SOUND control

COST Action CA17110

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Standardizing output-based surveillance to control non-regulated diseases of cattle in the EU

NEWSLETTER

January 2020

CONTENT

SELECTED TOPICS

Action chair's address

Welcome and thank you for reading this first annual newsletter of our SOUND control COST action. We started at the end of 2018, up to now we have built a consortium with more than 100 scientists and stakeholders from 31 countries aiming to stimulate initiatives to move towards output based comparison of disease control programmes (CPs). This means comparison of the results rather than prescribing how these results should be achieved. We hope that you find this newsletter informative and entertaining and that you will subscribe yourself to the member list so that we can keep you updated about our work.

Inge SANTMAN-BERENDS
Royal GD, the Netherlands

About SOUND control

Inge SANTMAN-BERENDS, Royal GD, the Netherlands

At this moment the requirements to achieve disease freedom are either input based for listed diseases or non-existent for endemic diseases, which create difficulties given the large variation in risk profile and surveillance level between countries. Therefore, In the COST Action SOUND control we try to stimulate initiatives that will enable implementation of a widely adaptable framework for output based comparison to proof freedom from disease as the result of differently designed disease CPs throughout Europe.

To stimulate activities towards output based surveillance, in this Action the variety in disease CPs and the requirements of an output based framework are mapped in working group (WG) 1. In WG2, a flexible data collection framework is designed that can be filled with country specific data that serve as basis for the calculation of disease freedom. In WG3, a number of methods that might be fit for the purpose of output based comparison are studied and their advantages and disadvantages are documented and discussed. The gaps that still exist in this field are identified by WG4 and explored to be able to document the necessities on how to proceed and expand an output based framework further. The communication and dissemination is the main focus area of WG5, ensuring that our Action has the largest possible outreach.

The outputs of all WGs together will result in a further step to move from input based standards where all steps to achieve disease freedom are prescribed, towards a more flexible output based approach that result in tailored and cost effective disease CPs whilst keeping trade safety when animals are moved between countries.

Abbreviations and useful information

COST European Cooperation in Science and Technology – Funding organisation for research and innovation networks. Networks are called **COST Actions**, last for 4 years and bring together researchers from European countries as well as other countries:

- COST Member countries: 38 full member countries and 1 Cooperating Member and 1 Partner Member
- Non-COST Members: COST Near Neighbour Countries (NNC), COST International Partner Countries (IPC)

COST Vademecum Key document which provides the terms and conditions for the financing of Actions and other activities. Other important documents and useful material can be found here.

SOUND control Standardizing OUtput-based surveillance to control Non-regulated Diseases of cattle in the EU

- **CA17110** – COST Action number

MoU Momeorandum of Understanding – The agreement which describes the Action‘s objectives accepted by participating countries

MC Management Committee – National representatives of each COST country nominated by COST National Coordinators (CNC) in charge of the coordination, implementation and management of an Action's activities. Each country has up to 2 MC members and 3 MC substitutes.

CG Core Group – Action‘s leadership

WG Working Group – our Action has 5 working goups:

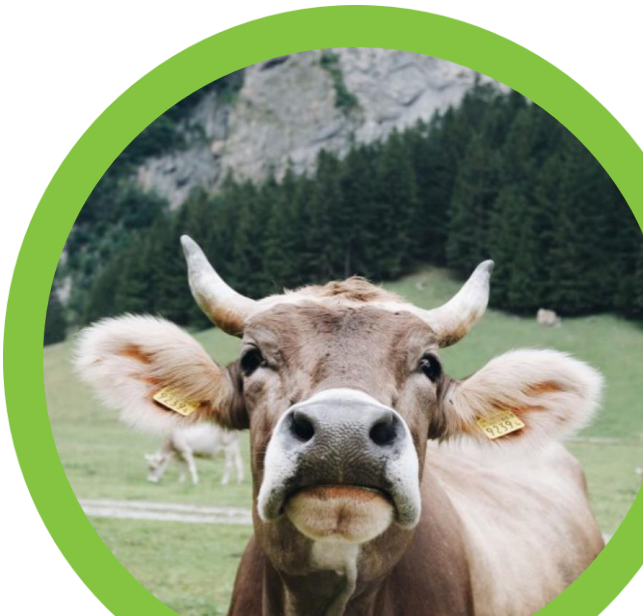
- **WG1** – Characteristics of existing control programmes
- **WG2** – Data requirements and availability
- **WG3** – Evaluation of existing methods
- **WG4** – Addressing the knowledge gaps
- **WG5** – Dissemination and communication

STSM Short-Term Scientific Mission - financially supported mobility of researcher from one institution participating in SOUND control COST Action to the participating institution in another country.

