



Final PhD Thesis Report

WILBR

**Contribution of wild birds to AMR in
the environment and on farm.**

Responsible OHEJP Partner: Animal and
Plant Health Agency

Contributing external partners: University of
Exeter



GENERAL INFORMATION

| | |
|--|---|
| European Joint Programme full title | Promoting One Health in Europe through joint actions on foodborne zoonoses, antimicrobial resistance and emerging microbiological hazards. |
| European Joint Programme acronym | One Health EJP |
| Funding | This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 773830. |
| Grant Agreement | Grant agreement n° 773830 |
| Starting Date | 01/01/2018 |
| Duration | 69 Months |

DOCUMENT MANAGEMENT

| | |
|---|--|
| PhD Report | Final PhD Thesis Report Y5 (2022) |
| PhD Reference | PhD WILBR |
| PhD candidate | Olivia Turner |
| PhD Lead Supervisor | Muna Anjum (Animal and Plant Health Agency) |
| PhD second supervisor | William Gaze (University of Exeter) |
| Other supervisor (s) | |
| Due month of the deliverable | M66 |
| Actual submission month | M66 |
| Type <i>R: Document, report DEC: Websites, patent filings, videos, etc.; OTHER</i> | R |
| Dissemination level <i>PU: Public (default) CO: confidential, only for members of the consortium (including the Commission Services).</i> | CO <i>This is the default setting. This report will be entirely copied into One Health EJP Work Package 6 Deliverable D6.18 - Thesis Reports of up to 17 PhD studentships.</i> |
| Dissemination <i>Author's suggestion to inform the following possible interested parties.</i> | <p>OHEJP WP 1 <input type="checkbox"/> OHEJP WP 2 <input type="checkbox"/> OHEJP WP 3 <input type="checkbox"/></p> <p>OHEJP WP 4 <input type="checkbox"/> OHEJP WP 5 <input type="checkbox"/> OHEJP WP 6 <input type="checkbox"/></p> <p>OHEJP WP 7 <input type="checkbox"/> Project Management Team <input checked="" type="checkbox"/></p> <p>Communication Team <input type="checkbox"/> Scientific Steering Board <input type="checkbox"/></p> <p>National Stakeholders / Program Owners Committee <input type="checkbox"/></p> <p>EFSA <input type="checkbox"/> ECDC <input type="checkbox"/> EEA <input type="checkbox"/> EMA <input type="checkbox"/> FAO <input type="checkbox"/> WHO <input type="checkbox"/> WOAH <input type="checkbox"/></p> <p>Other international stakeholder(s):</p> <p>Social Media:</p> <p>Other recipient(s):</p> |



INTRODUCTION

The final thesis or thesis report will be included in Deliverable 6.18 and the deadline to submit this deliverable to the European Commission is 30th June 2023. The deliverable will be a **public report** by default. **Where the final thesis report or final thesis contains information that must remain confidential under an embargoed period until the publications or outputs have been generated**, then a redacted version suitable for the public must be submitted.

A confidentiality clause should be included at the start of the redacted report or thesis clearly explaining any redactions, so the reader is aware. The embargo period should also be clearly stated.

- **PhDs that finish by 30th April 2023** are required to produce a drafted or final thesis as a final output. Once the PhD thesis is complete, PhD students should either submit an electronic version (PDF) of the thesis, or a DOI so that it can easily be linked (most theses are kept in a repository with open access unless by exception). The final thesis must be submitted to the WP6 team (wp6.onehealthjep@surrey.ac.uk) and uploaded to Zenodo by the PhD supervisor. In addition, the content covered in sections 1, 2, 7-16 of the thesis reporting template must also be completed and submitted to WP6 with the thesis and uploaded to Zenodo. Please ensure you upload the files in one Zenodo upload, so they have the same link.
- **PhD students that have not finished their PhD thesis by 30th April 2023** are required to produce a **Final Thesis Report** by completing the final thesis reporting template and to send a first version of the report back to the WP6 team (wp6.onehealthjep@surrey.ac.uk) **by 15th May 2023**.
- **In all cases**, PhD supervisors must submit the final (public) pdf(s) of the final PhD thesis to the WP6 team (wp6.onehealthjep@surrey.ac.uk) and **upload them to Zenodo by 30th June 2024**.

