OH-EpiCap user guide:
Evaluation tool for One Health (OH) epidemiological surveillance capacities and capabilities

The purpose of the OH-EpiCap tool is to develop system-specific profiles of (potential) surveillance interoperability between sectors, highlighting both strengths and gaps in surveillance capacity and capabilities. The OH-EpiCap tool facilitates characterizing, evaluating, and improvement of 'One Health-ness' using a set of standardized indicators, to allow comparison across systems, countries, and hazards of interest.

Feedback on the tool is welcome, you can e-mail this to Dr. Joaquin Prada (j.prada@surrey.ac.uk) and Dr. Viviane Hénaux (Viviane.henaux@anses.fr)

The OH-EpiCap tool has been developed by the MATRIX consortium, an integrative project funded by the One Health European Joint Programme. The MATRIX consortium aims to advance the implementation of One Health surveillance in practice by building onto existing resources, adding value to them, and creating synergies among the health sectors at the national level.

One Health (OH) surveillance is a collaborative and systematic collection, validation, analysis, interpretation of data, and dissemination of information collected on humans, animals, and the environment by actors from different sectors to inform decisions for more effective evidence- and system-based health interventions (Stärk et al. 2015).

The purpose of the OH-EpiCap tool is to develop system-specific profiles of existing surveillance interoperability between sectors, highlighting both strength and gaps in surveillance capacity and capabilities. The OH-EpiCap tool facilitates evaluation and improvement of 'One Health-ness' using a set of standardized indicators, to allow comparison across systems, countries and hazards of interest.

This kind of evaluation is relevant to any level of multi-sectoral initiative, where collaborations exist between institutes or disciplines across sectors. The tool is generic and can be applied to any surveillance system, focusing on foodborne, emerging, vector-borne, or environmental hazards.

This tool is stand-alone thanks to a web application (temporary link: https://carlijnbogaardt.shinyapps.io/OH-EpiCap/) that includes the following features:

- Evaluation of 'One Health-ness' across three dimensions
- Interactive visualization of results
- Benchmarking option to compare to other OH surveillance systems

The evaluation is conducted through the completion of a questionnaire, provided via the application. The questionnaire should be completed by a panel of representatives from the different sectors across the entire surveillance chain, during a workshop. To facilitate the

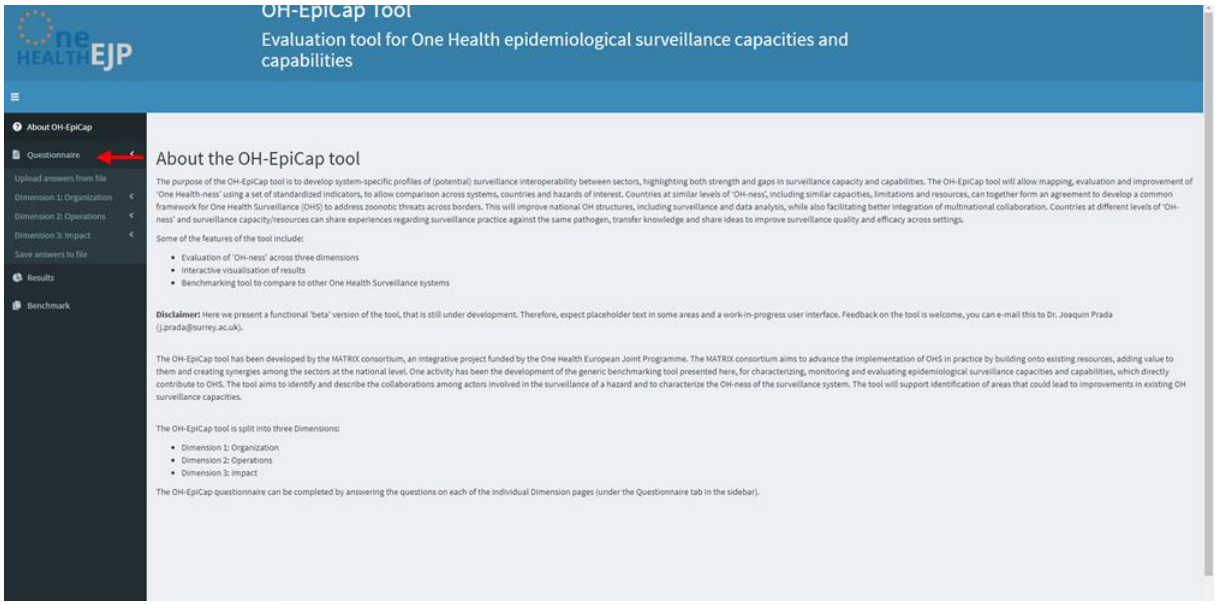
discussion, we recommend a panel with 8-10 participants from different disciplines and surveillance programs. A 4-hour time slot is recommended for the workshop.

HOW TO USE THE WEB APPLICATION

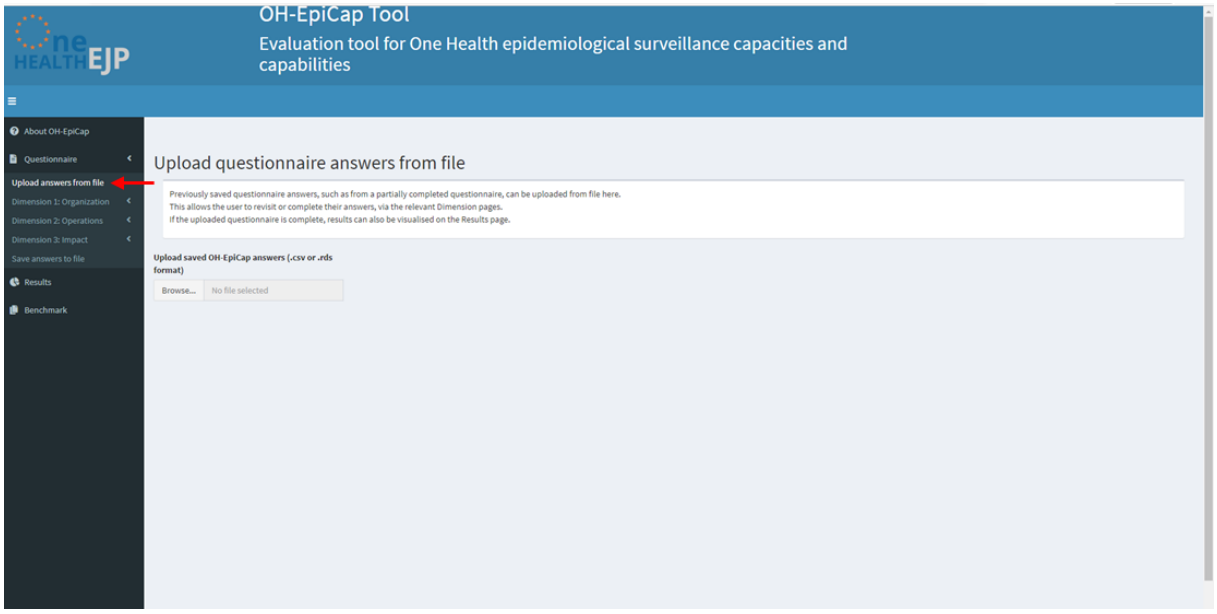
The OH-EpiCap online application enables you to complete your evaluation interactively, to upload the results from OH-EpiCap assessments completed previously, and to benchmark results of an evaluation with other OH surveillance systems.

