered to the new deadline of 28/02/2019.

JIP1-WP2-T9: Integration OH pilot studies (M7-M30)

The Danish pilot study: Integration of data and data interpretation to enhance the OH perspective. The pilot

study has three independent tasks: 1) Develop a template to interpret and report integrated AMR and AMU surveillance data for foodborne zoonoses across AH, FS and PH to a One Health Objective by integrating data streams; 2) Explore the added value of integration of multiple Campylobacter surveillance data streams from AH and FS; 3) Describe the Campylobacter surveillance system from farm-to-patient in a One Health context.

A detailed description of the pilot is available via the public ORION Knowledge Hub group: https://onehealthejp.eu/groups/orion-knowledge-hub/documents/

In addition, we continued to seek integration opportunities between work packages and provide fora and opportunity to do so. We supported the design and integration of individual pilots by identification of opportunities for collaboration and integrating the knowledge from experts within ORION. Since our pilots are on data integration, we have had several meetings with WP3 on data integration and data information sharing to mutual benefit for both WPs.

In June, WP2int chaired a workshop to identify expected outcomes and performance indicators for all pilots and share objectives and sub-objectives. This highlighted further opportunities for collaboration and integration within especially the ORION Codex. A plan for sharing pilot designs internally and externally was made and an evaluation matrix was planned. The knowledge sharing and added value from the enhanced collaborations between institutes will contribute to improve the OH knowledge hub as well as support MS with implementation of further OH approaches in surveillance. Another cross-pilot workshop is planned for January 2020.

3.2.5. WP3: OH Surveillance Harmonisation Infrastructure

JIP1-WP3-T1: Inventories and requirement analysis for OH Harmonisation Infrastructure (M1-M12)

This task has been completed, please see annual report 2018, or deliverable D-JIP1-3.1.

JIP1-WP3-T2: Improving OH Surveillance Harmonisation Infrastructure (M13-M24)

JIP1-WP3-T2-ST1: Systematic compilation and further development of infrastructural harmonisation resources - supporting *high priority needs identified in WP2 (M13-M24)*

This WP has identified the production of Linked-Data as the most effective way to achieve semantic interoperability among datasets across the One-Health sectors (animal health, public health and food safety). For data to be stored and shared in the linked format, this WP has focused on the development of 1) a "Health Surveillance Ontology" that attends the data annotation needs of specified examples from other WPs, including the concepts needed to make those datasets machine-readable and interoperable (https://w3id.org/hso). Additionally, we worked on 2) developing tools to support data annotation in the current data workflows used by the agencies involved on OH.

WP2 is producing an inventory of surveillance systems in Excel. Given the number of identified workflows which are Excel-based, and aiming to support WP2, we have focused the developing of technical tools to support data annotation on the development of an Excel plugin. An Excel plug-in was made available this year (https://karlhammar.com/ExcelRDF/), and through the work in the OH pilots, templates for data annotation will be distributed next year, including annotation of the surveillance inventory.

The ontology development this year has focused on data examples from the surveillance inventory (WP2), the Swedish OH pilot (see below) and the prevalence data model used by countries reporting Campylobacter spp surveillance to EFSA. The ontology, as well as extensive supporting documentation, are publicly available and can be found in the ORION knowledge Hub (orion.onehealthejp.eu).

JIP1-WP3-T2-ST2: Systematic compilation and further development of infrastructural resources - supporting high priority needs identified in WP1 (M13-M24)

Great focus was given to aligning the ontology to the reporting guidelines established by CRAC (see WP1). Additionally, the OH pilot developed in Sweden under the coordination of this WP will focus on publishing the Annual Swedish Surveillance Report as Linked-Open-Data, which will result in Excel templates to annotate reporting data, and workflows to produce reports that follow the CRAC guidelines.

JIP1-WP3-T3: One Health pilot (M7-M30)

The Swedish National Veterinary Institute publishes, yearly, the report entitled "Surveillance of infectious diseases in animals and humans in Sweden". The chapters for foodborne zoonotic pathogens are written in collaboration with the Swedish Public Health Agency and the Swedish Food Agency. We are working to improve the "OH-ness" of this initiative by promoting cooperation among the agencies earlier in the process of preparing the chapters, and to support data interoperability.

The surveillance report is compiled from January to June every year, collating results of the surveillance in the previous year. Already in December 2018 we introduced and planned the new OH-initiative to the inter-agency group responsible for the report. From February to May 2019 we conducted separate workshops for each chapter (Salmonella, Campylobacter and VTEC/STEC) to discuss the surveillance results and what OH conclusions to highlight in the report. Each workshop was followed up with skype-meetings to continue the work with texts, tables and graphs in each chapter. The surveillance report of 2018 was published in June 2019 already with "OH highlight" boxes in each chapter. In the Fall of 2019 work has focused on contacting each author to get feedback on the process, compiling suggestions for improvement in the next cycle of reporting and preparing written instructions for the next cycle of reporting. New workshops for each chapter are planned for early 2020.

3.2.6. WP4: Coordination, Communication, Training and Sustainability

JIP1-WP4-T1: Internal project coordination (M1-M36)

In month 13 the ORION Pilot Prioritization workshop took place in Uppsala. This workshop also served as a physical full consortium meeting for ORION. The project coordination continued to use the shared project management resources on Google, the ORION Virtual Research Environment (VRE) and promoted the adoption of the EJP Website and EJP ORION groups (an internal and a public group). The coordination holds trimonthly web meetings for the whole ORION consortium (including stakeholders and interested EJP members) and a monthly call for the WP leaders & deputy leaders. EFSA & ECDC representatives as well as the leads of EJP WP 4 and 5 and the coordinator of the COHESIVE project are invited to join the full consortium calls. ORION compiled the Data Management Plan (DMP) and supported the overarching EJP project in all requested activities (e.g. presentations at PMC meeting, offering short term missions, sharing of information, etc). For all physical and web-meetings the ORION coordination created meeting minutes that were shared via email and the ORION VRE.

JIP1-WP4-T2: External project integration (synchronized with EJP WP5) (M1-M36)

The project coordination contributed to relevant overarching EJP activities and continued to extend collaboration and information exchange between EJP projects. EJP stakeholders were actively informed on project results via e.g. invitation to project web meetings, WP specific web-meetings, newsletters (WP3) or via invitation to physical meetings. ORION also initiated an additional pilot called "EJP ORION WP1 & WP3 supra-national pilot with EFSA & ECDC" supported also by EJP WP5. ORION also supported request from non EJP members, e.g. the Federal Food Safety and Veterinary Office of Switzerland. ORION further integrated several resources into the "Tripartite Zoonoses Guide Surveillance and Information Sharing Operational Toolkit" SISOT.

JIP1-WP4-T3: Sustainability roadmap (M7-M36)

A draft of the ORION Sustainability Roadmap has been released as deliverable D-JIP1-4.2 on time. In agreement with the project description this roadmap will be continuously updated over the course of the ORION project.

JIP1-WP4-T4: Training and Dissemination (M1-M36)

JIP1-WP4-T4-ST1: Internal training (sharing knowledge on currently available national solutions) (M1-M12)

*This task has been accomplished in 2018, but i*n 2019 additional ORION internal training activities were carried out:

WP2int: Two cross-institutional meetings to discuss pilot project design, pilot execution and to share.

WP3: Three workshops, focusing on 3 specific zoonoses (Salmonella, Campylobacter and VTEC/EHEC) were conducted as part of the OH pilot in Sweden (WP3). These workshops gathered surveillance officials from the AH, PH and FS agencies. The flow and tools for surveillance data analysis and reporting was reviewed and shared among agencies.