ITC Inclusiveness Target Country - less research-intensive COST Member country

ECI Early Career Investigator – An individual who is within a time span of up to 8 years from the date they obtained their PhD/doctorate

CP/CPs Control Programme/s



Members and their experiences

"Being involved in diagnostics of infectious diseases as well as in design of epidemiological studies, control and surveillance programs in my country, participating in the SOUND control COST Action gives me a great opportunity to meet an excellent people and great experts in related fields, from whom there is a lot that can be learned and then used for improvement of the quality of existing as well as the introduction of additional CPs. For me personally, the added value of being a part of the SOUND control community is the valuable support we are getting, when designing surveillance programmes is in question, which goes beyond the scope of this Action and it is related to diseases of interest in animal species other than bovine."
Igor DJADJOVSKI, North Macedonia (ITC)

"Being part of this COST Action has given me opportunity to learn about the similarities and differences in disease control within the EU while working together with researchers from different countries to make the most of all the information that we already collect. On top of this, I have already been introduced to new research methodologies and participated inspiring discussions that have widened my perspectives and given ideas for future research projects. Perhaps one day some of them will be realised in collaboration with researchers that I have met within this action."
Lena-Marie TAMMINEN, Sweden (ECI)

"Thanks to SOUND control, I have had the opportunity to meet and work with people from many countries. This has allowed me to better appreciate the diversity of contexts with regards to collective means of controlling animal infectious diseases. The knowledge and experience shared will help us controlling these diseases and their consequences."
Aurélien MADOUASSE, France

SOUND control meeting in Utrecht with 58 participants from all Europe

Past meetings

29th October 2018	Management Committee (MC) meeting	COST Association, Brussels, Belgium
21st January 2019	MC, WG1 and WG5 meetings	Porto, Portugal
25-26th March 2019	MC and meetings of all WGs	Utrecht, The Netherlands
5th September 2019	WG1 meeting	Inverness, United Kingdom
4-5th November 2019	MC and meetings of all WGs	Zurich, Switzerland

Next events in 2020

23rd January 2020	CG and WG4 meeting	Warsaw, Poland
2nd week of June	Training school and possibly WG meeting	Ljubljana, Slovenia
1st week of November	MC and WG meetings	Greece

STSMs summary

Researcher	Home institution	Host institution	Topic	Duration
Jaka Jakob HODNIK	University of Ljubljana, Slovenia	SRUC, United Kingdom	**Characteristics of existing CPs and requirements for an output-based framework**	25 days
Jaka Jakob HODNIK	University of Ljubljana, Slovenia	SRUC, United Kingdom	**Development of a framework to collect information about characteristics of CPs of non-regulated cattle diseases; Stakeholders list**	32 days
Violeta MUÑOZ-GÓMEZ	SAFOSO AG, Switzerland	University of Copenhagen, Denmark	**Data requirements and availability to estimate freedom of disease for different CP**	11 days
Xhelil KOLECI	Agricultural University of Tirana, Albania	Utrecht University, the Netherlands	**Designing a data collection matrix for collecting information useful to estimate disease freedom from different CPs for a range of infectious cattle diseases**	12 days
Marit BIESHEUVEL	GD Animal Health, Netherlands	The University of Nottingham, United Kingdom	**Considering the application of a systems /socio-ecological approach to a disease control output-based framework**	25 days
Ingrid TOFTAKER	Norwegian University of Life Sciences, Norway	National Veterinary Institute, Sweden	**Using cattle movement data in the control of infectious diseases in Norway**	10 days
Adrian ARDELEAN	Sanitary Veterinary and Food Safety Directorate, Romania	INRAE & Oniris, France	**Review and ranking of methods for the estimation of a probability of freedom from infection from data generated by disease CPs**	18 days
Eleftherios MELETIS	University of Thessaly, Greece	INRAE & Oniris, France	**Evaluation of statistical methods for the estimation of a probability of freedom from infection from data generated by disease CPs**	20 days
Eleftherios MELETIS	University of Thessaly, Greece	Helmholtz Centre for Environmental Research – UFZ, Germany	**Evaluation of machine learning methods for the estimation of a probability of freedom from infection from data generated by disease CPs**	9 days

STSM participants and ITC grant receiver and their experiences

"My two STSMs were great, because they gave me the chance to meet new people, travel and gain a lot of experience in the field I am interested in. Thanks to the STSMs I got the chance to work at SRUC, one of the top epidemiological research units in the whole of the UK. I also got the chance to visit Scotland and explore its beauty. It was always a dream of mine to live in an English-speaking country to improve my English and I can't imagine a better place to do it in than in Scotland."
Jaka Jakob HODNIK, Slovenia (ECI, ITC)

"STSM1 was a great challenge for me, because in a short period of time I studied various types of statistical models and I gained a lot of experience working on these models, experience that will prove to be very useful for me in the field of epidemiology."
Eleftherios MELETIS, Greece (ECI)

