National Food Institute
Technical University of Denmark

INSPIRATION AND IDEAS

One Health Integration in Surveillance

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~ Inspiration and ideas ~

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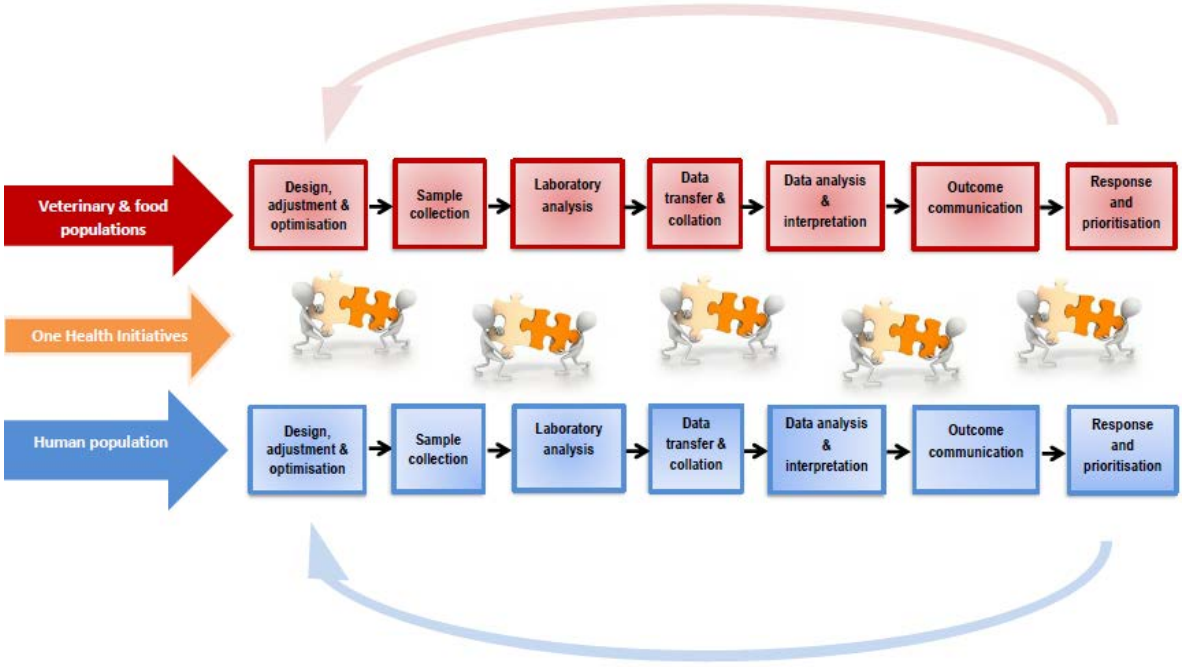
Introduction

The One Health Concept describes collaboration between different health sectors and often refers to the interaction between animals, people, food, feed and the environment. Today, most integrated One Health Initiatives encompasses only a few of the sectors. One Health is particularly valuable when combatting foodborne zoonoses and antimicrobial resistance, where cross-sector collaboration can lead to faster and more cost-effective control.

Traditionally in the EU, surveillance is carried out within sectors with defined areas of responsibilities, communication channels and risk management roles. However, the advantage of using One Health principles is becoming more apparent and Member States (MS) are beginning to define, structure and implement cross-sector collaborations. It is rare to find full cross-sectorial surveillance systems, but smaller One Health Surveillance Initiatives (OHSI) are integrated in many MS today.

OHSI are often implemented to address a specific problem or as a response to an adverse event. Once implemented, they remain operational in the context, become part of the surveillance routine and are often adjusted as new needs arise. They are implemented at different steps in the surveillance pathway and usually include multiple stakeholders from two or more sectors as illustrated in the figure below.



These OHSI add value for the country by improving the surveillance system, but they are rarely published or shared in detail with other countries. At the same time, many countries are considering more interaction and collaboration in their surveillance systems and are looking for inspiration among the published initiatives.

We have gathered examples of integrated OHSI in European MS and beyond via questionnaires and interviews. This catalogue describes some of OHSI and we hope they will inspire others to use the ideas and approaches to introduce more One Health into their own surveillance systems.

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OH Surveillance of Human Listeriosis - *France*

In France, human listeriosis has been notifiable since 1999. Cases are reported to the French Public Health Agency (PHA), and human *Listeria monocytogenes* (*Lm*) isolates are forwarded to the National Reference Center (NRC) for *Listeria* at the Pasteur Institute for core-genome Multilocus Sequence Typing (cgMLST) techniques. Approximately 400 cases of human listeriosis are reported annually of which 99-100% isolates are received at the NRC.

The NRC also receives food and environmental *Lm* strains isolated from 1) "food alerts" from the Ministry of Agriculture (MoA)" when food exceeds the regulation-defined threshold of *Lm*, 2) testing of food from the homes of patients with neurolisteriosis as part of the national surveillance strategy and 3) food producers' internal checks. All isolates from 1 and 2 are included in the National Surveillance System directly. Isolates from producers' internal checks are typed at the NRC based on private contracts and are only included, if cgMLST matches a case. The surveillance system then has power to request disclosure of information from the producer including type of food, date of collection and name of the company to facilitate an investigation in a timely manner.