JIP1-WP4-T4-ST2: Knowledge integration (web portal, Wiki, curricula, tutorials, videos, sample data) (M7-M36)

The ORION project continues to use a Virtual Research Environments (VRE) provided by the AGINFRA+ project as a resource for sharing project related documents, project internal information and as the technological backbone of the OHEJP Glossary. Further, ORION's One Health KnowledgeBase was established as an independent technical solution under the umbrella of BfR's "FoodRisk-Labs" web-page https://foodrisklabs.bfr.bund.de/. Via the ORION One Health EJP section on this platform it is now possible for ORION project partners / WPs to integrate content and links to their specific solutions:

WP1: the OH EJP Glossary and the OHS Codex will be available as dedicated web-services using the infrastructure of BfR's KNIME Server as well as the ORION VRE.

WP2Epi: The technical basis for the OH KnowledgeBase including the inventories for surveillance systems, data sources and tools and methods will be developed as R Shiny app.

WP2Int: First results are collected in the publication "OH integration in surveillance – inspiration and ideas" https://www.food.dtu.dk/english/-/media/Institutter/Foedevareinstituttet/Publikationer/Pub-2019/Rapport-One-Health-Integration-in-Surveillance.ashx

WP2NGS: a OH Surveillance NGS Handbook will be developed jointly and evolves continuously

WP3: for the "health surveillance ontology": http://bioportal.bioontology.org/ontologies/HSO or as machine readable permanent link: http://w3id.org/hso

JIP1-WP4-T4-ST3: Training and support for other EJP projects & partners (M7-M36)

In 2019 ORION performed two dedicated training and support activities for other EJP project and partners:

1) NextFlow workshop – 10-11th October 2019 in Oslo and
2) ORION Knowledge Hub webinar – 6th December 2019.

A detailed description of both events can be found in Deliverable D-JIP1-4.3.

In addition, ORION co-organized from 16th to 17th September 2019 the "WGS-based surveillance: a cog-wheel workshop to detect links and promote collaboration among OHEJP projects and external initiatives" workshop. The workshop had 32 participants, and promoted a discussion between EJP projects (ORION, COHESIVE and ARDIG were present) and key external projects in the field, namely: IRIDA, INNUENDO and COMPARE. Representants form EFSA and ECDC also attended the workshop.

The ORION project further contributed actively to all dissemination events organized by the overarching EJP project, e.g. with four presentations during the ASM Scientific conference in Dublin (https://www.ohejp2019.com/). Further there were dedicated collaboration activities carried out by individual ORION work packages with other EJP projects, e.g. COHESIVE, RADAR, NOVA, ListAdapt etc. Another mean to facilitate training and support were the ORION pilots that started in 2019.

3.3. Progress of the research project: milestones and deliverables

3.3.1. Deliverables

JIP name	Project deliverable number	Deliverable name	Delivery date from AWP	Actual delivery date	If deliverable not submitted on time: Forecast delivery date	Comments
ORION	D-JIP1-1.1	Report on requirement analysis for "OH Surveillance Codex"	12	31.12.2018	Delivered on time	
ORION	D-JIP1-1.2	Draft on OH Surveillance Codex	24	30.12.2019	Delivered on time	
ORION	D-JIP1-2.1	Report on requirement analysis for an "OH Knowledge Base – Epi"	12	14.01.2019	14.01.2019	
ORION	D-JIP1-2.2	Report on requirement analysis for an "OH Knowledge Base - NGS"	12	28.02.2019	28.02.2019	This report was delayed due to lack of manpower. That was fixed, and the report was handed in on the new forecasted delivery date.
ORION	D-JIP1-2.3	Report on requirement analysis for an "OH Knowledge Base – Integration"	12	28.02.2019	28.02.2019	The DTU ORION post doc is leaving his post before completing the work. The work was delivered a little later than planned.
ORION	D-JIP1-2.4	Status report on OH Knowledge Base – Epi	24	31.12.2019	Delivered on time	The document will give a detailed overview on the activities and outcome of the knowledge base Epi. It will include the description of the inventories as well as a description of the data analysis model.
ORION	D-JIP1-2.5	Status report on OH Knowledge Base – NGS	24	31.12.2019	Delivered on time	
ORION	D-JIP1-2.6	Status report on OH Knowledge Base – Integration	24	30.12.2019	Delivered on time	
ORION	D-JIP1-3.1	Report on requirement analysis for an "OH Harmonisation Infrastructure Hub"	12	29.12.2018	Delivered on time	The deliverable detailed a literature review on interoperability in health surveillance, the results of an interview of partners regarding data interoperability and publishing among health surveillance agencies, and a requirement analysis on the technical architecture for adoption of ontologies in practice.
ORION	D-JIP1-3.2	Status report on OH Harmonisation Infrastructure Hub	24	20.12.2019	Delivered on time	The deliverable will provide an update on the progress of the 3 WP tracks: a practice track

						which carried out workshops for inter-agency communication and data sharing; an ontology track that developed an ontology of health surveillance; and a tech track that developed an Excel plug-in to allow ontology use in practice without changing.
ORION	D-JIP1-4.1	Two internal training workshops for ORION partners	12	09.2018	Delivered on time	
ORION	D-JIP1-4.2	Draft on Sustainability Roadmap	18	30.06.2019	Delivered on time	
ORION	D-JIP1-4.3	Two training workshops for other EJP: Training workshop "Nextflow" for EJP, NVI ORION Webinar	24	20.12.2019	Delivered on time	

Additional output that is not a deliverable (non-scientific publication, video, …)

Ellis-Iversen, J., Petersen, C. K., & Helwigh, B. (2019). Inspiration and ideas - One health integration in surveillance. Kgs. Lyngby: Technical University of Denmark. Link: *One Health Integration in Surveillance*

Borck Hoeg et al, DANMAP 2018 - Use of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from food animals, food and humans in Denmark, Chapter 6., Campylobacter: *DANMAP 2018*
ORION project: webinar recording from 6th December 2019 *https://svasweden.adobeconnect.com/p90575ar1eht/*

3.3.2. Milestones

JIP name	Milestone number	Milestone name	Delivery date from AWP	Achieved (Yes / No)	If not achieved: Forecast achievement date	Comments
ORION	M-JIP1-1	Requirement analysis synchronization workshop	4	Yes		
ORION	M-JIP1-2	Prioritization workshop	15	Yes		Workshop held in Uppsala on 16th- 18th January 2019

3.4. Publications and patents

S. Stelzer, W. Basso, J. Benavides Silván, L.M. Ortega-Mora, P. Maksimov, J. Gethmann, F.J. Conraths, G. Schares, Toxoplasma gondii infection and toxoplasmosis in farm animals: Risk factors and economic impact, Food and Waterborne Parasitology, Volume 15, 2019, e00037, ISSN 2405-6766,

Doi reference:	https://doi.org/10.1016/j.fawpar.2019.e00037
Repository link:	https://www.openagrar.de/receive/openagrar_mods_00048514
Golden open access:	Gold
Public:	Public

3.5. Impact & relevance

The activities performed by the ORION project increasingly create relevant impact. For example, the provisioning of ORION solutions, like the OHEJP Glossary, in the Tripartite Zoonoses Guide Surveillance and Information Sharing Operational Toolkit (SISOT) supports directly European policy making. Many success stories are linked to the different national OH pilots that have already helped to bring national agencies together to discuss specific OH surveillance issues. For example WP2-Integration has improved the One Health integration of data and interpretation in DANMAP - the Danish national surveillance system for AMR and AMU (see DANMAP 2018). Further the WP2integration pilot currently explores the possibilities for control options for Campylobacter in poultry and the usefulness of new data analytical approaches of integrating surveillance data from animals, food, private industry and government. This will support the Danish national Action plan on Campylobacter. Activities in WP2-NGS create an online handbook that work as a platform and an information sharing hub for the three sectors (AH, PH, FS) on how to do sequencing for surveillance purposes. Based on these activities increased collaboration between the veterinary and public health sector in Norway and in other countries involved in the ORION project can already be observed. In Sweden, several workshops have been organized to discuss surveillance results of the previous year jointly, among the national agencies responsible for public health, animal health and food safety. The latter agency is not a partner of ORION, but resources from the project have allowed their engagement through these workshops, which resulted in the lifting of OH issues of interest to all agencies and the public.

