

PROJETS FINANCÉS PAR L'UNION EUROPÉENNE SUR LES ZOONOSES, ÉVALUATION DE LA VALEUR AJOUTÉE D'UNE APPROCHE UNE SEULE SANTÉ

EUROPEAN UNION FUNDED RESEARCH PROJECTS ON ZOONOSES, EVALUATION OF THE ADDED VALUE OF A ONE HEALTH APPROACH

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RÉSUMÉ

L'approche Une seule santé qui considère la santé de l'homme de l'animal et de l'environnement comme liées, est envisagée comme étant l'approche la plus pertinente pour permettre de relever les défis sanitaires. Les projets d'étude et de recherche financés aujourd'hui par la Commission Européenne dans le domaine des zoonoses alimentaires et de l'antibiorésistance sont tous construits sur des réseaux préexistants. Le 6^{ème} et 7^{ème} programmes cadre financèrent des ERA-nets, réseaux d'agences nationales de moyens, des réseaux d'excellence (Rex), des initiatives de programmation conjointe (JPI) et des programmes d'infrastructure de recherche. Le programme d'action conjointe (AC) a pour objectif de promouvoir des synergies entre États Membres en développant et mettant en œuvre une réglementation de type Une seule santé pour lutter contre l'émergence de nouveaux dangers en antibiorésistance. Le projet EJP Une seule santé est un projet de recherche co-financé par les États Membres et la Commission Européenne et qui impliquent un grand nombre d'opérateurs travaillant sur les zoonoses alimentaires et l'antibiorésistance. Si la démarche Une seule santé a été proposée pour résoudre ces problèmes sanitaires de grande complexité, il n'existe pas de méthodologie validée pour une évaluation quantitative de la valeur ajoutée lors de l'adoption de cette démarche. Les travaux du réseau européen d'évaluation de la valeur ajoutée de la démarche Une seule santé (NEOH) représentent une avancée dans l'objectivation de l'intérêt de la démarche.

Mots-clés : Une seule santé, Réseaux Européens, Interface Homme-Animal, Zoonoses, Antibiorésistance, Évaluation, Valeur ajoutée.

ABSTRACT

The One Health approach, in which feed, food, animal health, public health and contamination of the environment are considered as very closely linked, is regarded as the best way to achieve significant progress of health in these fields. The current European Union funded projects aimed to achieve a major step forward for Europe in the domains of foodborne zoonoses and antimicrobial resistance. The 6th and 7th Framework programs initiated networks, such as ERA-Net, Networks of Excellence (NoE), Joint Program initiatives (JPI), Infrastructure program. The European Joint Action (JA) aims to promote synergies among the EU Member States by developing and implementing effective One Health policies to combat the growing threat of antimicrobial resistance. The One Health European Joint Project (EJP) is a large co-funded project on emerging threats, zoonoses and antimicrobial resistance. If a One Health approach has been proposed to tackle the challenges by accepting that their complexity requires interdisciplinary approach, no standardized methodologies were available for quantitative evaluation of One Health activities. The Network for Evaluation of One Health (NEOH) represents a major contribution in that field.

Key words : One health, European Networks, Human-animal interface, Zoonoses, Antimicrobial resistance, Evaluation, Added value.

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INTRODUCTION

The One Health approach is considered as the best way to achieve significant progress in health and safety. The 4th and 5th Framework Programs initiated several collaborative projects. These include SAFE, SafeFood ERA and COST 920. The 6th and 7th Framework programs also initiated networks, such as ERA-Net Infect-Era (Infect-Era, 2013), the Network of Excellence; Med-Vet-Net (Med Vet Net), Epizone, Eadgene, Neuroprion, Integrated Project EDEN, followed by EDENext, ERA-Net EMIDA (Emida), ERA-Net ANIHOWA (Anihwa), JPIFacce, JPIAMR, Infrastructure Nadir, COMPARE and Capacity Building Arbozoonet. The European Joint Action on Antimicrobial Resistance and Healthcare-Associated Infections (JAMRAI) aims to promote synergies among the EU Member States by developing and implementing effective One Health policies to combat the growing threat of antibiotic resistance. The One Health European Joint Project (EJP) is a network of European laboratories and research centers with reference tasks in the domains of foodborne zoonoses and antimicrobial resistance. The broad extension of One Health EJP throughout Europe (19 member states) and its proposed interaction with national, European and international stakeholders (EFSA, ECDC, WHO, OIE), the EJP complies with this One Health approach. These European Initiatives were expected to enable quantitative evaluations of One Health activities by developing and applying a science-based evaluation protocol in a community of experts. The Network for Evaluation of One Health (NEOH) represents a major contribution in that field. Mainstreaming "One health" will lead to closer cooperation between human and animal health and with social and environmental