GETTING STARTED

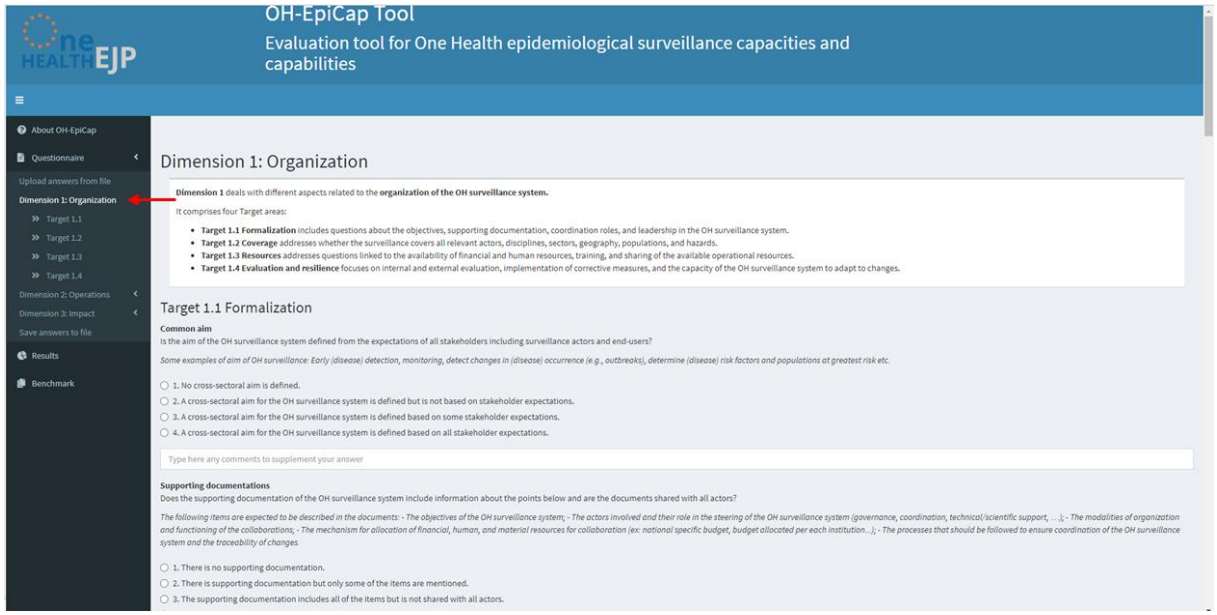
- Click on the link https://carlijnbogaardt.shinyapps.io/OH-EpiCap/ to open the OH-EpiCap tool in your browser. **Please note that this version of the OH-EpiCap tool is a beta version that times-out after 30 min of inactivity. To avoid data loss, you must save your data regularly using the "Save answers to file" option (as explained below).**
- To start filling out the questionnaire go to the sidebar on the left and click "Questionnaire". You will see a drop-down menu that enables you to upload a previously completed questionnaire, answer the questions for each of the three dimensions, and finally save your answers.



- If you would like to upload answers from a previously saved questionnaire, click on "Upload answers from file".
- Click on "browse" to upload locally saved OH-EpiCap answers (.csv or .rds format)
  This allows you to revisit or complete the answers. If the uploaded questionnaire is complete, results can also be visualized on the Results page.

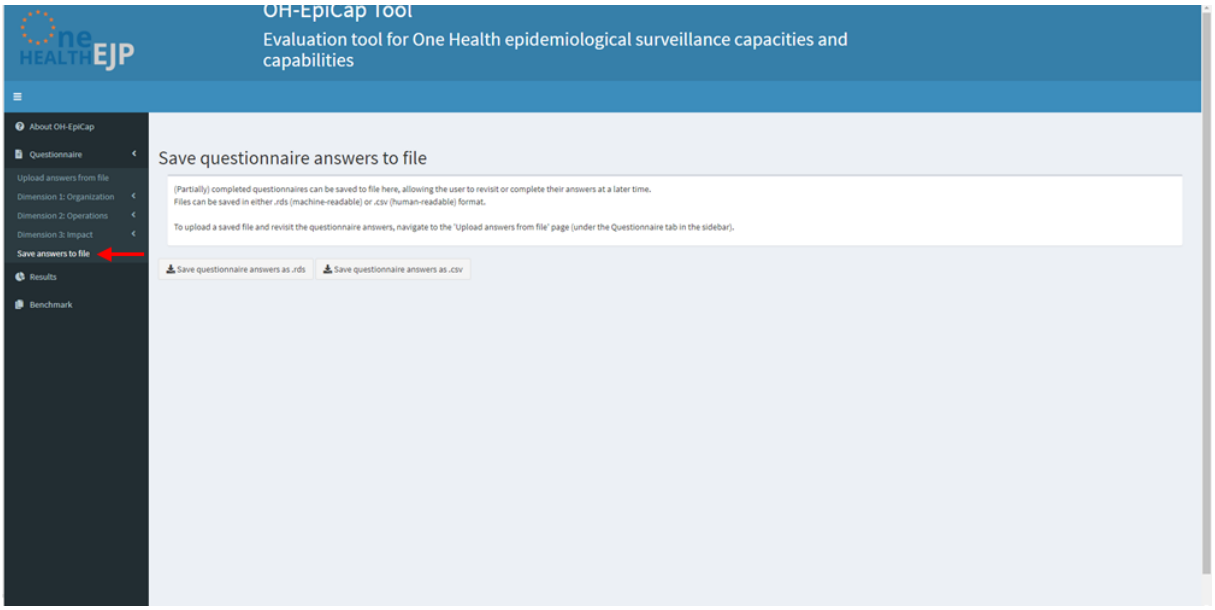


- If you don't have previously saved questionnaire answers and you would like to fill out the questionnaire, instead of clicking on "Upload answers from file" go directly to the dimension pages.
- Click on "Dimension 1" on the sidebar and you will see a drop-down menu with four targets under the dimension.
- Answer the questions for the first dimension by clicking the possible answer and (if you wish) write a comment in the comment space under each question.
- After you have finished answering the first dimension, or if you wish to go to another dimension, go back to the top-left dropdown menu and click on the dimension you wish to access.



- After completing all of the dimensions, or if you wish to continue this work at another time, go back to the top-left dropdown menu and click "Save answer to files".

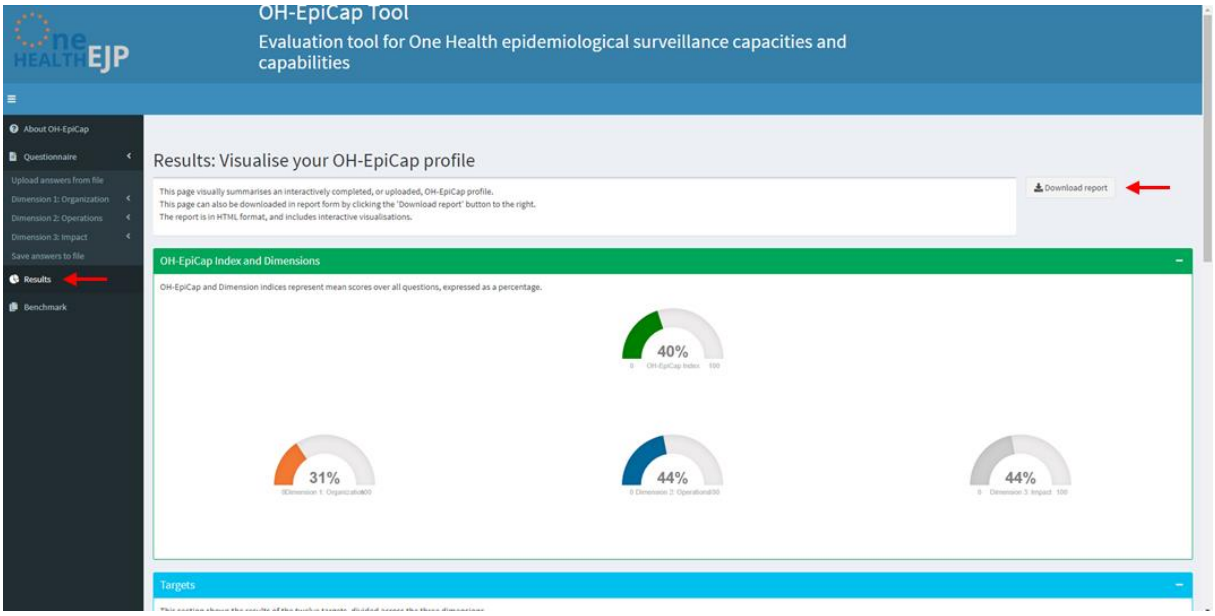
- Download the saved file and store it locally in your drive.