3.6. Interactions with other JRPs/JIPs or with external (EU or national) relevant project

WP1 joined forces with the EJP projects NOVA, COHESIVE and ORION to develop the OHEJP Glossary. These efforts were supported by EFSA and ECDC. ORION organized and hosted 6 joint web meetings to work together on a joint publication and the OHEP Glossary content. WP1 also submitted the OHEJP Glossary, the OHS Codex and the OH-CRAC as resources to the “Tripartite Zoonoses Guide Surveillance and Information Sharing Operational Toolkit” (SISOT).

WP2Epi collaborated with representatives of EFSA and ECDC on the details and sustainability questions of the inventories. A specific discussion workshop was carried out at EFSA in M19 to discuss the concepts lists (which will be drop-down lists of options in the inventory forms) for the respective fields and complete those according to existing EFSA and ECDC lists and guidelines. Furthermore, there is cooperation with the projects RaDAR and COHESIVE. In both projects, tools for carrying out risk assessments are developed, and the assessment of the systems (surveillance and monitoring) that provide data for risk assessments is of course given.

WP2-NGS has had extensive collaboration with WP4 of the COHESIVE OHEJP project in 2019. WP4 in COHESIVE includes work on databases that is also relevant for the work done in the infrastructure pilot of WP2-NGS. The collaboration between the two WPs has taken the form of email contact, online meetings, discussions at conferences and project meetings, and a direct visit with Adriano di Pasquale of ISZAM in Teramo. WP2-NGS has also had one online meeting each this year with EFSA and ECDC. We had a meeting with ECDC in February.

The focus for this meeting was to discuss the scope of the WP2-NGS handbook, and how it would relate to the scheduled EFSA/ECDC Technical Report on the collection and analysis of sequencing data for food-borne pathogens. We had a meeting with EFSA in September. WP2-NGS is exploring tools and pipelines for food-borne pathogens, and for the Oslo pilot the focus is on Listeria. EFSA is doing similar work, and thus the meeting focused on establishing collaboration and to define work areas between EFSA and WP2-NGS.

From 16th to 17th September WP2-NGS and WP3 co-organized the "WGS-based surveillance: a cog-wheel workshop to detect links and promote collaboration among OHEJP projects and external initiatives". The workshop had 32 participants, and promoted a discussion between EJP projects (ORION, COHESIVE and ARDIG) and key external projects in the field, namely: IRIDA, INNUENDO and COMPARE. Representatives from EFSA and ECDC also attended the workshop. The workshop was an opportunity for developers to present the available technical structure for WGS-based surveillance, and allowed for a fruitful discussion on the models of collaboration and the need for cooperation into a "ecosystem of solutions", rather than a "one fits all" solution.

WP2 Integration also participated in a COHESIVE workshop to discuss the application of the "A Tripartite Guide to Addressing Zoonotic Diseases in Countries » for a European setting and will continue involvement in this work. April 11th, 2019; the Webex meeting of COHESIVE Task 2.2 "Risk Assessment decision-making tool" on September 6th, 2019 and in a teleconference on VC COHESIVE Guidelines task 2.1 on July 17th/19th, 2019.

Several ORION partners attended the COHESIVE full consortium meeting from 27th-29th November 2019 in Rome.

Physical meetings with stakeholders (EFSA / ECDC):

4th January 2019	WP2NGS meeting with Karin Johannsen et al at ECDC
5th July 2019	WP2Epi meeting at EFSA
30th September 2019	WP2NGS meeting with EFSA
2nd December 2019:	Meeting at ECDC on WP1+WP3 pilot

3.7. Follow-up of the recommendations and comments in previous review(s) by the Ethics Advisors

Requirements (from ethical reviewers) in 2018	Measures and actions taken at the end of 2018	Comments Ethical advisors January 2019	Comments Project Leader at the end of 2019
The applicants must confirm the compliance with GDPR.	In WP1, no data from individuals will be collected or used. We see no risk of infringing the GDPR. In WP2Epi, no data from individuals will be collected or used. We see no risk of infringing the GDPR. In WP2-NGS, we might utilize some human related pseudonymized metadata for sequences that we might seek to analyse in collaboration with other EJP projects, however, these will if so be stored on an e-infrastructure approved for use for human sensitive data set up in Norway. For WP2int 2.3 - Requirement analysis for an "OH Knowledge Base – Integration", professional email addresses of individuals were volunteered in the screening questionnaires. Interviews with volunteering key personnel of some initiatives was recorded and the original sound files will be kept in a restricted folder complying with ORION data management plans, DTU data management plans, DTUs Policy of the Retention of Primary Materials and Data, GDPR, until deletion on the last day of the ORION project. In WP3, no data from individual cases or laboratory tests will be used, only data already aggregated at the surveillance level, and already made public by the owner institution. We see no risk of infringing the GDPR.	As regard to the proposed interviews with volunteering key personnel (WP2int 2.3), an informed consent procedure should have been established and proposed to the research participants. It must mention the rights to participants as described in GDPR, among which the contact address of the Data Protector Officer of the institution in charge of processing the data obtained through the interviews. It is not clear that the above documents were used for the questionnaire work	Informed consent was established with reference to GDPR by the Data Protection Officer and according to the existing rules. In the end, contact persons emails were omitted from the report, only publishing the organisational contact point emails already available on the web.
The applicants must specify whether human genome will also be sequenced in the pilot study. In case of whole genome analysis, a procedure to address any incidental / adverse	The human genome will not be sequenced in any of ORION's pilot studies.	Satisfactory reply to the genome analysis issue.	

findings must be prepared and available.			

3.8. List of critical risks

Description of risk	Yes/No
Loss of key-persons (staff and / or leaders)	Yes
Delay in work plan execution	Yes
Conflicts within the consortium	No
Lack of commitment of partners	No
Delay in duties, tasks or reporting	No
Poor intra-project (JRP) relationship	No
Potential entry/exit of partners Other risks (please describe)	No

Additional information

Several partners experienced in 2019 changes in personal that led to a delay in work plan execution, as hiring new staff took longer than expected. Also new staff had to get familiar with the work carried out by their predecessors. The ORION project coordination already informed EJP WP4 on this and indicated that all ORION partners agreed to ask in 2020 for a six-month cost-neutral project extension. It is expected that this project extension until June 2021 will allow all partners to achieve their specific project goals (specifically to run their national OH pilots) and that this furthermore opens up additional opportunities for ORION to disseminate project results to and beyond EJP partners.

3.9. Dissemination and communication activities

A general overview on all overarching ORION activities is available within the continuously evolving ORION Stakeholder Involvement and Dissemination Plan:
https://docs.google.com/document/d/1nDCx7KVxdi2RJSoa8uf-zOfcm34cX9rWCr-CoiKaLB8/edit#

3.10. List of planned tele- or video conferences, face to face meetings in the next year

The ORION project will continue to pursue monthly WP leader calls to monitor progress of project work and make decisions on project related issues. Every three months there will be a full consortium conference calls that is open for stakeholders, COHESIVE and the EJP WP3, 4 and 5. In addition each WP organizes further conference calls on their specific schedule and needs, e.g. for WP2Epi there are bi-monthly web-meetings.

According to the original project plan a full consortium meeting called "ORION Evaluation workshop" is scheduled for month 33. It will be decided in spring 2020 if this meeting should be postponed into 2021 due to the prognostic delay in pilot executions

Other scheduled meetings / web meetings:

9th January 2020	OHS Codex web-meeting #8
16th January 2020	OH CRAC web-meeting #5
22nd January 2020	Participation in Cogwheel workshop "INFACT and OHEJP"
23rd January 2020	WP2-Int pilot synchronization workshop, Copenhagen
14th February 2020	EJP WP4 web-meeting with other JIP projects
27th-29th May 2020	Presentations at ASM 2020, Prague
14th- 18th June 2020	6th World One Health Congress, one presentation submitted
Fall 2020	BfR will apply to host a one-week CPD module together with BfR colleagues from COHESIVE & RADAR

WP3 webinars to disseminate the Health Surveillance Ontology – 2-4 webinars planned, dates not yet decided.