CONFIDENTIALITY

Where the final thesis report or final thesis contains information that must remain confidential under an embargoed period, then a redacted version suitable for the public must be submitted. The non-redacted final thesis (or a link to this document) must be emailed to the WP6 team when it is available.

A confidentiality clause should be included at the start of the report or thesis clearly explaining any redactions, so the reader is aware. The embargo period should also be clearly stated.

****CONFIDENTIALITY STATEMENT****

Due to the fact that this PhD thesis is unfinished and not due for submission for several months, the introduction, methods, and results included in this report are in their draft format and still subject to change. As a result of this no content that will be included in the final thesis is to be made public before this has been finalised and submitted. The public release of this information could hamper the PhD students ability to go on to publish results from their thesis so the redacted sections will be embargoed until June 2024. All sections that are to be redacted will be highlighted in yellow.



1. PhD Project team composition

PhD student: Olivia Turner

University at which the PhD is registered: University of Exeter, UK

Lead PhD Supervisor: Muna Anjum, Animal and Plant Health Agency, UK

Second Supervisor: William Gaze, University of Exeter, UK

Date for PhD thesis submission: October 2023

2. Abstract

500 words, 1 page. Please summarise the main scientific results and pay particular attention to the impact the project may have for the One Health EJP and its stakeholders (ECDC, EFSA, EMA, EEA, FAO, OIE, WHO), and national ministries. This abstract may be used as a standalone communication piece, and therefore should be clear so it can be read as a separate entity if needed.

3. Introduction and Objectives

Please provide a detailed introduction which includes a literature review, followed by an explanation of the project objectives, and the realised or expected outcomes, impact and cross-sector collaborations.

- *Expected outcomes:*
 - *Have the results been implemented in your institute, consortium partners, elsewhere? Across sectors? Are such implementations planned? Has this been discussed at the level of One Health EJP partner organisations? What should be done to do so?*
- *Expected impact:*
 - *Scientific impact: Can new research be based on the outputs?*
 - *Societal and policy impact: If implemented at different institutes or organisations, what would that mean for animal health, public health, food safety, for preparedness at national and international levels. Can the results be useful for EU reference laboratories, international organisations, One Health EJP stakeholders etc.*

4. Materials and Methods

Option 1: Please provide details of the materials and methods used in as much detail as possible (consider this is a public report).

Option 2: If your materials and methods are part of a published scientific paper, please provide the DOI link to the scientific papers here instead.

5. Scientific Results and Discussion

Please provide your scientific results and discussion in this section and organise them into chapters (see below) which follow a clear 'storyline'. Describe all other aspects which contributed to the findings (e.g., integrative activities, collaborations etc.).



Please provide as much detail as possible (consider this is a public report) and include enough detail to understand the work done and outcomes (e.g. milestones, deliverables, outputs) of all Work Packages (e.g. WP1, WPN) and associated tasks (e.g. WP1 – T1, WPN – TN...).

6. Conclusions and Future work and perspectives

500 words, 1 page (Calibri or Arial Font size 11, margins of minimum 2cm). Please provide conclusions based on the work achieved, and any future recommended work.

7. PhD project self-evaluation

500 words, 1 page (Calibri or Arial Font size 11, margins of minimum 2cm). Please comment to what extent the initial PhD project objectives as laid out in the proposal have been met. Any deviation from the original project proposal should be included and justified.

In the original proposal it states that the project aims to specifically examine the role wildlife play in the occurrence and transfer of AMR and its contribution to the global AMR problem. It states that some of the major shortcomings of studies focusing on AMR and wild birds, are that these are one-off studies, based on an opportunistic sampling-scheme from limited geographic areas and often limited number of samples. This PHD has addressed this aim and worked to fill these knowledge gaps by carrying out a longitudinal and a cross-sectional study that resulted in over 1000 isolates undergoing whole genome sequencing.