Additionally, the National Reference Laboratory (NRL) of the Food Safety Agency test food and environmental samples from National Plans for Surveillance and Control of *Listeria* in the Food Chain and from other control programmes and surveys that are conducted annually to assess *Lm*-contamination of selected food items. These isolates can also be shared with the National Surveillance System, although the NRL has not fully transitioned to WGS-based typing yet.

The French national surveillance for listeriosis consists of an epidemiological information on human cases from PHA, on microbiological surveillance of human, food and environmental samples performed by the NRC and on samples from surveillance at the NRL. Both the Ministry of Health and the MoA fund the surveillance activities.

CgMLST-based microbiological surveillance performed weekly by the NRC identifies clusters of matching isolates and share these with the PHA and the MoA. Clusters involving at least one human case are jointly investigated by the PHA, the MoA and the NRC. Clusters that do not include human isolates are investigated by the MoA and the NRC. Merging of information from the PHA, the NRC and the MoA databases allows for efficient sharing of relevant data between agencies and timely investigations.

The close collaboration between the PHA, the MoA and the NRC has increased the number of solved clusters and outbreaks since 2015. In the future, the aim is to include food and environmental *Lm* isolates received at the NRL in the National Surveillance System.

The OH challenge is that each agency is responsible for their own databases on separate servers. Full integration would require a storage solution that allows for joint storage and sharing without compromising the integrity of the original data.

Santé publique France (Public Health Agency)

http://invs.santepubliquefrance.fr/en

Food Bug - *Finland*

Since 2010, surveillance data on *Salmonella* and EHEC/VTEC in Finland is shared by a routine procedure between THL (National Institute for Health and Welfare, including The Central Laboratory for Public Health) and EVIRA (Finnish Food Safety Authority, including animal health and welfare). The procedure varies by pathogen, but consists of an email sent to a list of recipients including people from epidemiological surveillance and laboratory from THL and EVIRA, with the subject "Food Bug". The recipient list is updated as frequently as needed.

This procedure started as a minor part of a research project that recognized a need to share data for outbreaks and routine surveillance weekly between food and public health authorities. The project included molecular typing on *Salmonella* and EHEC and at the time, also PFGE gel photos were exchanged between the institutes for comparison. Food Bug is a continuation of the project.

Every Friday THL shares the list of isolates from domestic *Salmonella* cases typed at the laboratory during that week with the Food Bug list. The list contains an ID for the isolates, the serotype, and resistance profile. EVIRA does the same, but because *Salmonella* isolates are seldom found in food and food-producing animals in Finland, their email is not sent weekly, but rather when a set of isolates is ready according to the laboratory logistics. Isolates are sequenced if a match is found based on time, location and type of human and food or veterinary isolates.

For EHEC/VTEC, human cases happen more rarely than *Salmonella* and the email is sent less frequently. When cases are reported, an investigation is initiated to locate farm contacts and the Food-Bug email is sent when this information is available. This list contains the stx-type and serotype of the isolates, the patients' age, municipality, farm contacts and some clinical information. Due to confidential content, these data is sent by secure email. EVIRA then proceeds to collect samples at the listed farm sites to try to find matching isolates.

This procedure promotes frequent interdisciplinary contact, which bring people from both sectors closer together and makes it easier for them to call and ask each other questions, or to resolve any issues. From an operational point of view, the EHEC/VTEC list with farm contacts gives EVIRA a risk-based approach to target their sampling and results in a more efficient way to collect EHEC/VTEC data.

One challenge originating from the Food Bug format is the new data privacy regulations, because regular emails cannot be used to send personal information and metadata. The institutes have agreed on a minimal amount of metadata to send by a secure email server, but will need a more sophisticated system allowing more complete metadata sharing.

For sharing sequences, the intention is to start using Innuendo, a cross-sectorial platform for genomics of foodborne pathogens, created in a project involving Finland, Estonia, Latvia, Portugal, The Basque Autonomous Community in Spain and Austria. The development of Innuendo was partially funded by EFSA. In Finland, the platform will be used for national purposes, for direct comparison of sequences from human, veterinary and food sources.

National Institute for Health and Welfare, Finland

https://thl.fi/en/web/thlfi-en

The Business Intelligence System (BI) - *Switzerland*

The Business Intelligence System (BI BLW/BLV) is a centralized data warehouse intended to store data from the food chain - and in the future public health data. It currently includes data provided by the Swiss Veterinary Service (BLV) and the Federal Office for Agriculture (BLW). It does not include data from Public Health yet. The following description covers the view of the BLV.

The Cantons of the Swiss Federation collect a large amount of data through several systems, but the access and use of such data for public service or academic purposes is not very easy. For that reason, the BI was created in 2016 with the objectives of improving access and harmonizing the data reported by the Cantons, thus reducing the workload for people analyzing data for different reports. The warehouse is part of the Swiss e-government structure, and the funding for its creation and operation comes from the internal IT budget of BLV and BLW.

Veterinary data reported to the BI include laboratory data on notifiable diseases according to Swiss legislation (including pets), zoonoses, abortions, somatic cell counts from milk analyses, antimicrobial resistance as well as samples collected to prove freedom of disease or from eradication programmes (e.g. BVD and *S. aureus*). Some of this data is also reported to EFSA.

There is currently no structure to store genetic sequencing data, so the system contains isolate information and basic metadata, like date of collection, species and sampling programme. Antibiotic resistance data in animals is included in a simplified format, as the system is not able to support the current results format for antibiograms. Data collected by the Cantons are reported through systems known as “central applications” and the BI extracts data from those applications.