Also, a general overview on all overarching ORION activities is available within the continuously evolving ORION Stakeholder Involvement and Dissemination Plan:
https://docs.google.com/document/d/1nDCx7KVxdi2RJSoa8uf-zOfcm34cX9rWCr-CoiKaLB8/edit#

4. JIP2 - COHESIVE

4.1. Summary of the work carried out

Two main events in 2019 were the annual meeting that was held on April 10-12 at SVA and the general meeting on November 27-29 in Rome at ISS. For an integrative project as COHESIVE, coming together and extensively discuss issues is very important. One element, in addition to work on the content of the project, is getting to know each other and build trust and respect. Since the whole project is built around strengthening collaboration between med-vet-food in the area of zoonotic diseases, realizing the value of this collaboration in an international setting is also key nationally. All tasks were discussed, and several workshops took place. Also, time was reserved to inform stakeholders via a videoconference in both meetings.

WP2: For WP2.1 the main goal is to develop guidelines for *national* One Health structures or other ways to strengthen human-veterinary collaborations, with the aim to improve signaling, risk assessment and response to zoonoses. Since in March 2019 an extended, update version of the Tripartite Zoonoses Guide (TZG) was published, the focus of the workshop during the annual meeting was shifted towards getting insight in to what extend the new TZG was useful in setting up/strengthening such collaborations in European countries. Although the TZG is useful, added value is seen in a dedicated, simple European guideline with focus on implementation (more practical). During meetings in Brussel and London steps were made drafting the implementation guideline. Contact has been made with the FAO group involved in the TZG and we are in the process how to shape the collaboration. During the general meeting in Rome, the focus was on 'political will' as this was indicated during several occasion as a barrier for implementation of activities.

For WP2.2 the goal is to develop a tool to help decide which tool/model best to use for risk assessment in a specific situation. An early prototype decision tree has been developed in excel, using a limited number of publicly available quantitative risk assessment tools and also includes disease prioritization tools. To make the application easily accessible and available (avoiding proprietary software) a version in R-Shiny is being made. A webinar was held on 6th September for partners in COHESIVE to introduce the tool ahead of the workshop during the general meeting. Input from the workshop is going to be used to further improve and refine the tool.

WP3.1: A workshop was held on WP3.1 during the annual meeting, focusing on how information around an event/outbreak is shared. It was concluded that detailed descriptions of systems may not be very helpful for other countries trying to build up new systems/ways to share signals. Rather, it may be more useful to identify different factors that are believed to contribute to well-functioning systems/ways to share signals, trying to answer "<u>why</u> does signal sharing work well in this context". An interview guideline has been made and in-depth interviews are in being held. Currently, the interviews are analysed.

For WP3.2 the first task was to make an inventory and analysis of horizon scanning tools. Evaluation of a questionnaire has been conducted, literature inventory and workshops have been performed within the task to identify horizon scanning tools. An important tool is the formation of an expert team. A horizon scanning exercise has taken place with the formed team during the general meeting. The different elements that can be drivers of change for One Health issues were discussed as well as current and future challenges.

For WP3.3 systematic mapping of zoonoses detection systems within the UK has been started. By using a

reversal process, we are starting with identifying the formal outputs of systems that are based around, or contain, zoonoses information.

WP4: For WP4.1 a survey has been conducted in order to gather detailed information on existing databases and information systems for WGS data management and analysis adopted or available among countries. A demo version of the COHESIVE prototype information system (CIS) is made and available for Italy, The Netherlands and Norway to perform a feasibility study.

In WP4.2, a list of available tracing tools was compiled, evaluated and published as a web service that can be updated by interested partners in the future (https://socialcompare.com/en/comparison/tracing-tools-for-supply-chains-4lh89xq0). Secondly, the physical setup of the tracing web portal with initial features was realised and several prototype modules for data collection, cleaning, visualisation and reporting were implemented within the portal or are going to be implemented in the upcoming months. Data formats to collect sample and case data were developed. Their visualisation was tested in case studies and in a current outbreak.

For WP4.3 the goal is to make a platform-independent risk modelling framework. A prototype of the risk modelling framework in R shiny for quantitative microbiological risk assessment has been developed. To make the web application easily available an online version is under development.

4.2. Work carried out in the JIP, scientific results

4.2.1. WP1: Coordination, communication and sustainability

JIP2-WP1-T1: Coordination (M1-M36)

In 2019, three institutes were welcomed as partners. From Portugal INIAV became a partner, VRI from the Czech Republic and ANSES from France are in the final stage to officially become partner.

COHESIVE has produced a DMP (data-management plan) which will be kept updated through-out the project. There have been several contacts with EFSA and ECDC, mainly concerning WP4. Also, regular video conferences will be organized between the contact persons of EFSA/ECDC and the coordinator of COHESIVE. ORION and NOVA were identified as other OH EJP projects to which COHESIVE could relate. The coordinator of COHESIVE was present at (part of) the ORION annual meeting. ORION, NOVA and COHESIVE are working together at a glossary including terms used within the different projects.

JIP2-WP1-T2: Communication/dissemination (M1-M36)

An annual meeting was organized in April 2019 at SVA in Sweden and a general meeting was organized in November 2019 at ISS in Rome. During the meetings several workshops were organized. There was also the possibility for stakeholders to listen in during the plenary sessions. In Sweden a dedicated session was organized for stakeholders, in which the progression of the COHESIVE project was presented via a videoconference.

The COHESIVE project delivered text for three newsletters, for information on the OH-EJP website and used twitter and linkedin. The coordinator presented the project at the PMC meeting and also at the POC meeting the project was presented. Also during the ASM in Dublin COHESIVE was presented and at the Annual research day at SVA in Sweden. Dissemination activities related to the other work packages are indicated below.

4.2.2. WP2. Integrated risk-analysis at the national level

JIP2-WP2-T1: Development of guidelines for national One Health structures (M1-M26)

The main goal of this task is the development of guidelines in order to support countries to set up/strengthen the collaboration between the human-vet-food domains with respect to signalling, risk assessment, response and control of zoonoses. During the workshop in November 2018, it was concluded that added value of the guidelines can be found when they would build upon existing guidelines (i.e. Tripartite Zoonoses Guide) and focus on implementation. In March 2019, an updated version of the TZG was published. The workshop in preparation was adjusted in a way to get insight in whether this updated version would fulfil the needs expressed earlier. An intensive workshop led to some conclusions giving direction on how to achieve added value of the implementation guideline. First steps for drafting the implementation guideline were made during the workshop held on July 1st-2nd in Brussel, which was continued during a meeting on October 8-9 in London. Contact has been made with the FAO with respect to the Tripartite Zoonoses Guide (TZG) of OIE, WHO and FAO. COHESIVE visited their SISOT working group meeting on collected tools that support the implementation of the TZG and FAO presented their work in the General Meeting of COHESIVE. Both COHESIVE and FAO see opportunities to collaborate and are enthusiastic to do so. During the general meeting in Rome, a creative session was dedicated to understand what the challenges are in relation to political will within the context of setting up OHRAS as this was identified as one of the major barriers.