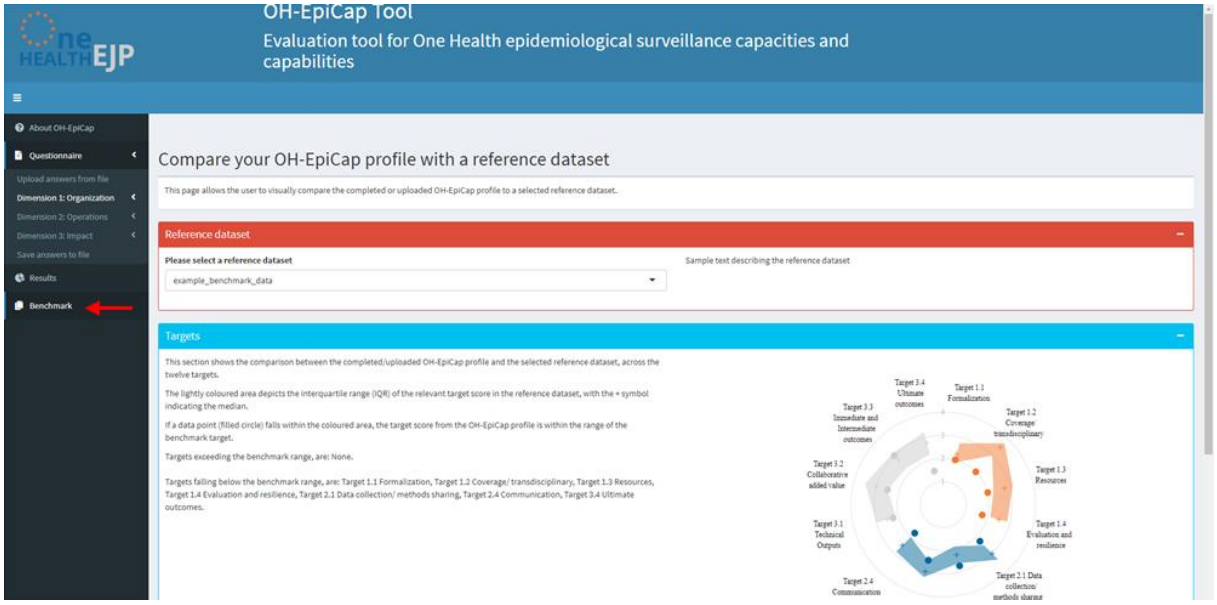
Note that the tool does not save your work automatically so make sure you have saved your work locally before closing the window.
Partially completed questionnaires can be saved in either .rds (machine-readable) or .csv (human-readable) format, allowing you to revisit or complete your answers at a later time.

RESULTS VISUALISATION

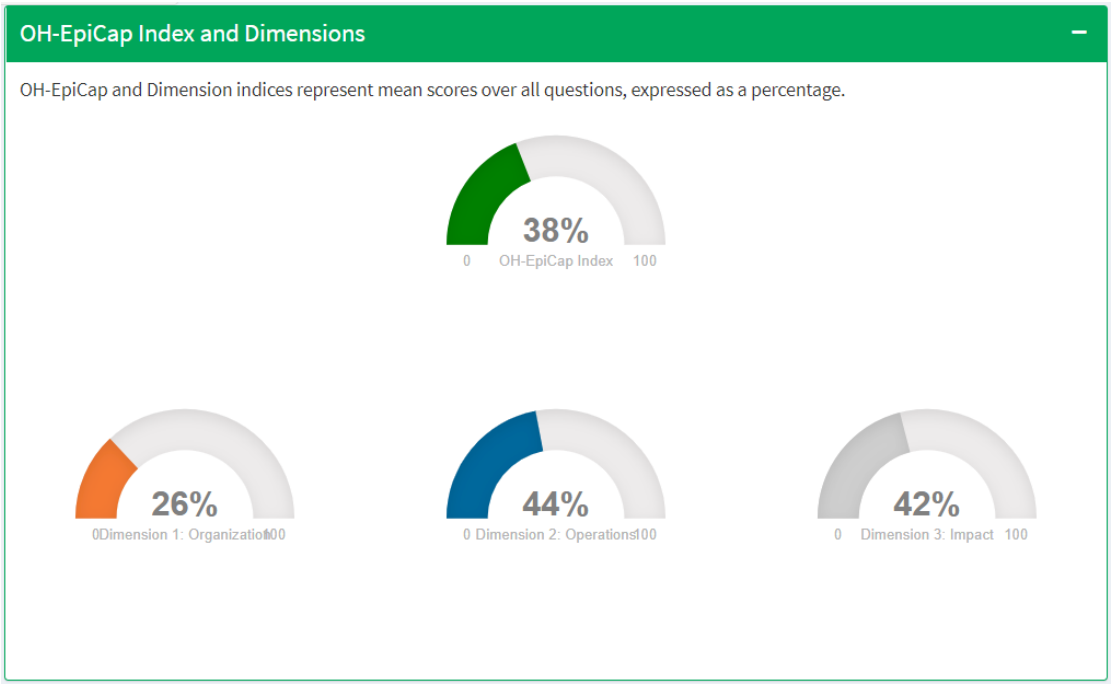
- The "Results" tab in the sidebar enables you to visualize an interactively completed or uploaded OH-EpiCap profile.
- You can download your report by clicking on the "Download report" button to the right. The report is in HTML format and includes interactive visualizations.



- If you wish to compare your OH-EpiCap profile with a reference dataset, click on the "Benchmark" tab in the sidebar. This page allows you to visually compare the completed or uploaded OH-EpiCap profile to a selected reference dataset.

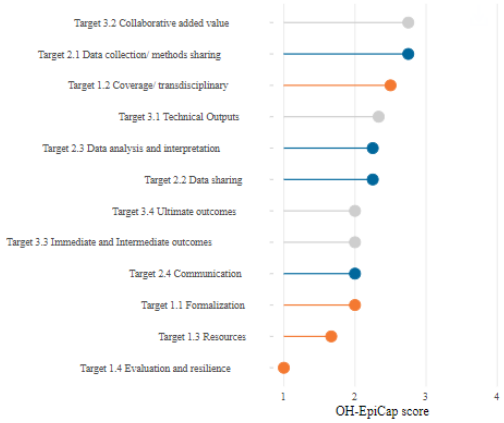


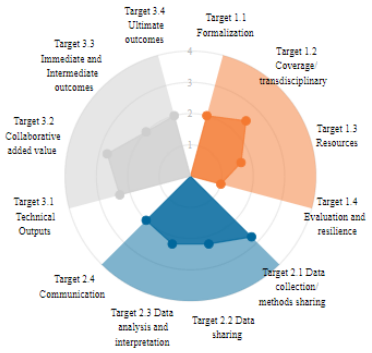
EXAMPLE OF RESULTS: OH-EPICAP PROFILE



Targets

This section shows the results of the twelve targets, divided across the three dimensions.
Scores range 1-4, with higher values suggesting better adherence to the One Health principle (better integration of sectors), and lower values suggesting improvements may be beneficial.
Users are encouraged to hover over data points to view a breakdown of each target score.