Data is collected from control visits in primary production (animal health, animal welfare, food safety and agricultural practice) and from business processes (animal welfare in pets, authorizations for businesses or persons in the veterinary sector and measures taken). Furthermore, data of the national registers for enterprises and animal movements are included in the Data Warehouse. Although the BLW and BLV operate a common infrastructure, the use of the data matches the fields of responsibilities of the institutions.

Even though this initiative is reasonably recent and does not yet fully meet its integration objectives, it has succeeded in increasing the use of the data by people in the veterinary and agricultural services, because access has been facilitated. As a consequence, these users have now a better understanding of the need for high-quality data, which in turn resulted in an increase in data quality and reporting.

The main OH challenge is to develop a legal framework that supports inclusion of human data and improve food data reporting by the cantons.

Swiss Veterinary Service

https://www.blv.admin.ch/blv/en/home/das-blv/organisation/veterinaerdienst-schweiz.html

The Zoonosis Plenum - *Denmark*

The Zoonosis Plenum (ZP) takes place as meetings between microbiologists, epidemiologists and decision makers working in surveillance in the different sectors, with the objective of reducing foodborne pathogens in Denmark. The plenary meetings started in the late 1980s after a large national *Salmonella* outbreak. During the investigation and control activities, it became clear that collaboration between human, food and veterinary sectors was not very well established. To address this and as part of creating the Danish Zoonosis Center, monthly meetings were held with collaborating partners from public health, veterinary and food agencies. The National Food Institute, Technical University of Denmark has been organizing the meetings since the beginning.

The main focus of the ZP was historically *Salmonella* and *Campylobacter* in humans, poultry, pigs and dairy cattle and alongside action plans and close collaboration with the private sector and the ZP has been an important piece in the jigsaw puzzle to successfully reduce *Salmonella* in Danish meat production. The structure is quite informal and revolves around information on the current situation in each sector. Participants present slides with a summary of their latest observations concerning prevalence estimates, outbreaks, emerging pathogen types, research results etc. Findings are discussed and cross-sector explanations and expertise are shared to explain unusual observations including explanation to data errors or surveillance artifacts in some part of the surveillance chain.

Presently, the plenary meetings occur three times per year with all interested participants from Statens Serum Institut (public health institute), the National Food Authority, the National Food Institute and the National Veterinary Institute. All current stakeholders are public or academic institutions, and include both risk assessors and risk managers.

The main outcome of this initiative is well-established inter-sectoral communication. Summarized data, expertise and crucial information is shared during the meetings, increasing trust and building collaborative spirit, which are both fundamental for One Health.

The main challenge facing the ZPs is the bittersweet result of its own success. Control of *Salmonella* in Denmark has been highly successful and the threat from zoonoses is reduced considerably due to national, collaborative and effective efforts. Established multi-sector national action plans and surveillance programs are running and relevant staff are finding it hard to prioritize time for the ZP meetings among other priorities and activities.

National Food Institute, Technical University of Denmark

https://www.food.dtu.dk/english/scientific-advice/surveillance-and-monitoring

Working Group One Health (WGOH) - *Switzerland*

The Working Group One Health was established in 2018 by members of the Subsidiary Body of One Health (SBOH-described elsewhere) members, who work at the Federal Food Safety and Veterinary Office (FSVO). The WGOH was created as a way of strengthening interdisciplinary collaboration within the FSVO after merging the sections of Food Safety and Nutrition of the Federal Office of Public Health and the Federal Veterinary Office. The WGOH source members from different FSVO Sections: Animal Health, Animal Welfare, International Affairs, Food Safety and Nutrition, Logistics and Informatics, Risk Surveillance, and Communication. The WGOH is part of the SBOH created to promote better integration between the Public Health, Animal Health and Food Safety sectors in Switzerland, with the objective to improve the detection, surveillance, prevention and control of zoonoses and vector-borne diseases, under a One Health framework.

The working group meets four times a year to strengthen the interdisciplinary collaboration and information flow concerning One Health topics. This group discusses cross-sectoral issues or new epidemiological situations and their recommendations and inputs feed into the SBOH meetings. The group functions as an internal panel of experts that influences the topics of discussion in the SBOH, covering the same populations and hazards as the Subsidiary Body. They invite external experts, but only involve public stakeholders and have no members from private industries.

One of the benefits of the working group is that it expands the number of people, who give input to the SBOH beyond their narrow membership and increasing the number of people working with One Health. Members of the WGOH participate in the group as an *ad hoc* activity within normal FSVO work time.

A main challenge is that a formal identification of One Health is still missing, resulting in a lack of meaning of terms like “OH people” or “OH activities”. The OH mentality is not widely spread and others do not consider cross-sector activities. This reduces the probability that an OH issue is brought to the attention of the SBOH and the WGOH.

Subsidiary Body One Health, Federal Food Safety and Veterinary Office, Switzerland

https://www.blv.admin.ch/blv/en/home.html

Annual Report on Zoonoses in Estonia - *Estonia*

The Annual Report on Zoonoses in Estonia has since 2005 reported on the epidemiological situation and trends of zoonotic agents. The report present information on zoonotic agents of national importance in Estonia including those reported to EFSA. It is jointly produced by The Veterinary and Food Board (VFB), The Health Board, Veterinary and Food Laboratories, Public Health Laboratory and the Agricultural Register and Information Board.