The Norwegian Institute of Public Health (NIPH) has carried out a thematic workshop on 24th April 2019 in Oslo. This workshop has been organised in close cooperation with Norwegian Veterinary Institute (NVI) and the Norwegian Food Safety Authority (NFSA). The large participation of Medical Doctors from all four Norwegian regions but also One Health epidemiological experts from different public agencies (NIPH, NVI and NFSA) contributed to a successful outcome of this event (totally 57 participants). The focus of the workshop was to update participants on common procedures and tools used to improve the human-veterinary-food safety collaboration in the area of emerging zoonosis and contribute to implementation of a sustainable integrated One Health structure at the national level. The experts from all three agencies presented best practise examples used in Norway on both national and regional level and engaged participants in practical exercises in food born disease outbreak investigation.

JIP2-WP2-T2: Development of structured decision making (M1-M18)

For WP2.2 the goal is to develop a tool to help decide which tool/model best to use for risk assessment in a specific situation. An early prototype decision tree has been developed in HTML, using a limited number of publicly available quantitative risk assessment tools and also includes disease prioritization tools. A webinar was held on 6th September for partners in COHESIVE to introduce the tool. At the general meeting a session was held looking at the questions developed for the decision tree within the tool. The participants were mainly focused on the priority of requirements for risk analysis techniques. Refining the questions ensures the tool weighs the features of different risk assessment techniques in line with the priorities of the user. Current work is focused on further improvements to the usability and additional content of the tool. The prototype tool was also demonstrated at the general meeting and is now available online for the partners to access and trial.

JIP2-WP2-T3: Knowledge transfer and dissemination (M25-M35)

Different dissemination activities already have taken place. They are separately indicated below. Also, preparation have started for the first pilot in Belgium. In addition, Norway, Italy and Portugal are candidates for a pilot.

4.2.3. WP3. Towards an EU zoonoses structure

JIP2-WP3-T1: "Explore current ways for exchanging signals between countries and cross disciplines – pathway analysis" (M1-M24)

One of the overall purposes of the task is to find good examples of ways to exchange signals cross disciplines/cross borders and learn from each other. During the workshop in Uppsala in April 2019, it was concluded that detailed descriptions of systems may not be very helpful for other countries trying to build up new systems/ways to share signals. Rather, it may be more useful to identify different factors that are

believed to contribute to well-functioning systems/ways to share signals as well as factors that prevent signal sharing, focusing on the persons in the systems rather than the technical or organizational solutions. In depth interviews were believed to capture more relevant information than a written questionnaire.

A common interview guideline was developed before summer and during summer and autumn, persons working at different levels in organization and institutes which may be involved in zoonotic events have been interviewed. Six countries have so far been involved and interviewed approximately five persons in each country. The aim is not to give a full description of systems, but rather collect experience from a sample of persons who in their daily work encounter signals of zoonotic events. In general, the participating countries have experienced that they through the interviews have received new information which is relevant when understanding signal sharing. Thematic analysis is ongoing on both national and joint level. One preliminary theme that has emerged is trust and the importance of knowing someone in person in order to share signals. A scientific manuscript is being drafted.

JIP2-WP3-T2: Select tools for Horizon scanning and signal detection (M1-M24)

Horizon scanning is defined as a specific foresight methodology that utilizes various steps to identify issues at the edge of current thinking that may have significant impact in the medium to long-term future. The multisectoral nature of horizon scanning provide opportunities for successful out-reach to disseminate key trends for One Health applications. Various horizon scanning methods have been identified and for instance, it turned out that there are different definitions in place.

An inventory of the literature on the tools of horizon scanning was done by searching published peer-reviewed papers and reports from international organisations. A horizon scanning workshop was held in April 10-11, 2019 in Uppsala, Sweden. A report based on the results of the questionnaire on One Health approaches on risk analysis of zoonotic diseases done within COHESIVE, on the inventory of the literature and on the results of the workshop was compiled and submitted to EJP. The report is available for EJP members but cannot yet be disseminated outside EJP.

There are many mid-long-term phenomena that can cause spread of zoonotic diseases and it is of interest to understand these phenomena, how they evolve over time, how they can be prevented, and how to consider and asses these phenomena. Consequently, horizon scanning requires structured information gathering. A One Health horizon scanning tool is based on assembly of information sources and assembly of analysis teams with assigned topics.

JIP2-WP3-T2: Extra deliverable

Based on the deliverable from M18 - JIP2-WP3-T2: **"**Select tools for horizon scanning and signal detection" a method has been proposed to be used in COHESIVE task 3.2 which was published by Wintle et al 2017 and Sutherland et al 2011. An important step in this horizon scanning tool is the formation of an expert team. Within the COHESIVE consortium the most relevant One Health disciplines are represented and by using the experts in COHESIVE a horizon scanning exercise was arranged in Rome 27-29th of November in Rome. The aim was to conduct a horizon scanning pilot exercise to identify "drivers of change" in order to strengthen European One Health.The seven step horizon scanning tool generated a list with "drivers of change" for the next five years including for instance: (i) political and decision maker behavior (ii) people/consumer behavior, (iii) information society, (iv) science, R&D and innovations (v), market behavior (vi), new threats (vii) environment and climate change including water sources, wild life, vectors, and farmed animals. The results from the pilot exercise will be followed up in various dissemination activities.

JIP2-WP3-T3: Retrospective systems analysis of detection of outbreaks (M6-M30)

This task started in month 6 of the project. During the kick-off meeting in 2018 potential partners were identified as wanting to contribute to varying degrees depending on the level of data available within

individual countries.

The immediate task involved selecting potential pathogens that could be used as case studies. As there was not one single pathogen that each country had experienced an incident with, a list of potential candidates was created. These pathogens were mostly focused on 'orphan zoonoses', defined as zoonoses for which no specific animal-health derived legislation exists. These present a challenge to One Health detection systems as they may not trigger formal intelligence gathering channels, but may still pose a threat to human health.

In order to structure the analysis in a way that all partners could participate (also with limited amount of time) while still producing outputs that are comparable between countries and maximizing the advantage of having several different points of view. For this different systems analysis and operational research frameworks were investigated, however no simple technical solution could be identified.

For WP3.3 systematic mapping of zoonoses detection systems within the UK has been started. By using a reversal process, this work was started by identifying the formal outputs of systems that are based around, or contain, zoonoses information. An outline map of one-health products (publications), actors (competent authorities, supporting institution, for instance) and links between them at multiple regional levels has been drafted. Visualising such a complex system is a challenge but is necessary to identify key components of the systems that represent hubs of One Health activity. As part of the general meeting in November 2019, a workshop was held with collaborating partners to gather partial information on the existing high-level structures and competent authorities within countries. Current activity is based on producing a 'core feature' structure that identifies where there are commonalties between countries.

4.2.4. WP4: Data platform to facilitate risk-analysis and outbreak control

JIP2-WP4-T1: Molecular typing data and metadata – database creation

A survey has been conducted in order to gather detailed information on existing databases and information systems for Whole Genome Sequencing (WGS) data management and analysis adopted or available among the Member States. The survey represented a first step for the evaluation of the technical feasibility of the inter-connection of genetic data produced by the laboratories and metadata archives available in each country and to provide the project with a reasoned list of the available Information Systems for WGS data and associated metadata. Eight countries answered to the questionnaire: Sweden, Norway, Belgium, Portugal, The Netherlands, Austria, Czech Republic and Germany. The 75% of countries reported that no OH surveillance system is in place at the moment, but where it exists WGS data are shared.

Proposals as a result from the discussions during the WP4 workshop (held at APHA-Weybridge November 2018) and the questionnaire results have been analysed.

A clearer description of the task 4.1 phases has been presented to EFSA representatives on March 2019 and during the stakeholder meeting at the COHESIVE Annual Meeting (held at Uppsala, April 2019). EFSA declared that Task 4.1 purpose is both clear and interesting to them. Besides Italy, two additional Member States decided to perform the evaluation and feasibility study of the project: The Netherland and Norway.