Targets demonstrating **good adherence** to One Health principles are: **None**.
Targets that would **most benefit from improvement** are: **Target 1.3 Resources, Target 1.4 Evaluation and resilience**.

Dimension 1: Organization

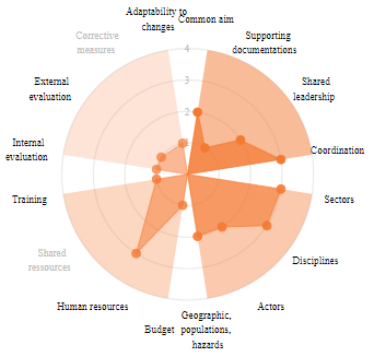
This section shows the results across all indicators within the four targets of Dimension 1 (Organization).

Scores range 1-4, with higher values suggesting better adherence to the One Health principle (better integration of sectors), and lower values suggesting improvements may be beneficial.

Indicators labelled in grey indicate a question was answered with NA. Users are encouraged to hover over plotted data points to view the wording of the chosen indicator level, and any comments that may have been added in connection with a particular question.

Indicators demonstrating **good adherence** to One Health principles are: **None**.

Indicators that would **most benefit from improvement** are: **Supporting documentations, Budget, Training, Internal evaluation, External evaluation, Adaptability to changes**.



Dimension 2: Operations

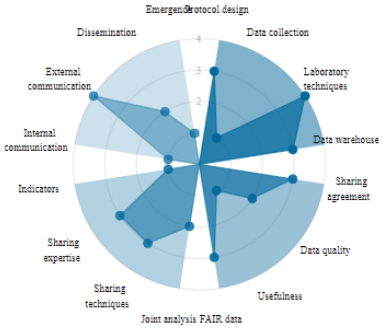
This section shows the results across all indicators within the four targets of Dimension 2 (Operations).

Scores range 1-4, with higher values suggesting better adherence to the One Health principle (better integration of sectors), and lower values suggesting improvements may be beneficial.

Indicators labelled in grey indicate a question was answered with NA. Users are encouraged to hover over plotted data points to view the wording of the chosen indicator level, and any comments that may have been added in connection with a particular question.

Indicators demonstrating **good adherence** to One Health principles are: **Laboratory techniques, External communication**.

Indicators that would **most benefit from improvement** are: **Data collection, Usefulness, Indicators, Internal communication, Emergence**.



Dimension 3: Impact

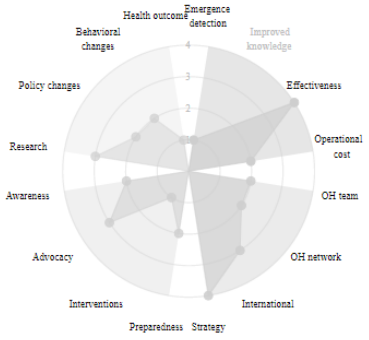
This section shows the results across all indicators within the four targets of Dimension 3 (Impact).

Scores range 1-4, with higher values suggesting better adherence to the One Health principle (better integration of sectors), and lower values suggesting improvements may be beneficial.

Indicators labelled in grey indicate a question was answered with NA. Users are encouraged to hover over plotted data points to view the wording of the chosen indicator level, and any comments that may have been added in connection with a particular question.

Indicators demonstrating **good adherence** to One Health principles are: **Effectiveness, Strategy**.

Indicators that would **most benefit from improvement** are: **Emergence detection, Interventions, Health outcome**.



EXAMPLE OF RESULTS: COMPARE YOUR OH-EPICAP PROFILE WITH A REFERENCE DATASET

Targets

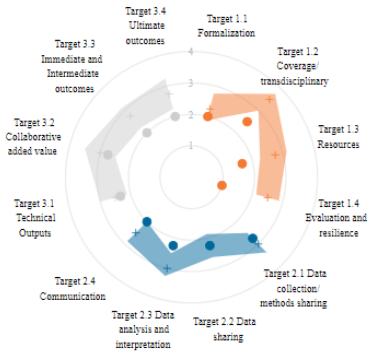
This section shows the comparison between the completed/uploaded OH-EpiCap profile and the selected reference dataset, across the twelve targets.

The lightly coloured area depicts the interquartile range (IQR) of the relevant target score in the reference dataset, with the + symbol indicating the median.

If a data point (filled circle) falls within the coloured area, the target score from the OH-EpiCap profile is within the range of the benchmark target.

Targets exceeding the benchmark range, are: None.

Targets falling below the benchmark range, are: Target 1.1 Formalization, Target 1.3 Resources, Target 1.4 Evaluation and resilience, Target 2.4 Communication, Target 3.3 Immediate and Intermediate outcomes, Target 3.4 Ultimate outcomes.



SCORING GUIDE

General comments

- In each question, scores range 1-4, with higher values suggesting better adherence to the One Health principle (better integration of sectors), and lower values suggesting improvements may be beneficial. **It is possible that the answers proposed for a question do not fit the OH surveillance system under evaluation; in this case, the panel of surveillance representatives should define what would be the ideal situation regarding this question for the OH surveillance system under evaluation and score the question accordingly by comparing the current situation to the ideal one.** We recommend the panel to indicate in the comment space under the question which alternative answer(s) they considered.
- The value "Not Applicable (NA)" can be used if the indicator is not relevant to the OH surveillance system under evaluation.

DIMENSION 1: ORGANIZATION

Target 1.1 Formalization

Common aim

Is the aim of the OH surveillance system defined from the expectations of all stakeholders including surveillance actors and end-users?

Some examples of aim of OH surveillance: Early (disease) detection, monitoring, detect changes in (disease) occurrence (e.g., outbreaks), determine (disease) risk factors and populations at greatest risk etc.

Possible answers:

NA.

1. No cross-sectoral aim is defined.
2. A cross-sectoral aim for the OH surveillance system is defined but is not based on stakeholder expectations.
3. A cross-sectoral aim for the OH surveillance system is defined based on some stakeholder expectations.
4. A cross-sectoral aim for the OH surveillance system is defined based on all stakeholder expectations.

Support documentations

Does the supporting documentation of the OH surveillance system includes information about the points below and are the documents shared with all actors?

The following items are expected to be described in the documents:

- *The objectives of the OH surveillance system;*
- *The actors involved and their role in the steering of the OH surveillance system (governance, coordination, technical/scientific support, …);*

- *The modalities of organization and functioning of the collaborations;*
- *The mechanism for allocation of financial, human, and material resources for collaboration (ex: national specific budget, budget allocated per each institution...);*
- *The processes that should be followed to ensure coordination of the OH surveillance system and the traceability of changes.*

Possible answers:

NA.

1. There is no supporting documentation.
2. There is supporting documentation but only some of the items are mentioned.
3. The supporting documentation includes all of the items but is not shared with all actors.
4. The supporting documentation includes all items and is shared with all actors.

Shared leadership

Is the leadership of the OH surveillance system fully operational with a steering committee shared among all sectors?

The steering committee provides support, guidance and strategic oversight. Steering Committee: is a composed of representatives from all sectors involved in the OH surveillance and responsible for the overall coordination and oversight the surveillance including establishing strategies, prioritizing, funding allocations and mobilizing resources. The members of these committees should have appropriate expertise, clearly defined roles and responsibilities. The committee should hold meetings regularly to oversee the function of the system.

Possible answers:

NA.