Pig and gull faecal samples were collected for the longitudinal study and 615 *E. coli* isolates underwent whole genome sequencing (pig=342, gull=273). The results of this study have shown that on this low antimicrobial usage pig farm there is clonal expansion of MDR bacteria, with bacterial clones present in both pig and gull isolates across multiple timepoints. This is indicative of repeated interspecies transmission events over time and suggests that wild birds are contributing to the persistence of MDR bacteria in the pig populations on farm. The results also indicate that this continues to happen even in the absence of the selective pressure of antimicrobials.

The cross-sectional study provides an in-depth look at the role of wild birds in the transmission of AMR bacteria on an outdoor pig farm with a more conventional approach to antimicrobial usage. This study resulted in 472 *E. coli* and non-*E. coli* isolates from pig, wild bird, and environmental swabs undergoing whole genome sequencing. The aim of this study was to investigate the role of the farm environment, as well as wild birds, as a reservoir of AMR bacteria. The study also considers the role of non-*E. coli* isolates in the transmission of AMR between pigs, wild birds, and the environment.

The original project proposal aimed to include *E. coli* isolates from wild birds in Sweden as a comparison of wider geographical areas. However, because of the COVID-19 pandemic the PhD student was unable to carry out the planned 6-month secondment to SVA laboratories to isolate bacteria collected from Swedish samples. There was also a change in the PhD supervisory team during the project as the supervisor based at SVA moved to a job role outside of the agency, so no longer had access to Swedish surveillance data. As a result of this samples were instead collected from farms from different geographical areas of the UK, and international isolates were included in some sections of WGS analysis from OHEJP partner institutes and online databases.

The student will continue to finish analysing the data produced by this project, keeping the original aims of the project in mind when writing their final PhD thesis.



8. Progress of the project: milestones and deliverables

The following list refers to the deliverables and milestones as mentioned in the successive project Annual Work Plans. This part of the report should demonstrate that the project has delivered all that was planned.

Please verify, correct if required, complete, and ensure that all deliverables are uploaded - both on the private project group of the One Health EJP website and on Zenodo.

Note that all deliverables should be public by default. If a deliverable should be temporarily confidential, the justification should be mentioned in the Document Management section in the deliverable template, and the Deliverable Confidentiality Statement Form should be completed and submitted, which provide details of when the deliverable can be made public. It is the responsibility of the PhD supervisor to keep the WP6 team informed of any delays to making these deliverables public. In exceptional circumstances where confidentiality is required indefinitely, this should be clearly justified.

If applicable, please assign an integrative category (1 to 8) to each of the deliverables, as this helps PMT to assess possible impacts the outcome may have.



Deliverables

Please fill the table belows. If a delay is due to the COVID-19 crisis, please add a comment. if there are no corrections required then no action is necessary.

| PhD reference | PhD Project deliverable number | Deliverable name (Original name, if different from the actual one) | Delivery date from AWP (month) | Date delivered (month) | Comments | Integrative categories* |
|---------------|--------------------------------|--|--------------------------------|------------------------|---|-------------------------|
| WILBR | 1 | Literature review of contribution of wild birds to AMR in the farm environment | M32 | M32 | <i>Confidential as will be included in the introduction of final PhD thesis</i> | |
| WILBR | 2 | Completion of 9 month review (Y1) | M33 | M33 | <i>10.5281/zenodo.7940500</i> | |
| WILBR | 3 | Completion of 9 month review (Y2) | M45 | M45 | <i>10.5281/zenodo.7940525</i> | |
| WILBR | 4 | Completion of 12 month review (Y2) | M48 | M48 | <i>10.5281/zenodo.7940562</i> | |
| WILBR | 5 | Completion of 9 month review (Y3) | M57 | M57 | <i>10.5281/zenodo.7940586</i> | |
| WILBR | 6 | Completion of 12 month review (Y3) | M60 | M60 | <i>10.5281/zenodo.7940596</i> | |

* Categories of Integrative activities : 1. Design and implementation of surveillance and control activities; 2. Harmonised protocols and applied best practice; 3. Databases of reference materials and data, incl. metadata; 4. Standardised data formats, aligned data analysis for interpretation of surveillance data; 5. Sharing and communication of surveillance data; 6. Sharing of best intervention activities); 7. Prevention: aligned use of facilities and models; 8. Other (please specify);