JIP2-WP4-T1-ST1: Workshop on data and DBs (M1-M6)

This task has been completed, see annual report 2018

JIP2-WP4-T1-ST2: Design and implementation of DBs (M6-M17)

The prototype COHESIVE Information System (CIS) has been realized and there is an ongoing feasibility in Italy, The Netherlands and Norway. A deliverable (D-JIP2-4.1) for this sub-task has been provided on May 2019. The general CIS system has been released on Zenodo. Three virtual machines are available for the Member States involved in the feasibility study:

Italy: https://cohesive.izs.it/cis_italy/

The Netherlands: https://cohesive.izs.it/cis_holland/

Norway: https://cohesive.izs.it/cis_norway/

During the Annual Meeting on November 2019 in Rome, has been decided to start the integration among the systems produced by tasks 4.1, 4.2 and 4.3.

JIP2-WP4-T1-ST3: Interconnection of the three DBs (M13-M21)

A deliverable (D-JIP2-4.2) for this sub-task has been provided on September 2019, with the details of integration and harmonization status for each Member State.

JIP2-WP4-T1-ST4: Analysis of the systems in involved countries (M11-M22)

The study of the systems for Italy is in progress. Data structures for data of NRL for *Listeria monocytogenes* and *Campylobacter* are ready. Integration with National Animal Identification and Registration System is available. Integration and harmonization with the human part is ongoing. During the General Meeting on November 2019 in Rome, it has been decided to investigate also Shiga toxin-producing Escherichia coli (STEC) as pathogen besides *Listeria monocytogenes* and *Campylobacter*.

The study of the systems for Norway is in progress. The pilot is based on *Listeria monocytogenes.* A preliminary feasibility analysis has been conducted. A Bioinformatician from NVI visited IZSAM in November 2019 to carry on the feasibility study. The NVI decided to use CIS as their official information systems for collecting WGS data and reporting analysis.

The study of the systems for The Netherlands is in progress. The pilot is based on *Listeria monocytogenes* and Hepatitis E virus. A first meeting took place in RIVM and WBVR on July 2019 producing a first draft of the feasibility study. Further analyses have been conducted on September and November 2019.

JIP2-WP4-T1-ST5: Filling of DBs (M15-M26)

In the new T4.1 description, the sub-task title is “Linking of the national databases with the COHESIVE prototype information system and the epidemiological analysis tools”.

During the General Meeting on November 2019 in Rome, it has been decided to start the activity of integration among the three information systems of the WP4. A telco is planned for the beginning of 2020 followed by face-to-face meeting.

JIP2-WP4-T1-ST6: Design and implementation of pipelines (M21-M32)

In the new T4.1 description, the sub-task title is “*Study of available pipelines*”.

The study is in the preliminary phases.

We are connected with Karin Lagesen from the EJP ORION project, which has a WP specifically dedicated to this activity.

JIP2-WP4-T2: Development of a platform-independent tracing framework (M1-M32)

JIP2-WP4-T2-ST1: Evaluation of all available approaches, algorithms and tools for tracing, epidemiological analysis and visualization combined with WGS data (M1-M12)

In addition to the work performed in 2018, in 2019 we were able to integrate even more available tools. The result is a web-based interactive table-like compilation that compares the functionalities of the software

tools found. This table was published on the EJP platform together with a report end of June 2019.

JIP2-WP4-T2-ST2: Programming a software and developing an algorithm (M1-M32)

In subtask 2, several modules for data collection, cleaning, visualisation and reporting – in part developed in the framework of other projects - will be unified in one platform:

- A data collection module
- An interactive analysis module
- A WGS-data integration module
- A reporting module
- A synchronization module with the desktop version of FoodChain-Lab (FCL)

The overall status and progress of the whole FCL project can be inspected at https://foodrisklabs.bfr.bund.de/foodchain-lab.

The specific status and new software versions of the FCL tracing web portal are deployed automatically to a test server where new features of the tool can be seen live. Currently, the production system of the tracing portal is set up and will be accessible at https://fcl-portal.bfr.berlin in early 2020.

A first demonstrator of a reporting module – the Rapid Outbreak Assessment (ROA) style – was implemented and integrated in the tracing web portal. The ROA style visualises tracing, sample and case information in a format which is suitable for publishing the results of tracing analyses in outbreak reports such as the EFSA-ECDC Joint Rapid Outbreak Assessments just in one click. For this, a JSON-based data exchange module was developed to import delivery data obtained from EFSA.

A prototype of a data cleaning module was developed as a KNIME server workflow. This module will be implemented in the FCL tracing web portal soon.

A prototype of an online data collection mask for tracing data was developed in the framework of a national project but is not yet integrated in the tracing web portal. The mask is available in multiple languages: German, English, Italian and Norwegian. Currently, a task and user management feature is being developed in the national project which will be integrated into the tracing portal as well.

During summer 2019, a web-security audit of the tracing web portal was conducted in the framework of another European project to ensure secure handling of sensitive information.

JIP2-WP4-T2-ST3: Integration of surveillance and outbreak data into the software platform for analysis (M13-M32)

In several presentations on FoodChain-Lab the audience highlighted the importance for integration of WGS data into tracing network visualisations.

Meetings with public and veterinary health institutes were conducted to clarify data needs e.g. in terms of case, sample and animal movement data.

A case study was developed in which WGS sample data i.e. the phylogenetic distance was implemented within the weight of the stations in the tracing network and visualized via different colours. The functionality was implemented in the FCL desktop application and still needs to be implemented in the tracing web portal.

In a current outbreak investigation, the sample status of companies and cases (confirmed/probable/not outbreak strain) was implemented and displayed within the tracing network in the FCL desktop application.

Sample data can be assessed via the data collection mask mentioned before. Furthermore, a data format for sample and case data was developed in the JSON format. Both can be displayed within the ROA style mentioned above. Visualisation was tested in the framework of case studies.

JIP2-WP4-T3: Development of a platform-independent risk modeling framework (M1-M33)

JIP2-WP4-T3-ST1: Requirement analysis (M1-M9)

Typical components have been identified that support quantitative microbiological risk assessment, advanced simulation techniques, documentation and extended usability. Selection of minimal models for testing and development is ongoing and will be completed in Q1 2020. The prioritization of building blocks for implementation in web application of rrisk is finished. Currently, also the search of models and data suitable as case study (ideally with input from project partners) is ongoing.

JIP2-WP4-T3-ST2 Implementation (M10-M30)

Various minimal models from the literature and from project partners were tested and defined. Risk questions and scenarios as well as quantitative risk models were provided by partners in COHESIVE and other EJP projects. As part of the implementation of standards, we were also provided with data sets and use-cases in cooperation with the FLI. Furthermore, in cooperation with project partners we have prioritized different building blocks. For the web application of rrisk we developed various mocks to define the workflow and the individual steps of the user interface in R shiny.

In the first step we have successfully implemented the one-dimensional Monte-Carlo simulation in the web application. The Prototype of “quantitative Riskanalysis” was developed and is finished. With “quantitative Riskanalysis” different risk models can now be implemented and calculated. The implementation of further statistical methods for quantitative risk assessment is ongoing (this subtask will be finished in Q2 2020).

In cooperation with EFSA and openanalytics, we want to work towards integrating rrisk (web-based version) into a European platform-independent framework for risk modelling.

JIP2-WP4-T3-ST3: Validation of the risk modelling framework (M19-M33)

Validation of web application is ongoing. The validation depends on the implementation of the app and will be implemented after completion of this work (this subtask will be finished in Q3 2020).

JIP2-WP4-T3-ST4: Deployment of the risk modelling framework (M34-M36)

We are in contact with various scientists in order to test the practical suitability and improve the app. According to current development status, the date of deployment of the risk tool is not at risk.

JIP2-WP4-T4: Dissemination (M25-M36)

Dissemination duties of WP4 achievements start only from M25. Nevertheless, in WP4.2 a lot of dissemination work for FCL and the tracing portal that was set up in COHESIVE was done in the framework of other projects in the years 2018 and 2019 (workshops and presentations on FCL, meetings with stakeholders). In the framework of COHESIVE annual meetings, presentations and workshops for WP4 tools were conducted for the COHESIVE community.