1. The steering committee is not operational and leadership is not shared between sectors.
2. The steering committee is operational but leadership rests only on one sector.
3. Leadership is shared between various sectors but the steering committee is not fully operational.
4. Leadership is shared between all sectors, and the steering committee fully operational.

Coordination

Are the coordination committees (at central, intermediate and field levels) fully operational, with their roles and composition clearly defined (based on the following items) and shared between sectors?

All the points listed below should be met at all surveillance levels (central, intermediate, and field levels):

- *The mandates of the coordination committee are defined at all levels;*
- *The coordination is shared between sectors;*
- *The coordination is shared between disciplines;*
- *The human resources from each actor and sector involved in the OH surveillance system are identified;*

- *The roles and responsibilities of each actor are defined;*
- *The financial and material resources allocated are identified;*
- *The modalities of organization and functioning of the coordination committee are defined;*
- *The coordination committee is operational and effective (e.g. meetings at a regular frequency, information sharing, participation rate, production of clear guidance for collaboration, etc.).*

Possible answers:

NA.

1. The modalities of coordination are not defined.
2. The modalities of coordination are well defined (include most items) but the coordination is not shared between sectors.
3. The modalities of coordination are well defined (include most items) and the coordination is shared between sectors at most levels of surveillance but is not fully operational.
4. The modalities of coordination are well defined (include most items) and the coordination is shared between sectors at all levels of surveillance and is fully operational.

Target 1.2 Coverage/ transdisciplinary

Sectors

Are all the relevant sectors to the hazard under surveillance included in the OH surveillance system?

Non-exhaustive list of potential relevant sectors: human, animal, environment, food, etc.

Possible answers:

NA.

1. Only one sector is included.
2. Few (i.e. less than half) of the relevant sectors are included.
3. Most (i.e. more than half) relevant sectors are included.
4. All relevant sectors are included.

Disciplines

Are the disciplines relevant to the hazard under surveillance identified and included in the OH surveillance system?

Disciplines to be considered depends on the OH system under study and may evolve over time. Potential disciplines include human medicine, veterinary medicine, clinical laboratory science, public health, animal health, environmental health, food safety, epidemiology, animal production, microbiology, immunology, biology, biostatistics (including geographic mapping), bioinformatics, economics, social sciences, etc. This list is not exhaustive.

Possible answers:

NA.

1. Disciplines relevant to the hazard under surveillance are neither identified nor included in the OH surveillance system.

2. Few (i.e. less than half) disciplines relevant to the hazard under surveillance are included in the OH surveillance system.
3. Most (i.e. more than half) relevant disciplines to the hazard under surveillance are included in the OH surveillance system.
4. All disciplines relevant to the hazard under surveillance are included in the OH surveillance system, with effective collaborations among most disciplines and shared transdisciplinary expertise.

Actors

Are all types of actors relevant to the hazard under surveillance identified and included in the OH surveillance system?

Potential actors include private firms, academia, research institutes, regulatory bodies, the general public, etc.

Possible answers:

NA.

1. Types of actors relevant to the hazard under surveillance are neither identified nor included in the OH surveillance system.
2. Only few (i.e. less than half) types of actors relevant to the hazard under surveillance are included.
3. Most (i.e. more than half) types of actors relevant to the hazard under surveillance are included.
4. All types of actors that are relevant to the hazard under surveillance are included.

Geographic, population and hazards

Does the coverage of the OH surveillance system encompass all of the following points?

A) All geographic areas relevant to the hazard under surveillance;

B) The entire human population (including people who might otherwise be excluded or marginalized), the animal populations relevant to the hazard (including livestock/animal production, domestic/pet animals, semi-ranging animals, and wildlife) and the environment;

C) Surveillance systems of hazards of the same category (antimicrobial resistance and antimicrobial use; mosquito-borne diseases; abortive cattle diseases, etc.).

Possible answers:

NA.

1. There is no coverage of those points.
2. There is a total or almost total coverage for either point A (regarding geographic areas), point B, (regarding populations) or points C (regarding hazards of the same category).
3. There is a total or almost total coverage for points A (regarding geographic areas) and B (regarding populations) or points A and C (regarding hazards of the same category) or for points B (regarding populations) and C (regarding hazards of the same category).
4. There is a total coverage for all points (A, B, C).

<u>Target 1.3 Resources</u>

Budget

Is a sufficient and sustainable budget allocated for the steering and operational activities of the OH surveillance system?

Possible answers:

NA.

1. There is no budget allocated.
2. A budget is allocated but is neither sufficient nor sustainable.
3. The budget allocated is either sustainable or sufficient.
4. A sufficient and sustainable budget is allocated.

Human resources

Are sufficient and sustainable human resources (i.e. personnel and time) assigned to the OH surveillance system?

Possible answers:

NA.

1. Human resources (personnel and time) are neither identified nor assigned to the OH surveillance activities.
2. Human resources (personnel and time) are assigned but are not sufficient and not sustainable.
3. Either sufficient or sustainable human resources (personnel and time) are assigned.
4. Sufficient and sustainable human resources (personnel or time) are assigned.

Shared resources

Are resources shared in the OH surveillance system?

Potential resources include relevant materials (ex. raw data), equipment (ex. software, analysis tools, etc.), etc.

Possible answers:

NA.

1. There is no resource shared within or between sectors.
2. Resources are shared within sectors only.
3. Some specific resources are shared (within and) between sectors, but more resources could be shared.
4. Most or all resources are shared within and between sectors.

Training

Is the training (including soft skills training) in OH approaches sufficient (in terms of the number of persons trained and frequency/continuity of organization) and appropriate (in terms of items/thematic proposed)?

Possible answers:

NA.

1. No training is given.
2. Training is given but is not appropriate.
3. Appropriate training is given but is not sufficient.
4. Appropriate and sufficient training is given.

Target 1.4 Evaluation and resilience

Internal evaluation

Are effective internal evaluations of the functioning of the OH surveillance system conducted (regularly)?

It is expected that a system of indicators was developed and validated by the steering committee. The indicators are exhaustive, address all surveillance steps, are measured according to the planned frequency, and enable an effective monitoring of the functioning of the OH surveillance system.

Possible answers:

NA.

1. There has never been an internal evaluation of the functioning of the OH surveillance system.
2. Internal evaluations of the functioning of the system have been conducted but only sporadically. The set of indicators is insufficient and could be substantially improved.
3. Internal evaluations of the functioning of the system are conducted but they remain irregular or the set of indicators could be improved to enable better monitoring of the functioning of the OH surveillance system.
4. Internal evaluations of the functioning of the system are conducted regularly, using an exhaustive system of relevant indicators.

External evaluation

Are effective external evaluations of the OH surveillance system conducted?

External evaluations of the OH surveillance system are expected to be conducted regularly (every 3-4 years), according to a well-known and complete methodology. The evaluations should consider actors' expectations and experience regarding the functioning of the OH surveillance system.

Possible answers:

NA.

1. There has never been an external evaluation of the OH surveillance system (before the current one).
2. An external evaluation of the OH surveillance system has been conducted but it was a long time ago and/or based on an incomplete methodology.
3. External evaluations of the OH surveillance system are conducted but their frequency could be improved and/or the methodology used could be more complete.
4. Regular external evaluations of the OH surveillance system are conducted, according to a well-known and complete methodology.

Corrective measures

Have corrective measures been taken based on the results of a previous evaluation of the OH surveillance system?

Possible answers:

NA.

1. No corrective measures recommended by evaluators have been implemented.

2. Only a few (or the least important) corrective measures recommended by evaluators have been implemented.
3. Most corrective measures recommended by evaluators have been implemented.
4. Corrective measures recommended by evaluators were implemented in a timely manner and traced in the OH surveillance system functioning and organization.