The report production began in 2005 after accession to the European Union (EU), where surveillance data on zoonotic pathogens in animals and humans were requested by EFSA and soon after, human data were also submitted to ECDC. In response to these data demands, Estonia started to collect and summarize the data in a systematic manner. Local veterinary laboratories, food laboratories and the Health Board laboratory test and type samples for the surveillance. Except for *Salmonella* isolates, which are typed at the Central Veterinary and Food laboratory. Results from food samples are stored in the database at the VFB including all the metadata required for EFSA reporting, who also receive the data from animal samples by email. The VFB produces the report using EFSA's reporting spreadsheets. On request from VFB, the Health Board emails human data aggregated as number of cases per disease alongside foodborne outbreaks according to EFSA guidelines. The industry provides the data that is required to by legislation. This includes number of carcasses sampled according to microbiological criteria regulation and samples from the *Salmonella* control programme in poultry. Academic data is not included in the report, because the EFSA data aims to follow trends over time and research data frequently only covers two or three years, starts at odd months and lacks the uniformity required by EU standards.

The report is connected to other national initiatives, besides the official reporting to EFSA. The report in Estonian is produced after reporting to EFSA and includes data on other zoonoses that are important for the country. The joint reporting and the habit of sharing data have improved communication between the different sectors and makes it easier to detect and discuss cross-sectorial issues. The main issue currently faced by the report editors is the double workload generated by reporting the data to EFSA and EC in English and producing their own report in Estonian for national use.

Some of the OH challenges are that data transfer and collation occurs only as data exchange under request between The Central Public Health Laboratory and VFB, not routinely.

Estonian Veterinary and Food Board

http://www.efsa.europa.eu/en/biological-hazards-data/reports

Report on Surveillance of Infectious Disease in Animal and Humans - *Sweden*

The Report on Surveillance of Infectious Diseases in Animals and Humans is a yearly report produced by the Swedish Veterinary Institute (SVA), containing epidemiological summaries on infectious diseases of Animal Health or Public Health importance in Sweden. The chapters on the zoonotic diseases include among others *Salmonella*, *Campylobacter*, EHEC/VTEC, *Yersinia*, Influenza and Brucellosis. Overlap in the zoonoses chapters between the sectors do exist. The main objective of the report is to disseminate surveillance results, but also to provide a clear, uniform description of Swedish surveillance efforts in each chapter for readers and stakeholders to understand how the surveillance for each disease was carried out. Every chapter starts with the methodological description followed by the results. Due to a history of effective control programmes, good health system and biosecurity policies, no detection or low prevalence of pathogens are frequent, but inclusion of these are important as it is important to document that surveillance was carried out effectively.

In the beginning, The Public Health Agency and SVA each produced their own reports, frequently describing the same pathogens. The joint reporting allows experts, to some extent, to perform shared analyses and co-write chapters with a shared conclusion. The report started as a task commissioned and funded by The Swedish Board of Agriculture to SVA. Presently, it is part of the core activities at SVA and the production is part of their internal budget. Besides the three institutes, surveillance activities in the field of animal health is also carried out by the industry, through organisations such as Farm & Animal Health, Växa Sverige and The Swedish Poultry Association. These private stakeholders execute part of the surveillance activities, collecting samples, testing for the presence of pathogens, and summarizing some of the data. Transfer of data happens from the private stakeholders, Swedish Board of Agriculture to SVA for animal results and herd/population data, but human and food data are, in most cases, analysed at their own respective institutes and not shared directly.

Albeit being a joint report, information for each sector and pathogen still is, in many cases, analysed and written independently by sector experts before collation by the editors. Interdisciplinary collaboration is an on-going aim, which is prioritised to some degree. Although the report only organizes a few startup meetings to decide on inclusion of chapters and authors, VTEC, *Salmonella* and *Campylobacter* have extra meetings throughout the year, to ensure that there will be a collaborative interpretation of the data to avoid flawed or siloed conclusions.

The editors consider that the largest benefit obtained from the cross-sectional efforts is a better quality of the material presented. The collaborative interpretations reduce the chance for writer and reader misinterpretation, and historically, criticisms to the report's contents have mostly happened in relation to chapters in which there was a lack of collaboration among experts. Another outcome is the establishment of an active partnership among the three sectors, which facilitates future collaborations as well.

National Veterinary Institute (SVA), Sweden

https://www.sva.se/en/about-sva/reports-and-publications-in-english/disease-surveillance/disease-surveillance-reports

Zoonoses Working Group in the Croatian Food Agency – *Croatia*

The Zoonoses Working Group was established in 2014 in order to improve communication on surveillance and reporting of zoonoses across sectors nationally as an addition to local collaboration. The group's membership consists of experts from The Directorate of Sanitary Inspection (Ministry of Health), The Directorate for Veterinary and Food Safety (Ministry of Agriculture), The Croatian Veterinary Institute, The Croatian Institute for Public Health, The Croatian Food Agency and The Faculty of Veterinary Medicine of the University of Zagreb. So far, there has been no participation from the private sector and no collaborations with the industry.