In 2020 a joint workshop on WP4 tools and how they interact is envisioned as a satellite event for the COHESIVE annual meeting open for the COHESIVE community and other interested users. WP4 activities might also be presented at the 2020 OHEJP Annual Scientific Meeting in Prague.

4.3. Progress of the research project: milestones and deliverables

4.3.1. Deliverables

JIP name	Project deliverable number	Deliverable name	Delivery date from AWP	Actual delivery date	If deliverable not submitted on time: Forecast delivery date	Comments
COHESIVE	D-JIP2-1.3	Annual meeting	14	12-04-2019		
COHESIVE	D-JIP2-1.4	Annual report	16	18-01-2019		
COHESIVE	D-JIP2-2.3	Development of tool for systematic risk-assessment	18	31-12-2019		Prototype is developed. Webinar held to introduce the prototype ahead of user testing. Presented during the general meeting, further refinement will remain.
COHESIVE	D-JIP2-2.4	Thematic workshops	20	02-07-2019		Two workshops have been done
COHESIVE	D-JIP2-3.2	Thematic workshops	20	30-06-2019		One workshop has been done and given input for the interview guidelines
COHESIVE	D-JIP2-3.3	Pathway analysis of exchanging signals	10		26	An interview-guideline has been developed and interviews have been performed in six countries. National as well as joint thematic analysis is ongoing.
COHESIVE	D-JIP2-3.4	Inventory and analysis of tools for horizon scanning	18	30-06-2019		In addition, an extra deliverable will be a pilot horizon scanning team exercise (see D-JIP2-3.6)
COHESIVE	D-JIP2-3.5	System analysis of detection of outbreaks	24		30	Draft of UK systems map completed Dec-2019.
COHESIVE	D-JIP2-3.7	Drivers of change in One Health– a horizon scanning exercise	30			New deliverable, not listed in the proposal. A horizon scanning exercise was done at the general meeting in November 2019. Material compiled within 3.2 (including the exercise) will be compiled.
COHESIVE	D-JIP2-4.1	Implemented database	17	30-06-2019		The workload of this subtask was underestimated, in particular because it depended by the first workshop which was postponed to Month 11. D-JIP2-4.1 = D-4.1.1. in project description
	D-JIP2-4.2	Description of the links and the linked databases	21	30-09-2019		The report was finished and uploaded to the EJP platform end of September 2019. D-JIP2-4.2 = D-4.1.2 in project description

COHESIVE	D-JIP2-4.5	Report of available tools and algorithms and ranking of most valuable features	12	30-06-2019		The report was finished and uploaded to the EJP platform end of June 2019. D-JIP2-4.5 = D-4.2.1 in project description
COHESIVE	D-JIP2-4.8	Report section about user requirements, relevant modelling modules and final specification for a modelling tool	10	30-10-2019		The report was finished and uploaded to the EJP platform end of October 2019. D-JIP2-4.8 = D-4.3.1 in project description

4.3.2. Milestones

JIP name	Milestone number	Milestone name	Delivery date from AWP	Achieved (Yes / No)	If not achieved: Forecast achievement date	Comments
COHESIVE	M-JIP2-1.2	Annual report	16	Yes		
COHESIVE	M-JIP2-2.1	Development of tool for systematic risk-assessment	18	Yes		
COHESIVE	M-JIP2-3.2	Pathway and system analysis of signal exchange and outbreak detection	24	No	33	Task 3.1 is currently on-going and the results will be compiled in early 2020. The preliminary draft of Task 3.3 which was done at UK level needs to be adjusted to other countries. The joint work of tasks 3.1 and 3.3 starts in 2020.
COHESIVE	M-JIP2-4.2	Prioritization of requirements for risk modeling framework	12	Yes		Typical components have been identified that support quantitative microbiological risk assessment
COHESIVE	M-JIP2-4.4	Databases for WGS data consistent with COMPARE standards, for the metadata of the samples included in the WGS database, and for the data collected by classical epidemiology investigations (case-control studies)	17	Yes		The workload of this subtask was underestimated, in particular because it depended on the first workshop which was postponed to Month 11
COHESIVE	M-JIP2-4.5	Fully operating and linked databases	21	Yes		The activity was finished and the related deliverable has been uploaded to the EJP platform end of September 2019.
COHESIVE	M-JIP2-4.6	Prototype for tracing framework ready	24	Yes		A first implementation of the tracing web portal including an interactive analysis module, a reporting module and a synchronization module with the desktop version of FoodChain-Lab (FCL) is available in a test environment. The production system of the tracing portal is currently set up and will be accessible at .https://fcl-portal.bfr.berlin in early 2020. More modules will be integrated in 2020.

4.4. Publications and patents

No peer reviewed publications

4.5. Impact & relevance

A major aim of this project is to close the gap between public health, food safety and veterinary domains, mainly in the area of risk-analysis. The aim of COHESIVE is to enhance collaboration on all zoonotic threats, irrespective of the regulatory status. Earlier warning of potential zoonotic threats in a structured and integrated way, will facilitate risk management, between the human, food and veterinary domains making use of the tools to be developed in this project (implementation guideline for integrated risk-analysis, decision-tree help selecting the proper risk assessment tool, tools for foresight prediction of zoonotic threats or drivers of change). In the several workshops during specific WP meetings and general meetings, important steps were made, to develop the foreseen tools, including attracting people to participate. In addition, the workshops are good opportunities for networking over domains but also over countries. Networking also took place by the interviews performed within countries among professionals in the area of zoonoses control. An important point of attention is implementation. Developing tools is one thing, but in order to have impact implementation is crucial. Therefore, stakeholder engagement is important. For Cohesive on one hand EFSA, ECDC and EU-Commission are important stakeholders, but also national policy makers and directors of public health institutes, veterinary institutes and food safety authorities are important stakeholders as well. We would like to interest them in Cohesive by inviting them to (parts of) our activities and have the intention to organize a specific broad stakeholder meeting. By teaming up with the FAO we hope to further increase the impact of the project. The integration of One-Health information systems bringing surveillance data together within a country will further close the gap between med-vet-food and help to improve signalling in an integrated med-vet-food fashion, support tracing, support risk modelling and control. Ideally, also EFSA and ECDC would benefit from these integrated databases. The FCL tracing portal combines the effort of several projects on national and European level by integrating their outcomes in the tracing portal. The portal also integrates data from food safety and public health and thereby promotes the One Health approach. As a proof of concept, the tracing portal is used in first outbreak investigations in Member States and by EFSA. There are efforts to implement the FCL tracing portal in EFSA official tasks such as producing Rapid Outbreak Assessments in the future. Within the different meetings new contacts were made with people from other domains and expertise, bringing the related tasks to a more One Health approach.

4.6. Interactions with other JRPs/JIPs or with external (EU or national) relevant project

- Together with ORION and NOVA a One Health glossary is developed. ORION is in the lead with providing a web-based tool. COHESIVE is providing terms which will be reviewed within COHESIVE and will review terms in provided by ORION or NOVA. A manuscript is in preparation.

- There have been several contact moments with EFSA and ECDC this year. Parts of the annual/general meeting were open for all stakeholders and other EJP partners interested in Cohesive.

- There is good contact with FAO. The coordinator of Cohesive and a member of WP2 from

APHA joined a meeting of the SISOT working group, led by FAO. Sean Shadomy from FAO presented the TZG and work of SISOT during the Cohesive general meeting in Rome. Also, a second person from FAO was present during this meeting.