Adaptability to changes

Regarding previous experiences, can the OH surveillance system adapt to internal and external changes and to critical situations within appropriate timelines?

Possible answers:

NA.

1. The system has the ability to conduct small adjustments to current persons and resources to improve the functioning of the OH surveillance system or achieve pre-defined goals (e.g. redaction of new support document, modification of the reporting frequency, etc.).
2. In addition to option 1, the system has the ability to adapt to changes in the OH surveillance system coverage or organization (e.g. integrating new actors/sectors, new scientific committee, turnover in steering committee, etc.).
3. In addition to option 2, the system has the ability to adapt to innovation and new activities (e.g. implementing a new analytical method, changes in IT/database tools, etc.).
4. In addition to option 3, the system has the ability to adapt in a short time to a critical situation (e.g. integrating a new/emergent hazard, degrading epidemiological situation, etc.).

DIMENSION 2: OPERATIONS

Target 2.1 Data collection/ methods sharing

Protocol design

What level of cross-sectoral collaboration occurs when designing surveillance protocols?

Possible answers:

NA.

1. There is no collaboration between actors for the design of surveillance protocols.
2. There is intra-sectoral collaboration between actors for the design of surveillance protocols.
3. Collaboration exists between actors from various sectors for the design of surveillance protocols.
4. Effective collaboration exists between actors from all sectors for the design of surveillance protocols.

Data collection

What level of cross-sectoral collaboration occurs for surveillance data collection?

Possible answers:

NA.

1. There is no collaboration between actors for data collection.

2. There is intra-sectoral collaboration between actors for data collection.
3. Collaboration exists between actors from various sectors for data collection.
4. Effective collaboration exists between actors from all relevant sectors for data collection.

Laboratory techniques

Are laboratory techniques and procedures harmonized across sectors?

The existence of procedures and protocols for conversion of laboratory results across multiple sectors is a prerequisite for data interoperability between sectors.If sectors use different laboratory tests or interpret results with different standards, it might impact the flow and use of information.

Possible answers:

NA.

1. Laboratory techniques and procedures are not harmonized between actors.
2. Laboratory techniques and procedures are harmonized between actors within sectors.
3. Some laboratory techniques and procedures are harmonized between actors from various sectors.
4. Relevant laboratory techniques and procedures are harmonized across all sectors and joint proficiency testing is conducted.

Data warehouse

Is there a common data warehouse?

A data warehouse is a central repository of integrated data from one or more sources in a single place. It stores current and historical data that is used for query and analysis.

Possible answers:

NA.

1. There is no data warehouse.
2. Data warehouses exist within sectors.
3. A data warehouse exists across some sectors.
4. A data warehouse exists across all sectors.

<u>Target 2.2 Data sharing</u>

Sharing agreement

Are data sharing agreements (specifying issues related to data management, data storage, data ownership and confidentiality) between relevant sectors are implemented?

Possible answers:

NA.

1. There is no data sharing agreement.
2. Data sharing agreements are implemented but only between actors within sectors.
3. Data sharing agreements are implemented between actors from various sectors.
4. Data sharing agreements are implemented between actors from all sectors.

Data quality

Is the evaluation of data quality conducted systematically (using relevant indicators of data quality) and results/findings shared between sectors?

Some examples of data quality indicators: completeness, accuracy, consistency, integrity, validity, timeliness etc.

Possible answers:

NA.

1. The quality of data is not evaluated.
2. Data quality evaluation is not systematically conducted, is conducted in few sectors only, or important improvements are needed in the evaluation procedure (e.g. using additional indicators, creating procedures for collecting missing data, etc.).
3. Data quality is systematically evaluated but there is no or a low level of information sharing with other sectors.
4. Data quality is systematically evaluated and results/findings shared with other sectors.

Usefulness

Do the shared data serve their purpose in the context of OH surveillance?

Possible answers:

NA.

1. There is no data sharing between sectors or data shared with other sectors are not adequate to serve their purpose.
2. Data are shared between actors within sectors and serve their purpose in a particular context.
3. Data are shared between actors from various sectors and serve their purpose in a particular context.
4. Data are shared between all sectors and serve their purpose in a particular context.

FAIR data

Are the data produced being handled within the OH surveillance system according to the FAIR principles?

FAIR data follow four principles: findability, accessibility, interoperability and reusability.

Possible answers:

NA.

1. Data do not meet or only part of the FAIR principles.
2. Data are being handled according to the FAIR principles within sectors.
3. Data are being handled according to the FAIR principles across some sectors.
4. Data are being handled according to the FAIR principles across all sectors.

<u>Target 2.3 Data analysis and interpretation</u>

Joint analysis

Are the data collected by the OH surveillance system (originating from multiple sources) jointly analyzed?

Possible answers:

NA.

1. There is no integrated analysis of data from multiple sources.
2. Joint data analyses are conducted within sectors.
3. Joint data analyses are conducted across some sectors.
4. Joint data analyses are conducted across all sectors.

Sharing techniques

Are statistical analyses, and visualization procedures shared across networks/sectors (e.g. syndromic surveillance scripts)?

Possible answers:

NA.

1. Neither tools, statistical analysis, nor visualization procedures are shared between actors.
2. Tools, statistical analyses and/or visualization procedures are shared between actors within sectors.
3. Tools, statistical analysis and/or visualization procedures are shared between actors from various sectors.
4. Tools, statistical analysis and visualization procedures are shared between all sectors.

Sharing expertise

Is scientific expertise shared between actors from different sectors to interpret the results?

Possible answers:

NA.

1. There is no sharing of scientific expertise.
2. Scientific expertise is shared between actors within sectors.
3. Scientific expertise is shared between some sectors.
4. Scientific expertise is shared across all sectors.

Indicators

Are the harmonized and common indicators/metrics used across sectors to analyze and interpret the data?

Some examples of indicators: ratio, proportion, incidence, prevalence etc.

Possible answers:

NA.

1. There is no harmonization of indicators between programs within the OH surveillance system.
2. Indicators are harmonized between programs within sectors.
3. Indicators are harmonized between some programs across sectors.
4. Indicators are harmonized between programs across all sectors.

<u>Target 2.4 Communication</u>

Internal communication

Is an organized/formal internal communication system established between actors/sectors?

Internal communication can include seminar reports, official letters, meeting minutes, or emails shared between actors of surveillance sectors.

Possible answers:

NA.

1. There is no formal system for communication within the OH surveillance system.
2. An internal communication system is established between actors within sectors.
3. An internal communication system is established between actors across some sectors but it could be reinforced.
4. An internal communication system is established between actors across all sectors.

External communication

Is joint external communication established?

External communication includes scientific articles on OH surveillance results, seminar reports, regular publication of surveillance results in the form of newsletters, reports, web platforms/Shiny interfaces, etc.

Possible answers:

NA.

1. There is no joint (i.e. multi-actor) external communication.
2. Actors within sectors are involved in joint external communication activities.
3. Actors from some of the sectors are involved in joint external communication activities.
4. Actors from all sectors are involved in joint external communication activities.

Dissemination

Is joint information dissemination to decision-makers conducted?

Possible answers:

NA.

1. There is no joint information dissemination to decision-makers.
2. Actors within sectors are involved in joint information dissemination to decision-makers.
3. Actors from some sectors are involved in joint information dissemination to decision-makers.
4. Actors from all sectors are involved in joint information dissemination to decision-makers.

Emergence

In the event of a suspected or detected case, is information sharing to other sectors conducted in real-time?

The definition of a case suspicion and detection (e.g. suspected case, clinical case, possible case, probable case, confirmed case, etc.) is specific to the surveillance programs of the studied OH system.

Possible answers:

NA.