Milestones



| PhD reference | Milestone number | Milestone name | Delivery date from AWP | Actual delivery date | Achieved | Comments |
|---------------|------------------|---|--|--|------------|--|
| PhD Referenc | Milestone number | Milestone name | Mxx (M1 = Jan 2018, M60= Dec 2022) | Mxx (M1 = Jan 2018, M60= Dec 2022) | Yes/No | |
| WILBR | 1 | Completion of literature review | M32 | M32 | Yes | |
| WILBR | 2 | Recruitment of farm for longitudinal study | M33 | M30 | Yes | Due to severe delays to fieldwork caused by the COVID-19 pandemic, this had to be changed to a cross-sectional study |
| WILBR | 3 | Collection of microbiological samples for longitudinal study | M48 | M45 | Yes | |
| WILBR | 4 | Molecular analysis of bacterial isolates and antimicrobial resistance | M60 | M65 | No | |
| WILBR | 5 | Characterisation of mobile elements transmitting/proliferating AMR | M60 | M66 | No | |
| WILBR | 6 | Completion of 9 month review (Y1) | M33 | M33 | Yes | |
| WILBR | 7 | Completion of 9 month review (Y2) | M45 | M45 | Yes | |
| WILBR | 8 | Completion of 12 month review (Y2) | M48 | M48 | Yes | |
| WILBR | 9 | Completion of 9 month review (Y3) | M57 | M57 | Yes | |
| WILBR | 10 | Completion of 12 month review (Y3) | M60 | M60 | Yes | |



9. Interactions with JRPs/JIPs or with external (global, EU, national or regional) relevant projects or initiatives such as national action plans (AMR, Zoonoses etc.), national and international surveillance programmes.

Please describe any link (workshops, meetings, missions etc.) with a Joint Research Project or Joint Integrative Project.

I have attended workshops and participated in online networking sessions run by the GW4 AMR Alliance ([GW4 Antimicrobial Resistance Alliance \(gw4amr.com\)](http://gw4amr.com)). This is a One Health AMR research consortium at the universities of Bath, Bristol, Cardiff and Exeter which aims to tackle the global threat of antimicrobial resistance.

This PhD overlaps with the OHEJP ARDIG project, where wild birds on farm have already been sampled.

I have also received *E. coli* ST744 WGS data from OHEJP stakeholders involved in the OHEJP ARDIG project that has been included in my second results chapter. These stakeholders were: L'Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail (ANSES), Universidad Complutense de Madrid (UCM), University of Surrey (UOS), National Veterinary Institute (NVI), Public Health England (PHE), German Federal Institute for Risk Assessment (BfR), Institut Pasteur (CNR).

10. Interactions with OHEJP stakeholders

Please describe any link with any external (EU, national and international) relevant project (name + website), or with the One Health EJP [stakeholders](#).

My PhD has been co-funded by the Veterinary Medicines Directorate (VMD) which is an executive agency of the Department of Environment, Food and Rural Affairs (Defra) within the UK Government. VMD contributes to DEFRA's objectives to protect public health and meet high standards of animal welfare. Their work also helps the Food Standards Agency to protect and improve the safety of food people eat. I have submitted annual reports to VMD detailing the progress of my project as well as receiving approval on all external presentations of my research.

11. Added value and benefits during PhD resulting from being part of the OHEJP doctoral programme and consortium

Please describe here what you perceived as additional value as a result of your PhD being a part of the One Health EJP e.g. training, networking with other disciplines or countries and access to a wide range of expertise.

Being a part of the OHEJP doctoral training programme has granted me the opportunity to receive unique training opportunities in the form of the OHEJP Summer School (2020). On this course I was able to work with scientists from countries, institutions, and scientific backgrounds across the world that I would otherwise not have had the opportunity to interact with, broadening my horizons and way of thinking.

I have also been able to attend multiple international conferences, both in person and online, to present my work. This has allowed me to improve my scientific communication skills resulting in me winning prizes for 'Best poster presentation' and 'Best oral presentation by an early career researcher' at conferences. This has also given me the opportunity to network with my fellow OHEJP PhD Students and other scientists working within One Health.