sciences and economics and will provide a roadmap for developing a sustainable approach at the human-animal-ecosystems interface.

ONE HEALTH CONCEPT

There is no single definition of the concept of One Health and the scope can be very large. In the narrow sense, adopted by FAO, the One Health approach is a collaborative, international, cross-sectorial, multidisciplinary mechanism to address threats and reduce risks of detrimental infectious diseases at the animal-human-ecosystem interface, in a « Med-Vet » approach. In the broad sense, the One Health concept can be extended to Eco-Health, Global Health, and Planetary Health. The set of European projects presented in this review are implementing the One Health concept in a human-animal interface approach. (Jestin & Davoust, 2015; Jestin & Dupouy-Camet, 2018; Parodi, 2018).

EUROPEAN UNION FUNDED RESEARCH PROJECTS

The One Health approach has been implemented in several projects funded in European Union framework program Horizon 2020 (2014-2020). The funds for One Health activities are mainly coming from Directorate General Research (Health, Food Safety), Directorate Agriculture and Directorate Santé (Table 1).

Acronyme	Type of Partnership	Scope	Start date
COMPARE	EU public collaborative Projects	Platform for outbreaks of foodborne diseases	2014-2019
JPI AMR	Public-Public Partnership	Antimicrobial Resistance	2014 current
ONE HEALTH EJP	Public-Public Partnership	Foodborne zoonoses and antimicrobial resistance	2018-2022
EHBM4EU	Public-Public Partnership	Biomonitoring of chemical threats	2017-2021
ZAPI	Public-Private Partnership	Zoonoses, preparedness	2015-2020
IRC (AMR)	Public-Public Partnership	Antimicrobial resistance	2017 current

Table 1: Acronymes, partnerships and scopes of the EU funded projects.

The collaborative project COMPARE

COMPARE is an example of European Union collaborative project, selected in a set of research projects, which are implementing the One Health concept. COMPARE project aims to develop a framework sharing platform system for the rapid identification, containment and mitigation of emerging

infectious diseases and foodborne outbreaks. The project is based on the use of sequence-based pathogens data by whole genome sequencing (WGS) for surveillance and preparedness by early detection of outbreaks. The system will be linked to existing and future network and databases such as those used by ECDC, EFSA, and NCBI. European Union contribution is

€20Mi, funded jointly from Social Challenge Human Health (SC1) and Social Challenge Agriculture (SC2). It is a consortium including research institutes, a mix of 29 veterinary-food institutes and public health institutes. Two coordinators are leading the project from DTU Food (Denmark) and from Erasmus University Medical Center (Netherlands).

Public-public partnerships

Joint Program Initiative (JPI) on Antimicrobial Resistance (AMR)

JPI AMR is a transnational European project contributing to implement the One Health concept and funding research to tackle AMR threats (JPI AMR). This project is based on the development of Strategic Research Agenda (SRA) that follows the One Health approach. The European Commission provides financial support for coordination of research activities and the national funding agencies are funding the research projects. The SRA will support development of national AMR strategies. Five transnational calls have been launched with a budget of €67,5Mi. Veterinarians are present in the scientific advisory board. Several calls for proposals have been launched and selected projects funded. The Transmission Dynamics call is one of the JPI AMR joint calls. It aims to study the transmission between humans and animals of genetic sequences conferring resistance to antibiotics. Several projects were funded among them i) Risk of companion animal to human transmission of antimicrobial resistance during different types of animal infection, ii) Predicting the persistence of resistance across environments, iii) Genomic approach to transmission from animals and humans and compartmentalization of extended-spectrum cephalosporin resistance in Enterobacteriaceae, iv) Dynamics of Antimicrobial Resistance in the Urban Water Cycle in Europe. The transmission dynamics JPI AMR joint call illustrates a perfect example of application of the One Health approach.