- There are links to the EJP NOVA project in which a module for analysis of sales data should be integrated into FCL. There is a close collaboration with EFSA with focus on tracing solutions in the framework of an EFSA-BfR Framework Partnership Agreement. Also, FCL was part of joint ECDC-EFSA crisis trainings. On the national level, FCL is involved in a project with the German federal state North-Rhine Westphalia on developing a data entry mask for supply chain data. Several modules of the tracing portal were developed in the framework of these projects and the aim of COHESIVE is to unify all of them under one umbrella – the FCL tracing portal.

- Several people involved in both COHESIVE and ORION

- During the WGS workshop in Dubrovnik, connections were made with projects ORION and IRIDA team from Public Health Canada, which also deal with connecting databases.

4.7. Follow-up of the recommendations and comments in previous review(s) by the Ethics Advisors

Requirements (from ethical reviewers)	Measures and actions taken	Comments Ethics Advisors in January-February 2019	Measures and actions taken by Project Leaders at the end of 2019
none	none	none	/

4.8. List of critical risks

Description of risk	Yes/No
Loss of key-persons (staff and / or leaders)	yes
Delay in work plan execution	yes
Conflicts within the consortium	no
Lack of commitment of partners	yes
Delay in duties, tasks or reporting	yes
Poor intra-project (JRP) relationship	no
Potential entry/exit of partners	yes
Other risks (please describe)	yes

Additional information

Some of the risks identified in the beginning of the project are already solved, but some will remain and new ones arise.

Unfortunately, we had to say goodbye to Armando Giovannini. The WP leader of WP4 died

suddenly. His tasks have been taken over within IZS-AM. It does not seem to lead to problems in the output.

PHE has withdrawn from the project. Due to retirement of key-personnel they could not fulfil the assigned tasks. This is not crucial to the project, but we will miss some unique expertise.

There are delays in the work plan execution, which will lead to not making all deliverables in time. However, up to this point, this does not seem to lead to problems in the final results/products.

Partners and key persons are loaded with other tasks. In addition, unforeseen crises and outbreaks in partnering countries may lead to delays in achieving the milestones. This happened in WP3, where key-personal was engaged in control of an outbreak.

Several modules to be integrated into the tracing portal are developed in the framework of other projects. However, if such a project fails to develop a usable module, the respective module cannot be integrated into the COHESIVE tracing portal.

4.9. List of dissemination and communication activities

Name of the activity:	COHESIVE Annual Meeting		
Date:	10-12 April 2019		
Place:	SVA, Sweden		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	yes
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	35	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	2
Policy Makers	2		

Name of the activity:	Thematic workshop in Norway – Outbreak investigation within One health across sectors		
Date:	24th April 2019		
Place:	Norwegian Institute of Public Health, Oslo, Norway		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop	yes	Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	70	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers			

Name of the activity:	Project presentation at Programme Management Committee		
Date:	9 May 2019		
Place:	ANSES, Paris		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	Yes
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	30	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers			

Name of the activity:	OHEJP Annual Scientific meeting: oral presentation: Dealing With (re)Emerging Zoonoses: A One Health Approach In The Netherlands		
Date:	20-24 May 2019		
Place:	Dublin		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	yes
Organisation of a Workshop		Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	300	Media	
Industry	5	Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers	5		

Name of the activity:	Meeting between German federal food safety and public health authorities: Presentation of FCL tracing portal and discussion on data needs for outbreak investigations		
Date:	29 May 2019		
Place:	Berlin		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	yes
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	10	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers			

Name of the activity:	Project presentation at “OHEJP: How is Sciensano Involved?”		
Date:	5 June 2019		
Place:	Sciensano Uccle, Brussels		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	Yes
Organisation of a Workshop		Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	35	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers	11		

Name of the activity:	Project presentation at Programme Owner Committee		
Date:	19 June 2019		
Place:	ANSES Paris		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	Yes
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	30	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers			

Name of the activity:	COHESIVE workshop on development guidelines		
Date:	1-2 July 2019		
Place:	Brussel, Sciensano		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop	yes	Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	15	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers			

Name of the activity:	WGS-based surveillance: a cog-wheel workshop to detect links and promote collaboration among OHEJP projects and external initiatives		
Date:	September 16-17 2019		
Place:	Dubrovnik | Croatia		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	yes
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	40	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers			

Name of the activity:	COHESIVE workshop on development guidelines		
Date:	8-9 October 2019		
Place:	London, APHA		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop	yes	Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	15	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers			

Name of the activity:	SEMINÁRIO DE COMEMORAÇÃO DO DIA MUNDIAL DA UMA SÓ SAÚDE - Quando acontece "UMA SÓ SAÚDE!" ONE HEALTH WORLD DAY CELEBRATION SEMINAR - When "ONE HEALTH!" Happens		
Date:	4th November 2019		
Place:	Faculty of Veterinary Medicine, University of Lisbon		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference	Yes	Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	80	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers			

Name of the activity:	Project presentation at annual research day SVA		
Date:	12 November 2019		
Place:	Uppsala, SVA		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	yes
Organisation of a Workshop		Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	80	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers			

Name of the activity:	HAIRS OneHealth Workshop (Task 2.2)		
Date:	07/11/2019		
Place:	Birmingham Repertory Theatre, Birmingham		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	Yes
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	6	Media	
Industry	3	Investors	
Civil Society	15	Customers	
General Public		Other	
Policy Makers			

Name of the activity:	DES Taster Club (task 2.2/3.3)		
Date:	12/11/2019		
Place:	APHA Weybourne Building, Surrey		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	Yes
Communication Campaign (e.g. Radio, TV)		(Internal presentation)	
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)		Media	
Industry		Investors	
Civil Society	20	Customers	
General Public		Other	
Policy Makers			

Name of the activity:	SISOT working group, part of Tripartite Zoonoses Guide-group		
Date:	20-22 November		
Place:	Rome, FAO		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	Yes
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	15	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other (FAO/WHO/OIE)	10
Policy Makers			

Name of the activity:	COHESIVE general meeting		
Date:	27-29 November 2019		
Place:	Rome, ISS		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	
Website		Other	yes
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	35	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	3
Policy Makers			

Name of the activity:	One Health Lunch (NVI and NIPH lunch together with short presentation of a relevant theme: COHESIVE project, OH EJP Summer School, OH EJP 2nd call projects, presentation of research at NVI		
Date:	10.1, 8.3, 17.10, 8.11		
Place:	Norwegian Veterinary Institute/Norwegian Institute of Public Health		
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer		Pitch Event	
Training		Trade Fair	
Social Media		Participation in activities organized jointly with other H2020 projects	yes
Website		Other	
Communication Campaign (e.g. Radio, TV)		Organisation of One Health Lunch	yes
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	5-15 per lunch event	Media	
Industry		Investors	
Civil Society		Customers	
General Public		Other	
Policy Makers			

Name of the activity:	Various media activities		
Date:	Throughout 2018- 2019		
Place:			
Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories			
	Yes / No		Yes / No
Organisation of a Conference		Participation to a Conference	
Organisation of a Workshop		Participation to a Workshop	
Press release		Participation to an Event other than a Conference or a Workshop	
Non-scientific and non-peer-reviewed publication (popularised publication)		Video/Film	
Exhibition		Brokerage Event	
Flyer	yes	Pitch Event	
Training		Trade Fair	
Social Media	yes	Participation in activities organized jointly with other H2020 projects	
Website	yes	Other	
Communication Campaign (e.g. Radio, TV)			
Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories			
	Number		Number
Scientific Community (Higher Education, Research)	X	Media	X
Industry		Investors	
Civil Society		Customers	
General Public	X	Other	X
Policy Makers	X		

4.10. List of planned tele- or video conferences, face to face meetings in the next year

- WP2.1/WP3.1 meeting, March/April 2020
- WP4 integration activity: Telco on January 2020 with BfR people, followed by a meeting at Bfr, probably on Summer 2020.
- Annual meeting, including workshops, Autumn 2020
- Stakeholder meeting 2020
- Monthly VC steering group and task leaders
- Regular VC per WP
- Regular VC with EFSA and ECDC