1. Information related to a suspicion or detection is either not shared, or not shared within a timeframe acceptable for taking appropriate preventive, surveillance or control measures by other sectors.
2. Information related to a suspicion or detection is shared in (quasi) real time between actors within sectors.
3. Information related to a suspicion or detection is shared between actors across some sectors, but transmission delays could be reduced for improving the effectiveness of preventive, surveillance or control measures.
4. Information related to a suspicion or detection is shared in (quasi) real time between all relevant sectors.

DIMENSION 3: IMPACT

Target 3.1 Technical Outputs

Emergence detection

Does the detection of hazard emergence based on OH surveillance data occur within appropriate timeframes (for implementation of preventive, surveillance and control measures)?

Hazard emergence may be defined as a rapid increase in number of cases (incidence, prevalence) or geographical range. This definition should be adapted to the specificities of the hazard, the epidemiological situation and the objectives of the surveillance system under study.

Possible answers:

NA.

1. Retrospective analyses of surveillance data showed that some hazard emergence(s) remained undetected.
2. Emergences are detected too late, in at least one sector, for the preventive, surveillance and control actions to be effective.
3. Detection of emergencies occurs within short timeframes for all sectors but could be further reduced.
4. There is a real-time detection of hazard emergences.

Improved knowledge

Has the OH surveillance system improved the knowledge of the epidemiological situation of the targeted hazard, as evidenced by the following outputs?

OH surveillance systems have the capacity to integrate large, multi-sectoral, quantities of information and data to produce new data, knowledge and methods. This can be evidenced by reports, scientific publications, seminars, conferences, specific training courses and reinvestment of new knowledge to improve the surveillance system.

Possible answers:

NA.

1. OH surveillance has not resulted in an improvement of knowledge on the epidemiological situation of the hazard or there is no outreach about this new knowledge.

2. OH surveillance has resulted in an improvement of knowledge on the epidemiological situation of the hazard based on data from part of the sectors only.
3. OH surveillance system has resulted in an improvement of the knowledge on the epidemiological situation of the hazard from all sectors but outreach activities remain limited.
4. A clear improvement of knowledge on the epidemiological situation of the hazard due to the implementation of OH surveillance has been observed and reflected by specific outreach activities.

Effectiveness

Has the implementation of the OH surveillance system improved the overall effectiveness of surveillance for the hazard?

Some examples of indicators: timeliness, sensitivity, specificity, positive predictive value, precision, robustness, etc.

Possible answers:

NA.

1. Effectiveness of the OH surveillance system has not been assessed.
2. Effectiveness of the surveillance is evaluated but no improvement in the overall effectiveness of surveillance for the hazard due to the implementation of the OH surveillance system has been demonstrated (or the improvement in the effectiveness is related to surveillance in only one sector).
3. Effectiveness of the surveillance is evaluated but only slight improvements in the overall effectiveness of surveillance for the hazard due to the implementation of the OH surveillance system have been demonstrated.
4. Effectiveness of the surveillance is evaluated and has shown a clear improvement in the overall effectiveness of surveillance for the hazard due to the implementation of the multi-sectoral collaborations.

Operational cost

Has the implementation of the OH surveillance system reduced the operational costs (human, material, financial resources) of surveillance activities?

Possible answers:

NA.

1. The operational costs of surveillance activities since the implementation of the OH surveillance system have never been evaluated or there are no previous (intra-sectoral) or incomplete evaluations to compare with.
2. The costs associated with the OH surveillance system have been evaluated but no reduction of operational costs arising from the implementation of multi-sectoral collaboration was observed.
3. The implementation of the OH surveillance system has resulted in a slight reduction of the overall operational costs of surveillance activities, or cost reduction for specific (few) actors or sectors.
4. The implementation of the OH surveillance system has resulted in a significant reduction (or as expected) in the operational costs of surveillance activities.

Target 3.2 Collaborative added value

OH team

Is the OH team (and the trust between surveillance actors) strengthened by the OH surveillance system?

A OH team (formal or informal) consists of members of different disciplines, working collaboratively to set goals, make decisions and share resources and responsibilities to achieve better health outcomes (it could be formal or informal).

Possible answers:

NA.

1. There is no OH team.
2. There is no observed added value for the OH team with the implementation of the OH surveillance system.
3. The OH team (and the trust between actors) is somewhat strengthened by the implementation of the OH surveillance system (i.e. role formalization, implementation of a dedicated budget, recruitment of staff, integration of new competencies or tools, etc.).
4. The OH team (and the trust between actors) is strengthened by the implementation of the OH surveillance system.

OH network

Has the network of stakeholders been strengthened (to become a solid network across all stakeholders) due to the existence of the OH surveillance system?

The OH network is defined as an engagement between two or more discrete stakeholders/actors with at least two of the sectors represented.

Possible answers:

NA.

1. There is no OH network.
2. The OH network has been established regardless of the added value of the OH surveillance system.
3. The established OH network has been somewhat strengthened by the OH surveillance system.
4. The established OH network has been strengthened with a solid network of all actors and stakeholders, which shares information.

International

Is international collaboration for the OH surveillance system (among countries or/and with international agencies) established?

Possible answers:

NA.

1. No international collaboration is established or existing collaboration with international agencies is not adequate.
2. There are some international collaborations established with each sector, independently.

3. An effective international collaboration is established with some sectors involved in surveillance.
4. An effective and formalized international collaboration is established with all relevant sectors.

Strategy

Is a common strategic plan that defines actions to set up or strengthen OH collaborations and the major steps or milestones needed to be reached by all stakeholders developed?

Possible answers:

NA.

1. There is no common strategic plan developed.
2. Common strategic plans are developed at the local level.
3. A common strategic plan is developed at the provincial level.
4. A common strategic plan is developed at the national level (or beyond).

Target 3.3 Immediate and Intermediate outcomes

Preparedness

Has better preparedness been developed from OH surveillance results?

Preparedness corresponds to the set of actions that are taken as precautionary measures in the face of potential hazard-related issues. These actions can include written procedures, the resources available and training for emergency action.

Possible answers:

NA.

1. Preparedness to hazard-related issues and real-time response capacity have not been developed.
2. The level of preparedness is modest and response capacity is insufficient to react to any emergence in real-time.
3. Preparedness and response capacity are emplaced, but further actions (ex. IT development, specific protocol development, etc.) are needed to react in real-time.
4. There is an adequate level of preparedness and real-time response capacity to any emergence.

Interventions

Have interventions been developed and implemented in a timely manner based on the evidence provided by the OH surveillance system (e.g. data from human sector feeding interventions in the animal sector)?

Evidence-based interventions are practices or programs that have peer-reviewed, documented empirical evidence of effectiveness.

Possible answers:

NA.

1. The OH surveillance system did not provide evidence or the evidence is not robust enough to influence intervention measures.
2. The OH surveillance system provided quality evidence for intervention measures but not in a timely manner.

3. The OH surveillance system provided quality and timely evidence for intervention measures.
4. The OH surveillance system provided quality and timely evidence for intervention measures and supported prioritization of these measures.

Advocacy

Is effective advocacy being conducted by the OH surveillance system or by another stakeholder (not directly involved in the OH surveillance system) using information produced by the OH surveillance system?

Advocacy includes activities and publications (media, legislative, and grassroots efforts) to influence public policy, laws and budgets, and to educate target groups (government officials, students in public, animal and environmental health education, and the public) about the mitigation of the hazard risk based on the information obtained from the OH surveillance system.

Possible answers:

NA.

1. No advocacy activities are being conducted.
2. Some advocacy activities are conducted but address only one stakeholder.
3. Extensive advocacy activities are conducted and address several stakeholders.
4. Extensive advocacy activities are conducted and address all relevant stakeholders.