One Health European Joint Programme (EJP)

The EJP is a new type of contract in Horizon 2020 framework programme, a co-funded mechanism between the European Commission and the Member States, allowing more integration between research actors (EJP One Health). The One Health EJP is following a One Health approach. Research is mainly focused on foodborne zoonosis and AMR, but also emerging threats. It is a pure “Med-Vet” Partnership including 20 public health institutes and 20 veterinary public health institutes. The One Health EJP aims to create a sustainable European One Health framework of Public Research Institutes, by alignment and integration of medical, veterinary and food institutes strategies and expertise, through joint programming of national research agendas and by funding research projects and by matching the needs of European and national policy makers and stakeholders (ECDC, EFSA, DG Santé). The total budget is €90Mi funding 25 research projects. The One Health EJP can be considered as a prototype of European Union initiative implementing the One Health concept (Jestin & Imberechts, 2018).

European Joint Programme (EJP) Human Bio-Monitoring for European Union (HBM4EU)

The European Joint Programme (EJP) Human Bio-Monitoring for European Union (HBM4EU EJP) contributes to assess, in a One Health approach, the impacts on human health of

pesticides present in the environment, in plants and in food producing animals. The objectives of the HBM4EU EJP is to: provide policy makers with comparable data on human internal exposure to chemicals, ii) to link data on internal exposure to chemicals to aggregate external exposure, iii) to generate scientific evidence on the causal links between human exposure and health, iv) to provide tools to detect emerging chemicals and to identify the chemical mixtures and v) to adapt chemical risk assessment methodologies to use human bio-monitoring data. The consortium of 66 partners is a project co-funded (total budget €100 Mi) by the Member States and the European Commission.

Joint Action on Antimicrobial Resistance and Healthcare Associated Infection (JAMRAI)

The European Commission, strengthening the One Health approach, is funding AMR research projects on Guidance and Best practice. The main objective of the network JAMRAI is to define common policies to fight AMR and to control HCAI. The expected outcomes are: i) to produce guidance documents and tools, ii) to strengthen the One Health approach and coordination with relevant sectors, iii) to have a coordinated European response in regards to prioritizing and iv) to improve sustainability in practice by health care professionals. JAMRAI Project is funded (€4Mi EU) by Directorate General Santé, with contribution of the Ministries of Health, a total of 47 partners are members from 22 countries.

Public-private partnerships

Zoonoses Anticipation and Preparedness Initiative (ZAPI)

ZAPI is a project funded by the Innovative Medicines Initiative (IMI) which is a public-private partnership funded by the European Commission (50%) and the European Federation of Pharmaceutical Industries and Association (EFPIA) (50%). ZAPI brings together experts in human and animal health to create new platforms and technologies that will facilitate a fast, coordinated, and practical response to new infectious diseases as soon as they emerge.

The objective of ZAPI project is to allow rapid identification of the viruses and rapid production of veterinary vaccines and antibodies to protect the human population. ZAPI project is the first One Health IMI project, with a total budget of €22,8 Mi (2015-2020). The proof-of-principle to be obtained is expected for Rift Valley Fever Virus (RVFV), Schmallenberg Virus (SBV) and the MERS-Coronavirus. Manufacturing processes needs for animal and human health are expected from ZAPI project.

International collaboration

International Research Consortium on Animal Health (IRCAH)

IRCAH is a network of 22 members from 13 countries including international research organizations, the European Commission, Charity and industries. The objectives of this network are to coordinate research at international level and to contribute to new and improved animal health strategies for at least 30 priority diseases issues. The expected deliverables are production of candidate vaccines, diagnostics, therapeutics, scientific information to support risk analysis and tools for disease control. The One Health concept will be implemented at the international level for research on AMR and Zoonoses.