Working Group members meet three to four times a year and their main tasks are to produce the Croatian Zoonoses Report, as well as to discuss how to improve zoonoses surveillance in human and animal health. Their agenda is focused on emerging diseases, epidemiological trends, laboratory capacities and limitations, and public health emergencies involving zoonotic pathogens. The group covers a wide range of agents monitored by the two sectors: *Brucella*, *Listeria*, Bovine Spongiform Encephalopathy, *Echinococcus*, *Campylobacter*, *Salmonella* and *Trichinella*. In the case of emerging diseases, strategies for communication and coordination between affected regions and their neighbors are also discussed and initiated. There is no direct sharing of data; pre-analysed and summarised numbers form each Office are presented as slides, to be discussed together. There is also no specific funding for the Working Group. Meetings are organised by the Croatian Food Agency and members participate as an *ad hoc* activity out of personal interest in the subject and objectives.

The benefits from the initiative include improved communication between sectors. People from different sectors met for the first time with the initiation of the Zoonoses Working Group and it has led to familiarity and improved communications when needed. Another positive outcome is the production of the annual report, which was first published in 2014. In 2018, the report will for the first time include a chapter on antimicrobial resistance and several summaries of diseases that are not part of EFSA's mandatory notification list.

The main challenge today is the group's sustainability as there is no specific funding allocated and it depends solely on the continued priority and interest of the members.

Croatian Food Agency

https://www.hah.hr/en/o-hah-u/radna-grupa-za-zoonoze/

Brucellosis surveillance - *France*

As a large exporter of raw milk cheeses, France has had very well-established systems for surveillance and control of brucellosis since the 1960s. The system collects epidemiological knowledge in humans and susceptible domestic animals systematically, including event-based syndromic surveillance in wild animals. The aim is to improve risk analysis and strategies for prevention and eradication of the disease both in humans and in animal populations.

The country has been officially free of brucellosis in cattle since 2005 and the last case in sheep and goats was reported in 2003. Sheep and goats are still vaccinated, because of difficulties in control of animals during alpine pasture in the southern French Alps obstructing the possibility of brucellosis-free status in these species. A re-emergence in cattle occurred in in 2011, in northern French Alps, where cattle were infected by wildlife (Ibex) during alpine pasture. Bulk tank milk for cheese production is regularly tested as part of requirements for the product certification and food is only imported from countries officially free of brucellosis or from producers that are certified-free in non-free countries.

Human surveillance is mostly carried out to understand epidemiological changes of the disease and to alert the Santé Publique France (national public health institute, SPF). Nowadays most domestic/autochtonous cases are employees from diagnostic laboratories, shifting away from the historic farmer/veterinarian occupational infections. Most other human cases have been infected by direct contact with animals or consumption of raw milk and raw milk products in other countries. Animal and food surveillance is carried out to ascertain that they can stay brucellosis free, and to certify their products in other countries. Summarised yearly data are reported to ECDC and EFSA. Each human case without any obvious at-risk exposure instigate a multi-disciplinary investigation by The French Agency for Food, Environmental and Occupational Health & Safety (ANSES, animal health), SPF and the National Hunting and Wildlife Agency with the aim to classify it as a travel-related case or to identify the French herd they had contact with. In the same manner, if an infective herd identified by ANSES, they immediately contact SPF, to look for human cases in the local area.

Human samples are tested and isolates typed at The National Reference Laboratory for human brucellosis, which is part of the Bacteriology Department at The Nîmes University Hospital. ANSES types animal isolates. In case of outbreaks, strains are shared between institutes, but since animals are a free only human isolates are available. Each agency pays for their own activities as part of The National Surveillance System.

The personnel from different sectors, who handle brucellosis outbreaks are usually also responsible for other pathogens and meet in person or through conference calls almost every day. This means that trust and communication channels are very well established and frequently used between the sectors, making it easier to compare information and solve outbreaks. The challenge, ironically, comes as consequence of their success: Because France has been free of brucellosis for a long time, municipal and regional offices frequently lack people with expertise in the disease, making the system very dependent on the national authorities.

Santé Publique France (Public Health Agency)

http://www.santepubliquefrance.fr/

The Veterinary Risk Group (VRG) – *United Kingdom*

The Veterinary Risk Group (VRG) was created in 2009, in response to the independent Anderson Review on the large Foot-and-Mouth Disease outbreak in the UK in 2001. It identified a need for a transparent, rapid and consistent way to rapidly escalate and prioritise animal health and welfare related threats to decision makers and the Human Animal Infections and Risk Surveillance Group (HAIRS) and VRG were created. The VRG assesses potential threats to and from animals in England, Wales, Scotland and Northern Ireland, while HAIRS's focus is on the assessment of potential zoonotic threats to public health.

The VRG is a technical group that delivers for the Department for Environment, Food and Rural Affairs, Scottish Government, Welsh Government and Department of Agriculture, Environment and Rural Affairs in Northern Ireland. The core is a group of risk analysis experts with technical and policy-related roles. A network of risk managers bring issues or potential threats to the monthly meetings for assessment and participate to stay informed about threats that may have the potential to affect their area. Two types of issues are dealt with in the meetings: 1) "threats" for which there are no clear policy owners for response and may need actions across sectorial or agency borders; and 2) "points for information", which describe an ongoing or developing serious situation that has a clear policy or protocol for management. An example are the recent BSE cases in the UK, which are of great concern. Unless a subtle change in the issue occur, it remains a point for information in VRG to keep track of the situation.

