

APPROVED: 21 April 2021

doi: 10.2903/j.efsa.2021.e190501

## EFSA's expertise supports One Health policy needs

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### Introduction

During the 21st century, many global health threats have already emerged linked to zoonotic and (re)emerging infectious diseases (e.g. SARS, COVID-19, zika, avian influenza), climate change and environmental sustainability. These health threats are complex and cannot be adequately addressed by any individual discipline acting alone. A comprehensive strategy and transdisciplinary collaboration on all aspects of health for people, animals and the environment is required: this is commonly referred to as a One Health approach. WHO indicates that *One Health is an approach to designing and implementing programmes, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes* (WHO, 2017). Another definition by the EcoHealth Alliance refers to One Health as *an interdisciplinary approach to strengthen systems globally and locally by recognizing the shared health of humans, animals and the environment* (EcoHealth Alliance, 2020). While there is no universally accepted or commonly applied definition, existing definitions share the principle of transdisciplinary cooperation, along different tiers, and across different sectors (including human, animal, plant and increasingly also environmental health).

The need for a One Health approach is well recognised by different European and international organisations. The Sustainable Development Goals (SDGs) adopted by the UN General Assembly in 2015 embody a One-Health strategy – healthy people living on a habitable planet (Cf O, 2015). The FAO promotes a One Health approach as an integrated way of preventing and mitigating health threats across the Animal–Human–Plant–Environment interface. In order to support this increased collaboration for the promotion of One Health and the prevention of emerging diseases of animal origin, WHO and partner organisations and agencies are establishing a *One Health High-Level Expert Group* to provide guidance on issues that support cooperation among governments. The European Commission's Green Deal is an integral part of its strategy to implement the United Nation's 2030

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**Declarations of interest:** The declarations of interest of all scientific experts active in EFSA's work are available at <https://ess.efsa.europa.eu/doi/doiweb/doisearch>.

**Suggested citation:** Bronzwaer S, Geervliet M, Hugas M and Url B, 2021. Editorial: EFSA's expertise supports One Health policy needs. *EFSA Journal* 2021;19(5):e190501, 4 pp. <https://doi.org/10.2903/j.efsa.2021.e190501>

**ISSN:** 1831-4732

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The EFSA Journal is a publication of the European Food Safety Authority, an agency of the European Union.



Agenda and the SDGs. The EU will work with all partners to increase climate and environmental resilience to prevent these challenges from becoming sources of conflict, food insecurity, population displacement and forced migration ... (Communication from the commission, 2019). Some parts of the Green Deal such as the Farm-to-Fork and Biodiversity Strategies make explicit reference to One Health. However, the Green Deal may need to draw lessons from the COVID-19 pandemic, that highlighted the strict connections linking environment, health and economy (Becchetti et al., 2021).

Existing challenges such as antimicrobial resistance and bovine spongiform encephalopathy (BSE) have highlighted the need to mitigate emerging health risks using a One Health approach, as these are multifactorial issues that need expert knowledge from different disciplines and thus different perspectives. The 'Mad Cow' debacle in the 1990s showed that reintroducing waste into the feed chain had unexpected and long-lasting public health consequences. This was a strong call to adopt a One Health perspective from the start when considering the circular economy and/or innovation in food systems and processing. EFSA was established in the wake of the BSE crisis and consequently its Founding Regulation includes a clear reference to One Health in EFSA's mission. Article 22, item 3, of Regulation 2002/178/EC states: *The Authority shall contribute to a high level of protection of human life and health, and in this respect take account of animal health and welfare, plant health and the environment, ...*

## Evolution of the One Health concept

Over recent decades, the One Health concept has broadened from the medical and veterinary sciences to include a rapidly growing range of synergistic disciplines, including food safety, public health, health economics, ecosystem health, social science and animal health (Xie et al., 2017). We are learning that it is not enough to deepen our knowledge of each individual scientific domain in ever increasing detail, we must also be able to bring it together! Without close collaboration between different sectors and disciplines, it will be impossible to address and understand the challenges of tomorrow. It is now recognised that environmental factors, including chemical contaminants in animals and animal products, residues of veterinary drugs and plant protection products play a significant role in human, animal and plant health; the concept of *One Health – One Environment* is widely accepted. The EU Farm-to-Fork strategy refers to the concept of One Health as an approach to tackle emerging problems (e.g. antimicrobial resistance) and underlines the need for holistic transdisciplinary approaches to move towards safe and sustainable food systems. This more holistic perspective aims to improve human, animal and environmental health simultaneously. The COVID-19 pandemic further underlines the need for a One Health approach that does not stop at national or EU borders. It is encouraging to read in the recent Biodiversity strategy that: *The EU will enhance its support to global efforts to apply the One Health approach, which recognises the intrinsic connection between human health, animal health and healthy resilient nature* (European Commission, 2020a).

However, implementation of the One Health concept comes with several challenges, such as overcoming siloed approaches of individual scientific disciplines and the lack of harmonisation of terminology and concepts across disciplines and sectors. EFSA is collaborating with the One Health European Joint Programme (OHEJP, [www.onehealthejp.eu](http://www.onehealthejp.eu)) that aims to create a sustainable European One Health framework and reinforce collaboration between institutes by enhancing transdisciplinary cooperation. One of the Joint Integrative Projects of OHEJP, called ORION (One health surveillance Initiative on harmOnization of data collection and interpretation) has produced useful tools for harmonised, cross-sectional description and categorisation of surveillance data across different domains. These tools are publicly available, including the 'One Health Glossary' which is a collection of One Health-related terms and definitions in the public health, animal health and food safety sectors.