Through OHEJP I have also been able to easily access WGS data from OHEJP partner institutes that were involved with OHEJP ARDIG project. As a result of this I could increase the size of my dataset and try to gain further insights into the potential origins of MDR *E. coli* isolates from the APHA ARDIG farm.

12. Transferrable skills and Training

Describe details of relevant transferrable skills, training courses or CPD training attended and undertaken by the PhD student throughout the PhD programme.

| Name of Training Event | Topic | Dates (DD/MM/YY) | Organising Institute |
|--|---|------------------|---------------------------------|
| Scientific Writing Skills Workshop | Development of skills in scientific writing | 04-05/02/2020 | Animal and Plant Health Agency |
| OHEJP Summer School | Global One Health | 17-28/08/2020 | Wageningen University |
| EURL-AR Training Course | Working with bacterial sequence data in relation to the monitoring and reporting of antimicrobial resistance in zoonotic and commensal bacteria | 26-29/04/2021 | Technical University of Denmark |
| Engaging in Professional Development | Workshop | 14/06/2022 | University of Exeter |
| Research and innovation to reduce the burden of antibiotic resistance: strengthening the European action | Conference | 07/06/2022 | UE France 2022 |
| GW4 AMR Alliance Early Career Pathways | Webinar | 19/05/2022 | GW4 AMR Alliance |
| GW4 AMR Alliance Lightning Talk and Networking Session | Online networking session | 28/02/2022 | GW4 AMR Alliance |

13. Ethical Reviews

Please fill the table below. If there are no corrections required, then no action is necessary.

| Comments of Ethics Advisors, January 2020 | Comments PhD Project Supervisor, mid-2020 | Comments of Ethics Advisors, October 2020 |
|--|--|---|
| The beneficiary must confirm that appropriate health and | The student will receive extensive training in | No further comments |



| | | |
|--|---|-----------------------------------|
| <p>safety procedures conforming to relevant local/national guidelines/legislation are followed for staff involved in this project.</p> | <p>microbiological procedures that will be carried out, and is required to read and work to the standards stipulated within APHA risk assessments when going on farm surveys and carrying out microbiological testing. Farm surveys will be undertaken alongside other scientists/vets.</p> | |
| <p>Please comment on any implications for the animal. Please state the 3Rs aspects of this work. Please describe how the animals' welfare are protected and considered</p> | <p>Faecal samples will be collected directly from the ground and farm environment; therefore no direct animal handling is required and is outside of the Animal (Scientific Procedures) Act 1986. Animal welfare on farm is covered by the animal welfare act 2006, and additional controls are required by other farm assurance schemes, which pig farms also adhere to.</p> | <p>No further comments</p> |

14. Scientific Publications



| Publication date | Publication title | Authors | DOI reference | Zenodo reference | Is OHEJP acknowledged? | Is it a Green Open Access? *please specify embargo length | Is it a Gold Open Access? |
|------------------|---|---|-------------------------------|-------------------------------|------------------------|--|---------------------------|
| 01/2/2022 | Detection of the transferable tigecycline resistance gene tet(X4) in Escherichia coli from pigs in the United Kingdom | Francesca Martelli, Manal AbuOun, Shaun Cawthraw, Nathaniel Storey, <u>Olivia Turner</u> , Matthew Ellington, Satheesh Nair, Anais Painset, Christopher Teale, Muna F Anjum | DOI: 10.1093/jac/dkab439 | 10.1093/jac/dkab439 | Yes | No | Yes |
| 8/3/2022 | Use of genomics to explore AMR persistence in an outdoor pig farm with low antimicrobial usage | Nathaniel Storey, Shaun Cawthraw, <u>Olivia Turner</u> , Margherita Rambaldi, Fabrizio Lemma, Robert | DOI: 10.1099/mgen.0.000782 | DOI: 10.1099/mgen.0.000782 | Yes | No | Yes |



| | | | | | | | |
|--|--|---|--|--|--|--|--|
| | | Horton, Luke Randall, Nicholas A Duggett, Manal AbuOun, Francesca Martelli, Muna F Anjum | | | | | |
|--|--|---|--|--|--|--|--|



15. Additional Outputs

Other relevant dissemination outcomes can be highlighted here, e.g. non-scientific publications, proceedings, poster, video, tools, guidelines, patents, etc. If the outcome is a deliverable it should not be mentioned here.