Threats are assessed in monthly meetings and the group produces advice on technical aspects. Although the focus is on animal health and welfare, the VRG assessment of the threat includes the impact on public health and the public perception. All identified public health threats are forwarded to HAIRS for a full assessment on the risk to public health. The communication with HAIRS is consistent and meeting minutes are shared between the two groups. Furthermore, several members have joint memberships and established methods for transferring ownership, allowing individuals in HAIRS to become aware of serious threats and the detailed discussions in VRG.

VRG core members and risk managers are mainly from DEFRA, the Animal and Plant Health Agency, the Welsh Government, the Scottish Government, the Department of Agriculture, Environment and Rural Affairs of Northern Ireland, Local Authorities, Centre for Environment, Fisheries and Aquaculture Science, Veterinary Medicines Directorate and the Food Standards Agency. Private institutions or industry representative bodies are not members of VRG, but some of the risk managers are part of veterinary and industry sector networks and thereby maintain relationships with the industry, which allows bringing intelligence and threats from industry for assessment in VRG meetings. The group is independent of named programs or initiatives, and receives no specific funding, as the activities are part of core functions of the agencies involved.

The data brought to the meetings is evidence that has been assessed and interpreted by their agencies of origin. Some examples are prevalence, increases in incidence, or references to peer-reviewed papers. Another type of data is intelligence from the industry submitted by the connected risk managers. As the threats are usually new or emerging, the pre-assessments are highly dependent on the type and amount of evidence available, frequently resulting in recommendations to fill data gaps. Data, evidence, and discussions are kept under data protection with two levels of sensitivity. The authorities receive the full report of all assessments and recommendations with a more general and less detailed report more widely shared. This ensures transparency without enclosing sensitive information.

Furthermore, VRG has an annual workshop to evaluate the ways-of-working and suggest improvements or changes. This involvement of everyone in the evaluation and optimisation is essential in keeping challenges and difficulties under control.

The biggest benefit from VRG is that issues and threats identified are promptly managed even if they do not have an official ownership or response protocol, and many other benefits such as standardised assessments across sectors, collaboration and regular communications across many agencies and government departments are also apparent.

Animal and Plant Health Agency, UK, Email: vrg@apha.gov.uk

Early Warning Meeting on Zoonoses – *The Netherlands*

The Early Warning Meeting on Zoonoses (EWMZ) is a monthly meeting for early detection of zoonotic signals in livestock, pets, vectors, wildlife and humans. In EWMZ meetings, the potential risk of zoonoses to public health is assessed and the focus is mainly non-notifiable pathogens, where no official control protocols exist. The Netherlands Food and Product Consumer Safety Authority (NVWA), the Faculty of Veterinary Medicine of Utrecht University, National Institute for Public Health and the Environment (RIVM), Wageningen Bioveterinary Research and GD Animal Health are represented by people in senior research and/or upper management positions with a broad scientific background and a mandate to make decisions on action.

The EWMZ originated from a large Q-Fever (*Coxiella burnetii*) outbreak in goats in 2007-2010. At that time, collaboration between the veterinary and public health sectors was not common and roles not well-defined. This led to some conflict of interest between the Ministry of Agriculture, the Ministry of Health, Welfare and Sport, and the private laboratories running detection tests for Q-Fever resulting in inefficient reporting of positive farms among other things that slowed the control response. In 2009, the Dutch government concluded that a human-veterinary integrated risk analysis structure was needed to determine appropriate response actions and initiated the project to design such a structure. Initial investigations included comparing types of surveillance used in the public health and veterinary sectors incl. terminology and the ranking of zoonotic diseases according to their potential public health impact. Data sharing taking into account all privacy issues and potential conflicts of interest also needed solving. In 2011, an official suggestion on a full Zoonoses Structure was submitted to the Dutch government, assigning the roles, responsibilities and mandates of each partner during the EWMZ meetings and in response situations.

Today, approximately 15 people participates in a monthly EWMZ. Further meetings take place on an ad hoc basis in urgent situations. Each organization brings information on non-notifiable pathogens of current importance detected as signals by their surveillance systems. A joint assessment is made to determine whether a signal requires further action, which measures could be taken and whether further research or information is needed. In principle, if the exchange of data is necessary to assess a signal, data is shared between sectors. However, sharing of actual data is rare because the focus is non-notifiable diseases, where no regular data is collected. Examples of reasons for action are: Lack of knowledge in some populations, a new disease with unknown impact, high media attention or a threat with potential to cause social unrest.

The main benefit is that non-notifiable diseases are regularly assessed leading to actions, even though no specific protocols and control programmes exists. However, the regular meetings EWMZ has also led to familiarity between members and organizations, a build-up of trust resulting more sharing of information. It has developed a sense of community between personnel of the multiple sectors, which also facilitates collaborations on other cross-sectorial projects.

The challenge of different perspectives between sector remains and it is not always easy to agree and justify taking action against potential threats from a resources and budget point of view. From a public health perspective, the prevalence in the animal population needs to be rather high to pose a risk to public health, because many zoonotic diseases depend on animal-human transmission. This occasionally undermines the usefulness of early warning surveillance in animal populations and pathogens may become established before action is seen as justified.