Awareness

Does the OH surveillance system contribute to an increase in the level of awareness among stakeholders about the epidemiological situation (distribution, patterns, and determinants of the hazard of interest in defined human and animal populations as well as on the environment) of the hazard?

Possible answers:

NA.

1. The OH surveillance system has no impact on improving awareness.
2. The OH surveillance system has some impact on improving awareness among a few stakeholders.
3. The OH surveillance system has a significant impact on improving awareness among most stakeholders.
4. The OH surveillance system significantly contributes to increasing the level of awareness among all relevant stakeholders.

<u>Target 3.4 Ultimate outcomes</u>

Research

Does the existing OH surveillance system create opportunities to develop and conduct new multi-sectoral collaborative research?

Possible answers:

NA.

1. No multi-sectoral and multidisciplinary collaborative research has been initiated.

2. Research (multi-disciplinary) collaborations have been initiated between actors within sectors.
3. Multi-sectoral research collaborations have been initiated between several actors across various sectors.
4. Multi-sectoral research collaborations have been initiated between all relevant sectors.

Policy changes

Have policy (e.g. regulations, public interventions) changes been made based on, or informed by, evidence or recommendations from the OH surveillance system?

Possible answers:

NA.

1. No policy change has been made in accordance with available evidence and recommendations from the OH surveillance system.
2. Few changes in policy related to the hazard have been made based on evidence and recommendations derived from the OH surveillance system, although, important recommendations from the OH surveillance system have been made.
3. Some changes in policy related to the hazard have been made based on the main recommendations that emerged from the OH surveillance system. Further policy change would be needed to take into account all evidence and recommendations from the OH surveillance.
4. Important policy changes have been made based on evidence and recommendations derived from the OH surveillance system.

Behavioral changes

Have behavioral changes been observed in the population at risk based on or informed by the OH surveillance system?

Behavioral changes include attitude, lifestyle changes.

Possible answers:

NA.

1. Behavioral changes in the population at risk have not been assessed.
2. Neither attitude nor lifestyle/habit changes, aimed at reducing risks related to the hazard, have been observed in the population at risk.
3. Some attitude and lifestyle/habit changes, aimed at reducing risks related to the hazard, have been observed in the population at risk, but further interventions or activities are needed to reinforce behavioral changes.
4. Significant (evidence-based) changes in attitude and lifestyle/habit, aimed at reducing risks related to the hazard, have been observed in the population at risk.

Health outcome

Have the health outcomes among human and animal populations and ecosystems improved and achieved the goals set by decision-makers, as a result of the implementation of interventions informed by the OH surveillance?

Health outcomes include reduction of incidence, prevalence, case fatality, mortality, etc.

Possible answers:

NA.

1. The impact, on population health outcomes, of the interventions informed by the OH surveillance has not been evaluated.
2. The impact, on population health outcomes, of the interventions informed by the OH surveillance have been assessed using hazard-specific epidemiological indicators but no marked impact was demonstrated.
3. The impact, on population health outcomes, of the interventions informed by the OH surveillance have been assessed using hazard-specific epidemiological indicators and encouraging changes (yet not as high as expected or planned) have been demonstrated.
4. The impact, on population health outcomes, of the interventions informed by the OH surveillance have been assessed using hazard-specific epidemiological indicators and significant changes (consistent with planned goals) have been demonstrated.

GLOSSARY

Actors: An individual or organization that operates with a primary intent to improve health of people, animals and the environment.

Central/Intermediate/Field levels: Central level in a One Health (OH) surveillance system is the level of management. It consists of the highest-ranking executive, whose primary responsibilities include making major decisions, managing the overall operations and resources, overseeing the goals, policies, and procedures of the surveillance and collaborations. Their main priority is on the strategic planning and execution of the overall surveillance success. **Intermediate level** of leadership in OH surveillance is a middle level of a hierarchical organization that is subordinate to the executive management and responsible for 'team leading' and line managing. Intermediate level is between the field and the central unit. Their role is to coordinate activities in the field, and to validate, and if necessary correct, the data collected before they are sent to the central unit. **Field (or local) level** is primarily concerned with the execution of day-to-day work (Dufour et al 2009).

Corrective measure: An action to eliminate the cause of a detected nonconformity or other undesirable situations.

Data warehouse: Central repository of integrated data from one or more sources in a single place. A data warehouse stores current and historical data that is used for query and analysis (https://web.archive.org/web/20180726071809/https://spotlessdata.com/blog/exploring-data-warehouses-and-data-quality; https://docs.oracle.com/cd/B10501_01/server.920/a96520/concept.htm#43555).

Epidemiological surveillance: Observational method based on continuous recording to follow health status or risk factors in a defined population, and particularly to detect the appearance of pathological processes and study their development over time and in space, with a view to adopting appropriate control measures (Dufour et al 2009).

End user: The person who receives and ultimately uses a product (WHO, 2021).

FAIR Data: The FAIR data principles are a set of guiding principles in order to make data findable, accessible, interoperable and reusable (Wilkinson et al., 2016).

One Health (OH): Multisectoral and multidisciplinary approach ensuring communication, collaboration, and coordination among all relevant ministries, agencies, stakeholders, sectors, and disciplines working locally, nationally, and globally to attain optimal health for people, animals, and our environment (https://extranet.who.int/sph/one-health-operations).

One Health network: Defined as an engagement between two or more discrete actors with at least two of the following sectors represented: animal health, human health, and the environment or ecosystem (Khan et al 2018).

One Health surveillance / Integrated surveillance: The systematic collection, validation, analysis, interpretation of data, and dissemination of information collected on humans, animals, and the environment to inform decisions for more effective evidence- and system-based health interventions (Aenishaenslin et al 2021; Stärk et al 2015).

One Health surveillance system: System in which collaborative efforts exist across at least two sectors (among human health, animal health, food safety and environment) in the surveillance process to produce and disseminate information with a purpose to improve any

of human, animal or environmental health (Dufour et al 2009; https://aginfra.d4science.org/web/orionknowledgehub/catalogue).

One Health team: Consists of members of different disciplines, and sectors working collaboratively, to set goals, make decisions and share resources and responsibilities to achieve better health outcomes for human, animal and the environment.

Outcome: the level of performance or achievement that occurred because of the integrative effort of multiple disciplines working to attain optimal health for people, animals, and the environment and it is a benefit that the integrative is designed to deliver. Expected outcomes in a OH surveillance system include the information resulting from the surveillance effort, which is then used for decision-making, policy development, and action.

Output: immediate product resulting from surveillance. OH surveillance outputs provide information (e.g. tables or graphs showing counts or rates of cases/events, or proportional morbidity or mortality, categorized by demographic, geographic or other risk factors) for those responsible for taking the control and prevention action.

Stakeholders: the ultimate beneficiaries (i.e. animals, people and the environment) and the organisations that work to protect them (i.e. research institutes, government ministries, international organisations and professional bodies) (Dufour et al 2009).

Steering Committee: The One Health surveillance Steering Committee will assume the overall coordination and oversight regarding the implementation of the surveillance. The committee will be composed of representatives from all sectors involved in the One Health surveillance. It will be responsible for the overall governance including establishing strategies, prioritizing funding allocations and mobilizing resources for one health. The members of these committees should have appropriate expertise, clearly defined roles and responsibilities; these members should hold meetings (with minutes taken and kept) regularly to oversee the function of the system.

Surveillance system/network: All individuals or agencies organised to ensure surveillance in a given region of one or more pathological entities constitute an epidemiological surveillance network (Toma et al 1991).

Sustainable: The robustness and ability of the system to be ongoing in the long term.

Traceable: Able to be followed on its course “when, where and by whom was produced."

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