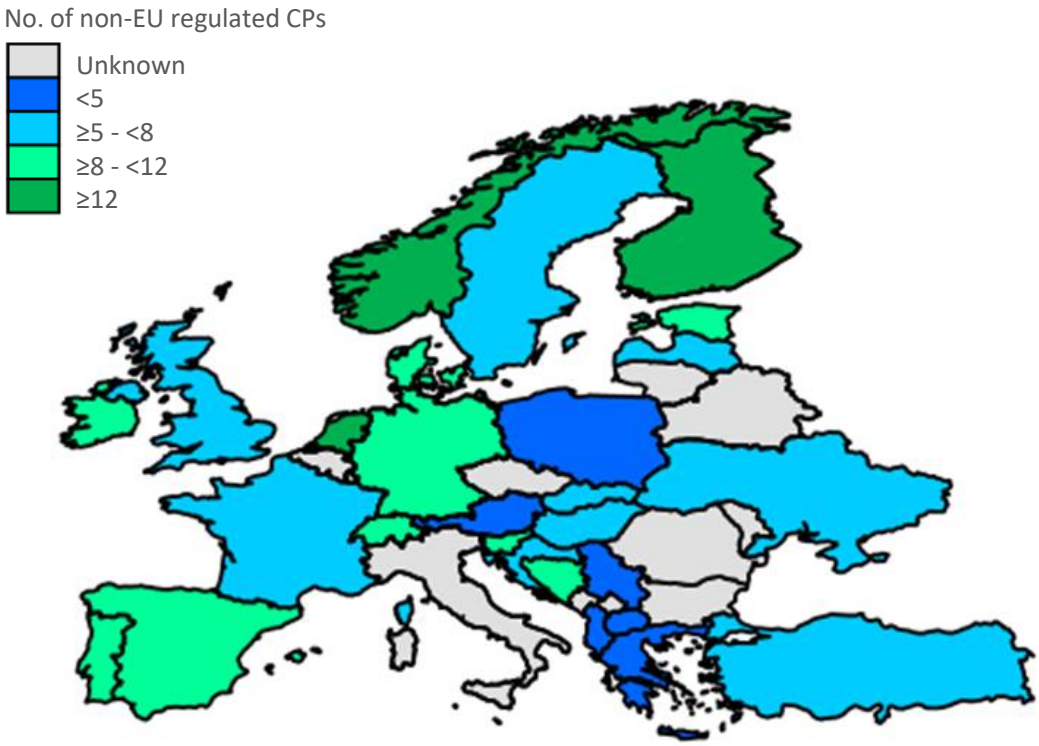
"COST Action in general as well as people involved in our Action gave me a lot of opportunities even though I am relatively unexperienced and not yet an established researcher. I am happy to be able to work with so many engaged experts, to get a chance in leading a working group and to be awarded the ITC conference grant to attend the SVEPM conference in 2019. I am very grateful that so much effort is given to the inclusion of young professionals and especially to those coming from less research-intensive countries."
Tanja KNIFIC, Slovenia (ECI, ITC)

Selected topic

Overview of non-regulated cattle diseases in the European Union for which control programmes are in place

Jaka Jakob HODNIK, University of Ljubljana, Slovenia

At the second WG1 STSM in Inverness a framework of discussion points was made. The framework is divided into two parts, the first is a set of discussion points for the description of the cattle-rearing situation in each country and the second part serves as the basis for the description of the actual CPs. It also includes a decision tree to help all actors decide what is considered as a CP for the purposes of this project. The narratives for Slovenia and the UK, which will serve as an example for other countries were written. Writing the narratives included a review of a lot of legislation from both countries. Gathering the information from the organisations that implement the CPs in the UK was very difficult as it was very scattered. The Deliverable 1.1 (which summarizes the information received from member states in the form of tables that were sent out in January 2019) for WG1 was finished by correcting and adapting the deliverable based on the comments received form representatives of other member states. A discussion, which summarizes the information received and tries to define what will be considered as a CP for the purpose of this Action was added. Subsequently a set of instructions for member states to write a list of relevant stakeholders was made and sent out by email. To date, several replies have been received. On the 5th of September, the work was presented at the WG1 meeting hosted in Inverness. The main results of this STSM are the framework, the narrative for Slovenia and the UK, the list of relevant stakeholders and Deliverable 1.1.