RIVM Centre for Infectious Disease Control, the Netherlands

https://www.rivm.nl/sites/default/files/2018-11/Folder%20signalling%20zoonoses%202018.pdf

Subsidiary Body One Health (SBOH) - Switzerland

The Subsidiary Body One Health was established in 2017 under the Federal Food Safety and Veterinary Office in the Federal Department of Home Affairs. A Coordinating Body for disease surveillance was initially created under the Swiss Epidemics Act, but it became apparent that zoonotic diseases needed a special approach, as they involve more complex systems than other Public Health threats including food, livestock and wild reservoirs. For that reason, the SBOH was founded, integrating Public Health, Animal Health, Agriculture, Environment and Food Safety.

Although the SBOH is free to act in respect to any public health threats or hazards, its main objective is to support the confederation in the detection, surveillance, prevention and control of zoonoses and vector-borne diseases. Other topics include early detection of new and emerging diseases in the context of climate change and the promotion of measures that lead to a reduction in the use of antimicrobials, pesticides or biocides. The idea is to have a One Health organization that includes delegates from all concerned federal agencies, as well as one delegate for each respective cantonal authority.

Members meet twice a year and the core body of the SBOH is formed by public institutions with occasional academic participation and no private stakeholders. The Federal Food Safety and Veterinary Office chairs SBOH, which includes representatives of the Federal Office for Public Health, Federal Office of the Environment and the Federal Office for Agriculture alongside a Cantonal medical doctor, a Cantonal chemist, a Cantonal veterinarian, a Cantonal pharmacist and a representative of the Swiss Army Veterinary Service. Members of academic institutions are invited as external experts when required. Reference laboratories for infectious animal diseases, public health and food safety are contacted according to the situation and topics. The Food Safety and Veterinary Office funds the secretariat and members' salaries are paid by their own institutions. There is no specific budget for meetings or campaigns.

The SBOH's main achievements are improving communication and information exchange among Federal Offices and Cantons. Benefits are apparent as improved coordination between sectors. Personnel from offices, who had never met before, are now comfortably discussing freely, making decisions or propositions and identifying potential synergies. Representatives in the SBOH continue in their professional roles, ensuring they are familiar with the subjects and situations, when discussions are necessary. This results in an accelerated response, which is important for emerging diseases. A tangible outcome of this new synergy is the creation of the National Strategy on Antibiotic Resistance (StAR), developed by the SBOH.

The main challenge is that they have mandate to generate recommendations for competent authorities, who has decision and implementation power. Furthermore, the new data protection regulations complicate the process of sharing data in an ideal One Health manner. The SBOH is a young initiative and expect to overcome the limitations eventually.

Subsidiary Body One Health, Federal Food Safety and Veterinary Office, Switzerland

https://www.blv.admin.ch/blv/en/home.html

The Swedish Zoonoses Council - Sweden

The Swedish Zoonoses Council (SZC) was formed in 1997 based on legislation also founding the Swedish Zoonosis Center. The SZC started as a reference group for the Zoonosis Center and served as a tool to improve communication between authorities of the different sectors. The council is composed of risk assessors and risk managers from different authorities with responsibilities in the field of zoonotic agents in animals, humans and food. The involved authorities are The National Food Agency, The Swedish Board of Agriculture, The Swedish Veterinary Agency, The National Public Health Institute, The Swedish Work Environment Authority, County Medical Officers, County Veterinary Officers, and representatives of the municipalities. There is no direct participation of the industry and expansion to inclusion of academic representatives is under consideration.

SZC meets four times a year and discuss outbreaks, strategy gaps, communication strategies and zoonoses control strategies mainly for STEC, Salmonella, Campylobacter and Listeria. An interest in rat-transmitted Hantavirus has also emerged. Discussions revolve around humans, animals, food and feed in Sweden, but outbreaks in neighboring countries may also be part of the agenda. Outbreaks are the main focus, but routine surveillance is also included occasionally.

Data is not exchanged during the meetings. Information on outbreaks is presented and discussed, but no actual data is shared other than related to the actual outbreak and no data interpretation occurs. Legislation on data sharing is very restrictive especially in regards to samples from private persons or producers and this remains the main challenge for the Council. A project called Zoonoses Co-operation is trying to address the issue of data sharing, but has not succeeded yet.

Benefits of their activities include an increased understanding between sectors at administration levels, especially at county and municipality level. This generates more direct communication and allows for better agreement on the development of shared policies and strategies. Because Swedish authorities are very sectioned, a lack of effective communication channels could hamper the work on zoonoses and outbreak investigations. In addition, SZC do suggest projects, but have no funding of their own.

National Veterinary Institute (SVA), Sweden

https://www.sva.se/en/about-sva/the-swedish-zoonosis-centre

DANMAP surveillance - *Denmark*

DANMAP is the Danish Programme for surveillance of antimicrobial consumption and resistance (AMR) in bacteria from animals, food and humans. It is a multi-partner project that involves all sectors connected to the farm-to-fork continuum in a One Health perspective. The DANMAP programme is funded jointly by the Ministry of Health, the Ministry of Environment and Food and the Ministry of Higher Education and Science.

The programme started in 1996, by a group of researchers from the former National Veterinary Serum Laboratory, who believed that the occurrence of AMR in humans was driven by the use of antimicrobials not only in humans but also in animals. This belief is still the main rationale behind the program and its main driver is reducing AMR in human pathogens. It covers the use of antimicrobials in humans and animals and AMR is surveyed along the farm-to-patient chain. Data is collected by surveys along the whole food chain from live animals and carcasses to products at retail and in laboratory samples from ill people and animals. Antimicrobial usage data is collected electronically from all prescriptions in both animal and public health, and analysed and interpreted annually. Although all direct stakeholders are public, non-public sectors can be contacted to help explain specific observations.