Please indicate where the item can be found, for instance on Zenodo or any open access repository. Please indicate the link and check the functionality.

The student has won a prize for 'Best poster presentation' at OHEJP ASM 2021 (online), and a prize for 'Best oral presentation by an early career researcher' at OHEJP ASM 2022 (Italy).

16. Specific outcomes to highlight in dissemination and communications

In this paragraph you have the possibility to draw the attention to remarkable achievements that could be highlighted to illustrate the potential impact of your project.

Outcomes (deliverable, publication, folder, tool, etc.) of the project that might be suited for communication purposes to various audiences, for instance food safety or AMR scientists, national and international stakeholders, specific professionals, the general public, etc.

Are there any outcomes of this project that are already discussed or even implemented and in use at any institute of the project consortium, at stakeholders' organisations (ECDC, EFSA, EMA, EEA, FAO, OIE, WHO), or at the level of national authorities?

Some of the outcomes of the project may already be in use or planned to be implemented in one or more partner institutes, or in external organisation (including stakeholders' organisations), or at the level of national authorities. Please describe.

17. One Health impact

About 500 words, 1 page – *This part is extremely important, also for the One Health EJP stakeholders. Please, describe the impact of the PhD project, reflecting at least the following aspects:*

- *Specify any direct or indirect impact the outcome of your project may have for international stakeholders active in the domains of foodborne zoonoses, AMR and/or emerging threats (ECDC, EFSA, FAO, WOH WHO-EU; EU reference laboratories, etc.) e.g. suggested improvements of existing /planned surveillance programmes, new relevant databases for risk assessment updates, improved methodologies for risk assessment and management, etc.*
- *Please describe how regional or national authorities and stakeholders may implement and/or integrate any of the results from the project in their work. Which contacts, if any, have been taken between your consortium and authorities or stakeholders that may lead to such a knowledge transfer? Please describe.*
- *Has this project helped you building and strengthening the networking with other partners of the One Health EJP and beyond? Please describe shortly and give some examples.*

The results of this project have indicated that wild birds can play a role in the transmission and persistence of AMR bacteria in the farm environment. The results suggest that there can be repeated horizontal transmission events between pigs and gulls, but also vertical transmission of AMR bacteria within epidemiological groups on a farm. This data could help inform national and European



surveillance networks, in the value of including samples from wild bird species. Results of this study could be further disseminated by the supervisory team as they are involved in two JPIAMR surveillance networks (Towards Developing an International Environmental AMR Surveillance Strategy; Wildlife, Agricultural soils, Water environments and antimicrobial resistance - what is known, needed and feasible for global Environmental Surveillance). Expanding existing surveillance networks to include samples from wild birds could help uncover more of these transmission events and assist in mitigating against the worst of them to prevent entry into the food chain.

The results of this project also have implications for biosecurity. Stakeholders can make recommendations to farmers on how to improve their biosecurity measures on farm to reduce close contact between wild birds and food producing animals and therefore transmission events of AMR bacteria. Wild birds are known to be opportunistic feeders so an example of this could be to use covered feeders instead of open troughs on outdoor farms so that it is more difficult for wild birds to access.

This PhD project has been co-funded by the VMD who are involved in the development of UK government policy as a devolved agency of the Department for Environment, Food and Rural Affairs. There have been multiple knowledge transfer events between the PHD student and the co-funding body over the last three years. VMD has received annual reports from the PhD student and been happy with the progress made during their studies, they have also approved all posters and presentations prior to them being taken to workshops and conferences. This was one of the first studies carried out at APHA investigating the role of wild birds in the transmission of AMR bacteria, but there are now further projects being funded within the agency to study this and it is being incorporated into national surveillance schemes.