EVALUATION OF THE ADDED VALUE OF A ONE HEALTH APPROACH

Needs to evaluate the added value of a One Health approach

The One Health concept is a paradigm that addresses complex challenges to promote the health and well-being of all species and the environment through the integration of relevant sciences at systems level. The question is can One Health approach provide solutions? One Health approach is intuitively appealing and multiple benefits and added value are perceived and described. Nevertheless what is lacking? The One Health approach is not yet a mainstream and until now there was no systematic resource allocation. Urgent needs are to provide standardized methods and data to evaluate One Health activities and to provide robust evidence base for decision-making and resources allocation. If the One Health is welcome, it is urgent to measure the added value of the approach.

The Network for Evaluation of One Health (NEOH)

NEOH is a network funded by the European Cooperation in Science and Technology Action (COST). At the European level, NEOH is a major initiative identifying criteria to measure the added value of One Health (Zinsstag *et al.* 2005). Its objectives are i) to develop a robust and standardised evaluation approach, ii) to evaluate existing One Health initiatives, iii) to involve decision-makers in network activities and iv) to create the interdisciplinary network to address the evaluation of One Health. A set of 5 deliverables are identified. A blueprint has been published in 2017 (Ruegg *et al.* 2017) identifying a need to provide evidence on the added value of OH for governments, researchers, funding bodies, and stakeholders. Then in 2018, it has been suggested a systems approach to evaluate One Health initiatives, this methods approach combines a descriptive and qualitative assessment with a semi-quantitative scoring for the evaluation of the degree and structural balance of "OH-ness", summarised in an OH-index and OH-ratio respectively and conventional metrics for different outcomes in a multicriteria decision analysis. It was then recognised that knowledge integration is a key feature of all stages in the development of related policies, strengthening One Health governance (Hitziger *et al.* 2018). A roadmap to a One Health agenda 2030, aligned to the Sustainable Development Goals (SDGs) has been published. The NEOH has decided to join Eco-Health International, observing convergence between zoonoses, disease emergence, pandemic threats and ecosystem health. To conclude, NEOH has a major contribution to the assessment, on clear basis, of the added value of the One Health approach at European level,

recently NEOH was tending to enlarge the concept from One Health to Eco-Health (Bresalier *et al.* 2005 ; Zinsstag *et al.* 2020).

Conclusion from an European perspective

One Health is more than a buzzword from an EU research funding perspective (Cavitte, 2017). One Health is operationalized through many projects, some directly as in the examples provided in the article but many more projects are indirectly implementing the One Health approach. The interdisciplinary approach exists in these projects, but various obstacles exist as different communities, players and interests. Various other concepts (e.g. Eco-Health, Planetary Health etc) emerged and tend to enlarge the concept. In conclusion, we can consider that a question remains actual: how to better address One health in a systems' approach? (Cavitte, 2017).

CONCLUSION

The authors of this article restricted the content of the One Health concept to its narrow sense, as adopted by FAO, dealing with infectious diseases. In the broad sense, the One Health concept can be extended to Eco-Health, Global Health, and Planetary Health. Mainstreaming One health, in its broad sense, will lead to closer cooperation between human and animal health and with social and environmental sciences and economics and will provide a road map for developing a sustainable approach at the human-animal-ecosystems interface. In our contemporary period of repeated epidemic outbreaks, a greater inclusion of social science knowledge is needed for a better understanding of complex socio-ecological systems (Lainé & Morand, 2020). One Health has been operationalized at the European level, through H2020 projects. The environmental dimension has not been addressed as intensively as expected. New Instruments (co-funded, co-programmed) will be launched in Horizon Europe (2021-2027) to fund research on One Health. It is essential to demonstrate under which circumstances One Health initiatives provide added value compared to disciplinary or conventional health initiatives. The COST Action NEOH is an European initiative providing first data on One Health parameters, which is an important step towards the creation of a dataset for future benchmarking. Progress has been made on evaluation of governance, knowledge creation, knowledge integration in One Health policy formulation, implementation and evaluation. Integrated approaches save human and animal lives and reduce costs when compared to public and animal health sectors working separately.

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