DANMAP is a large programme, which includes several One Health initiatives beyond the regular surveillance activity. Research, teaching, international training on integrated surveillance systems and laboratory methodology, national communication initiatives to the public and production of the DANMAP Report are examples of the additional initiatives usually carried out in collaboration between sectors. The DANMAP report has been a template for national reports around the world presenting results of the national monitoring of antimicrobial use and AMR in food animals, food and humans. It is produced by the National Food Institute, Technical University of Denmark in collaboration with Statens Serum Institut, the national public health institute. The National Food Institute is the main driver for data compiling on zoonoses and animal data and Statens Serum Institute analyses the remaining human data. The programme has a cross-sector steering committee, where strategic decisions, communication plans and development of the programme is discussed.

The close and regular collaboration between sectors has several benefits. In an early stage of the programme, it was made possible to see the concurrent usage of growth promoters in the animal population and the increasing AMR in humans, which resulted in the ban of growth promoters initially in Denmark and later in the EU. The close cross-sector collaboration has also resulted in joint teaching sessions, lectures and receiving formal foreign delegations in partnership rather than as separate sectors.

Current challenges include changes in the organizations participating and in the Danish surveillance institutes in general. Exciting future challenges include implementation of novel genomic methods, whilst maintaining the historical value of the surveillance data and finding ways to include the environment to enhance the One-Health-ness of the programme. Plans to increase the OH-ness of data interpretation and surveillance design are also on-going.

National Food Institute, Technical University of Denmark

https://www.food.dtu.dk/publikationer/antibiotikaresistens/danmap

AMRCO - The Antimicrobial Resistance Coordinating Office - *Singapore*

The Antimicrobial Resistance Coordinating Office (AMRCO) started its full operations in September 2018 in the National Centre for Infectious Diseases under the Singaporean Ministry of Health. The office was established as part of their National Strategic Action Plan on Antimicrobial Resistance (AMR). A One Health AMR workgroup was created in 2017 to draft the National Plan, and it was apparent that a coordinating body was needed to facilitate and direct all the planned cross-sectoral integration. The main objectives are 1) the analysis and coordination of surveillance data and evaluation of control measures; 2) coordination of AMR research; 3) development and coordination of AMR education efforts across sectors and 4) provide secretarial support for various national committees for AMR.

AMRCO's main task is to assess situations that could benefit from cross-sectoral approaches and propose areas of collaboration. As of now, there is no integration of surveillance between public health, animal health and food sectors. However, there are some overlaps among the prioritised pathogens, namely ESBL, MRSA and *E.coli*. The animal and food sectors also overlap on their interest in *Salmonella*. From this, cross-sectoral topics have been identified and a pilot for integration is currently being discussed.

The partners and stakeholders vary according to the objective. For education, they involve the Ministry of Education, the Health Promotion Board, the Pharmaceutical Society, nursing schools, medical schools and health care institutions. A plan to educate farmers on the importance of not abusing antimicrobials is in the pipeline for implementation by the animal sector. Public, private and academic stakeholders are all involved and funding for daily office operations comes from the Ministry of Health, while projects to educate the public are financed by the Health Promotion Board. Surveillance is expected to be funded by the individual sectors and currently, AMRCO does not hold any specific funding for research.

AMR and antimicrobial use (AMU) surveillance is implemented in all public hospitals and private hospitals will start submitting data in 2018. In the next few years, primary care units are also expected to start reporting. The Agri-food and Veterinary Agency collects data on animal surveillance and AMU, the latter through collaboration with wholesalers of veterinary drugs. For research, AMRCO is currently mapping all research done in Singapore to do a gap analysis of what is needed to plan research for the future. AMRCO will contact all research institutes and public agencies to propose projects based on the identified gaps.

In 2018, AMRCO took over the production of the national report on AMR and antimicrobial use in public hospitals. As of now, public hospitals submit data in spreadsheets, which are collated for the report. The new One Health report will include data from the human, environmental, animal and food sectors. Data on AMU in animals will be similar to what is reported to the World Organisation for Animal Health. Whole genome sequencing is used for outbreak investigations or in research projects, but there are no present plans to include these data in the reports. As of now, the One Health reports are only for internal circulation in the relevant ministries.

Although it is a very young initiative, AMRCO already generated some tangible benefits, like establishing communication between sectors. Before 2016 and the formation of the One Health AMR working group, there was little knowledge of one another's activities in efforts against AMR.

As a new and wide-ranging initiative, AMRCO also faces multiple challenges. Public awareness of the relevance of AMR is still fairly low and hence demands a high level of effort during the coming years. Regarding research gaps, AMRCO does not have funding for research and will need to apply for common grants to test policies or proposed interventions. Furthermore, AMR is perceived as a human health issue and is not a high priority outside the Ministry of Health. As the issue does not receive widespread recognition yet, it will take time for certain regulations to be adjusted to include AMRCOs work.

AMR Coordinating Office, National Centre for Infectious Diseases, Ministry of Health, Singapore

https://www.ncid.sg/About-NCID/OurDepartments/Antimicrobial-Resistance-Coordinating-Office/Pages/default.aspx

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