Another obstacle in transdisciplinary cooperation that has received a great deal of attention, particularly in research framework programmes, is access to data. Making research results more accessible contributes to better and more efficient science, and is a prerequisite for One Health. Since Horizon 2020, public-funded research results are by default placed in the public sphere, but many challenges still need to be addressed such as infrastructure, intellectual property rights, and alternative metrics, to move from 'open access' to 'open science'. Openness and transparency have been key values for EFSA since it was established. The new regulation on the transparency and sustainability of EU risk assessment in the food chain, applying from 27 March 2021, strengthens the Authority's ability to carry out its risk assessment functions in accordance with the highest transparency standards. The COVID pandemic has shown the power of early online sharing of SARS-CoV-2 genome sequences, helping to develop vaccines in record time. However, scientists are still urging that SARS-CoV-2

genome data should be shared more openly to help analyse how viral variants are spreading around the world.

Yet another challenge is to avoid erecting borders around the classical concept of One Health related to zoonotic emergencies, and to embrace the concept fully to also include the environment. A recent bibliometric analysis of 'The state of One Health research across disciplines and sectors' by Hubboldt-Dachroeden documented an: *increasing interest for One Health in academic research. However, it revealed some thematic and disciplinary shortcomings, in particular with respect to the inclusion of environmental themes and social science insights...* (Humboldt-Dachroeden et al., 2020).

An important 'mediator' that connects the many different species inhabiting planet Earth is the microbiome. In the EFSA Journal editorial: *Exploring the need to include microbiomes into EFSA's scientific assessments*, the authors refer to a recent concept paper arguing that microbiome structures and dynamics across the food system can have both direct and indirect effects on human and animal health, in addition to their impact on food quality, safety and sustainability. Moreover, recent research projects have offered new insights into the associations between microbiomes and a wide range of human diseases as well as their possible impact in modulating the exposure to environmental chemicals. It is known that chemical agents can influence the human microbiome, and conversely, the gut microbiome can modulate exposure to environmental chemicals.

## One Health cooperation among EU Agencies

It will not suffice for the concept of One Health to be just widely acknowledged, it will also need to be applied. EFSA has access to extensive transdisciplinary scientific knowledge and expertise along the entire food chain that can contribute to the development of effective 'One Health' policies. EFSA has successfully applied One Health principles in recent years in the areas of antimicrobial resistance and bee health and is keen to promulgate this approach into other areas and with new partners. One Health is at the basis of longstanding cooperation with other EU agencies, like for example with the European Centre for Disease Prevention and Control (ECDC) and the European Medicines Agency (EMA) in producing the annual report on the integrated analysis of the consumption of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from humans and food-producing animals (ECDC, EFSA, EMA, 2017). One Health cooperation is also occurring with other agencies, such as the European Chemicals Agency (ECHA), with whom EFSA, as a contribution to the 'European Green Deal', has drafted a joint position paper on 'one substance - one assessment' for chemicals (EFSA-ECHA, 2020). EFSA is also working closely with ECHA and the Environmental Agency (EEA) in preparation for a European Partnership on Chemical Risk Assessment (PARC) (European Commission, 2020b).

## Conclusion

Having One Health not only in its mandate but also in its DNA, EFSA has been advocating the application of One Health principles as widely as possible. The Global SDGs and European Green Deal are reinforcing EFSA's drive to cooperate beyond geographical borders and scientific disciplines. One Health should be the default approach not only when considering biological hazards and zoonotic agents but is fundamental also to risk assessments in other domains, such as environmental and microbiome assessment. This will mean *inter alia* the inclusion of One Health in the education of future scientists and the provision of continuing education to today's scientists as well as organising access to transdisciplinary science in a structural manner, particularly for EFSA's Panels and working groups. This is why EFSA's next Scientific Conference will be organised under the title *ONE – Health, Environment, Society – Conference 2022* (<https://www.one2022.eu/>) to examine food and feed safety from the broader perspective of sustainability and to reflect on future strategic goals and directions for regulatory science, such as One Health.

Transdisciplinary cooperation is fundamental to One Health, and EFSA will continue to strengthen its cooperation with EU Agencies and other One Health actors. EFSA is ready to extend its contribution from the European Partnership of Chemical Risk Assessment to a number of other candidate partnerships under Horizon Europe, including One Health Antimicrobial Resistance; Animal health: fighting infectious diseases; Environmental Observations for a sustainable EU agriculture; Safe and Sustainable Food Systems for People, Planet & Climate; EIT Food Partnerships; and possibly the European partnership for pandemic preparedness.

Considerable work on food systems is required globally to ensure that they become sufficiently resilient and sustainable. As we have learned, One Health scientific advice is crucial to underpin robust

policy interventions. The EFSA Strategy 2027 therefore includes as a priority the development of new risk assessment approaches across the entire food chain, considering human, animal, plant and environmental health, to be ready to address the One Health policy needs of the future.

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## Abbreviations

BSE	bovine spongiform encephalopathy
ECDC	European Centre for Disease Prevention and Control
ECHA	European Chemicals Agency
EMA	European Medicines Agency
FAO	Food and Agriculture Organization
OHEJP	One Health European Joint Programme
ORION	One health surveillance Initiative on harmonization of data collection and interpretation
PARC	European Partnership on Chemical Risk Assessment
SDG	Sustainable Development Goals
WHO	World Health Organization