The student has presented their work at multiple UK-based and international conferences where international stakeholders were in attendance, increasing the reach of the research and exposure to policymakers and stakeholders.

This project has reinforced links with OHEJP ARDIG project partner institutes as the student utilised samples that were originally collected as part of the APHA's work on this project. The student contacted partner institutes to ask if they would share WGS data of *E. coli* ST744 isolates they had collected as part of their involvement in the project. The student received 56 isolates from seven partner institutes which included isolates from humans, wild birds, poultry, cows, and pigs.



18. List of dissemination and communication activities

Please fill in one table per event you attended/organised during the entire life span of the project. Please make sure they are registered online on the OneHealth EJP webpage:

<https://surveys.sciensano.be/index.php/754325?lang=en>

If relevant (for instance flyer, video, etc.) please include hyperlink.

| | | | |
|---|----------------------------|--|----------|
| Name of the activity: | Animal Microbiome Workshop | | |
| Date: | 28/02/2020 | | |
| Place: | University of Surrey | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | | <i>Participation to a Conference</i> | |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | Yes |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education, Research)</i> | 27 | <i>Media</i> | |
| <i>Industry</i> | 1 | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |



| | | | |
|---|--|---|----------|
| Name of the activity: | One Health EJP AGM 2020 | | |
| Date: | 27-29/04/2020 | | |
| Place: | Online | | |
| 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) | all who attended the online conference | Media | |
| Industry | | Investors | |
| Civil Society | | Customers | |
| General Public | | Other | |
| Policy Makers | | | |



| | | | |
|---|---|--|----------|
| Name of the activity: | One Health EJP Summer School | | |
| Date: | 17-28/08/2020 | | |
| Place: | Online | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | <i>all who attended the online conference</i> | <i>Participation to a Conference</i> | |
| <i>Organisation of a Workshop</i> | <i>30</i> | <i>Participation to a Workshop</i> | |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | Yes |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education, Research)</i> | | <i>Media</i> | |
| <i>Industry</i> | | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |



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|---|---|--|----------|
| Name of the activity: | One Health EJP FULL FORCE Plasmid Analysis Workshop | | |
| Date: | 07-08/09/2020 | | |
| Place: | Online | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | | <i>Participation to a Conference</i> | |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | Yes |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education, Research)</i> | | <i>Media</i> | |
| <i>Industry</i> | | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |



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|---|---|--|----------|
| Name of the activity: | University of Birmingham Virtual Plasmid Workshop | | |
| Date: | 08/09/2020 and 22/09/2020 | | |
| Place: | Online | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | | <i>Participation to a Conference</i> | |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | Yes |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education, Research)</i> | | <i>Media</i> | |
| <i>Industry</i> | | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |



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|---|---|---|----------|
| Name of the activity: | Resistomap Webinar : Antibiotic Resistance in the Environment | | |
| Date: | 24/11/2020 | | |
| Place: | Online | | |
| 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) | | Media | |
| Industry | | Investors | |
| Civil Society | | Customers | |
| General Public | | Other | |
| Policy Makers | | | |



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|--|--------------------------------|---|----------|
| Name of the activity: | ISPB Plasmids Around the Globe | | |
| Date: | 06/05/2021 | | |
| Place: | Online | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | | <i>Participation to a Conference</i> | |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | Yes |
| <i>Press release</i> | | <i>Participation to an Event other than a</i> | |
| <i>Non-scientific and non-peer-reviewed</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education,</i> | 60 | <i>Media</i> | |
| <i>Industry</i> | | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |



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|---|--------------------------------|--|----------|
| Name of the activity: | ISPB Plasmids Around the Globe | | |
| Date: | 25/05/2021 | | |
| Place: | Online | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | | <i>Participation to a Conference</i> | |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | Yes |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education, Research)</i> | 60 | <i>Media</i> | |
| <i>Industry</i> | | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |



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|---|---|--|----------|
| Name of the activity: | OHEJP ASM 2021 (poster and 3MT competition) | | |
| Date: | 09-11/06/2021 | | |
| Place: | Online | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | | <i>Participation to a Conference</i> | Yes |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | Yes |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education, Research)</i> | 550+ | <i>Media</i> | |
| <i>Industry</i> | | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |



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|---|--|--|----------|
| Name of the activity: | GW4 AMR Lightning Talk and Networking Event – Networking session with other early career researchers from GW4 institutes | | |
| Date: | 28/02/2022 | | |
| Place: | Online | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | | <i>Participation to a Conference</i> | |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | Yes |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education, Research)</i> | 30 | <i>Media</i> | |
| <i>Industry</i> | | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |



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|---|---|--|-----------------|
| Name of the activity: | <i>Careers in Animal Health University Event – Presentation on PhD project and academic journey</i> | | |
| Date: | <i>23/03/2022</i> | | |
| Place: | <i>Online</i> | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | <i>Yes / No</i> | | <i>Yes / No</i> |
| <i>Organisation of a Conference</i> | | <i>Participation to a Conference</i> | |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | Yes |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | <i>Number</i> | | <i>Number</i> |
| <i>Scientific Community (Higher Education, Research)</i> | 6 | <i>Media</i> | |
| <i>Industry</i> | | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | 40 |
| <i>Policy Makers</i> | | | |



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|---|---|--|----------|
| Name of the activity: | One Health EJP AGM 2022 - 3 minute thesis, oral presentation and participation at roundtable discussion | | |
| Date: | 11-13/04/2022 | | |
| Place: | Orvieto, Italy (attended in person) | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | | <i>Participation to a Conference</i> | Yes |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education, Research)</i> | ? | <i>Media</i> | |
| <i>Industry</i> | ? | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |



| | | | |
|---|--|--|----------|
| Name of the activity: | GW4 AMR Lightning Talk and Networking Event – 3 minute presentation on PhD project and networking sessions | | |
| Date: | 27/04/2022 | | |
| Place: | Online | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | | <i>Participation to a Conference</i> | |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | Yes |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education, Research)</i> | 30 | <i>Media</i> | |
| <i>Industry</i> | | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |



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|---|--|--|-----------------|
| Name of the activity: | <i>Academic Board Student Networking Conference – Helped to organise and co-chaired the second day</i> | | |
| Date: | <i>23-24/06/2022</i> | | |
| Place: | <i>Online</i> | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | <i>Yes</i> | <i>Participation to a Conference</i> | |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education, Research)</i> | <i>TBC</i> | <i>Media</i> | |
| <i>Industry</i> | | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |



| | | | |
|---|--|--|----------|
| Name of the activity: | Exeter University College of Medicine and Health Post Graduate Research Conference – Oral presentation | | |
| Date: | 28-29/06/2022 | | |
| Place: | University of Exeter, Penryn Campus (attended in person) | | |
| Specify the Dissemination and Communication activities linked to the One Health EJP project for each of the following categories | | | |
| | Yes / No | | Yes / No |
| <i>Organisation of a Conference</i> | | <i>Participation to a Conference</i> | Yes |
| <i>Organisation of a Workshop</i> | | <i>Participation to a Workshop</i> | |
| <i>Press release</i> | | <i>Participation to an Event other than a Conference or a Workshop</i> | |
| <i>Non-scientific and non-peer-reviewed publication (popularised publication)</i> | | <i>Video/Film</i> | |
| <i>Exhibition</i> | | <i>Brokerage Event</i> | |
| <i>Flyer</i> | | <i>Pitch Event</i> | |
| <i>Training</i> | | <i>Trade Fair</i> | |
| <i>Social Media</i> | | <i>Participation in activities organized jointly with other H2020 projects</i> | |
| <i>Website</i> | | <i>Other</i> | |
| <i>Communication Campaign (e.g. Radio, TV)</i> | | | |
| Specify the estimated number of persons reached, in the context of this dissemination and communication activity), in each of the following categories | | | |
| | Number | | Number |
| <i>Scientific Community (Higher Education, Research)</i> | TBC | <i>Media</i> | |
| <i>Industry</i> | | <i>Investors</i> | |
| <i>Civil Society</i> | | <i>Customers</i> | |
| <i>General Public</i> | | <i>Other</i> | |
| <i>Policy Makers</i> | | | |