Number of non-EU regulated control programmes implemented by countries participating in the SOUND control COST Action

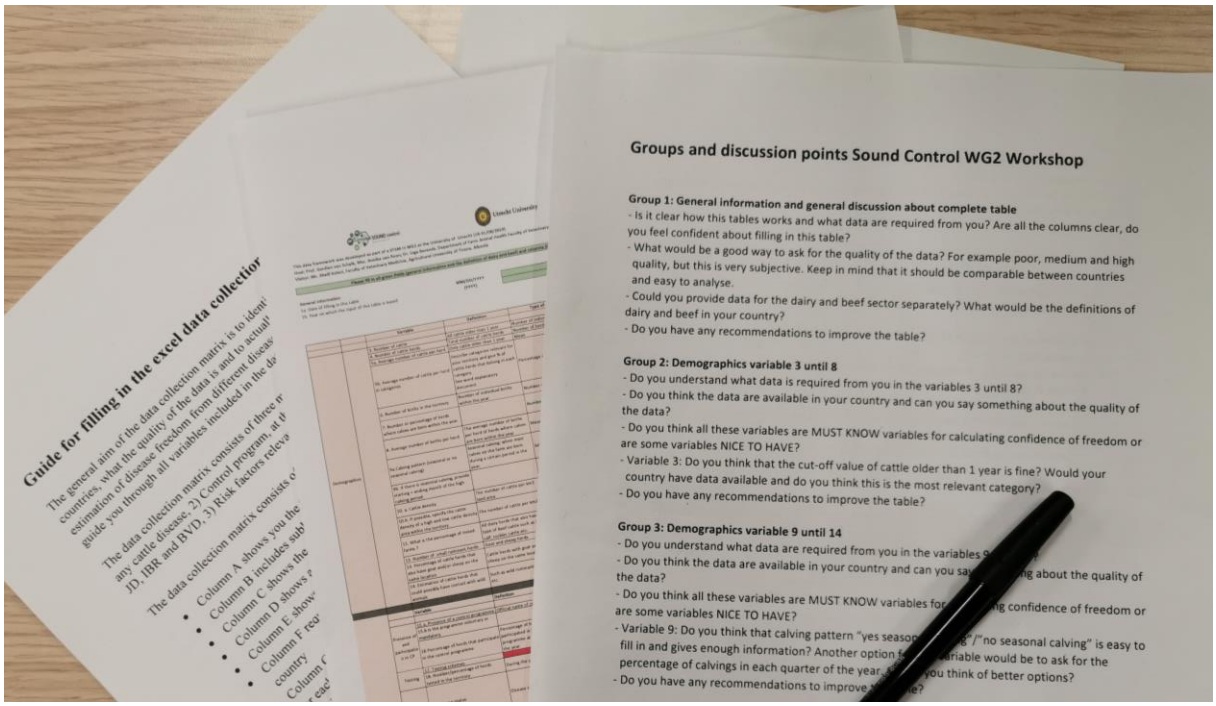
Selected topic

Data collection matrix

Annika VAN ROON, Utrecht University, the Netherlands

Within WG2 a first draft data collection matrix was developed to collect data required for an output-based framework for comparing freedom from infection. The matrix was developed to evaluate availability and quality of data required for calculation of freedom of non-regulated cattle diseases in each country involved in SOUND control. The matrix comprises three sections: cattle demography, disease CPs, and risk factors for the introduction of disease. Within each section many variables are included for which we ask the availability and quality of quantitative data, and the actual data for the cattle industry. Whenever possible and necessary, the variables were separated according to the type of production (beef and dairy cattle) and the data source. Examples of variables within the demographics section are the number of cattle, number of births and cattle density. In the CP section, more details are requested about the presence of CPs, disease status and the testing schemes within each CP. The risk factor section includes variables about purchase, grazing, breeding etc.

A pilot study, in which the matrix was filled in for the Netherlands and Albania, provided us with very valuable information about the differences between these countries and directions in which to improve the matrix. During the SOUND control meeting in Zurich in November 2019, WG2 organized a workshop for all participants in which they were asked to evaluate the design and content of the matrix. Group discussions were organized to look at different parts of the matrix, discuss the importance of included variables and the definitions of good/poor data quality, and assess data availability at the regional and/or national level. Based on the outcomes of the pilot study and the workshop, the matrix will be further developed during the next STSM.



Material used for small group work at the WG2 meeting in Zurich, Switzerland on 4th November 2019

Selected topic

Evaluation of statistical methods for the estimation of a probability of freedom from infection from data generated by disease control programmes

Eleftherios MELETIS, University of Thessaly, Greece
Aurélien MADOUASSE, INRAE & Oniris, France

Under an output-based framework in order to estimate the probability of freedom from infection, various statistical methods can be applied.

Scenario tree analysis is the reference method that is used in order to address this type of problem. Even though with scenario trees multiple complex data sources can be analysed, the main limitation of scenario tree modelling is that this method can only be applied to populations free from infection.

Hierarchical models, under a Bayesian framework, in order to substantiate freedom from infection can be used. These types of models can be applied to both infected and uninfected populations or to populations with unknown infection status. Bayesian hierarchical models assess the probability that an animal population in a country is free from a specific pathogen ("infection"). In order to come to that conclusion, the country-level infection status, region-level infection status, and herd-level infection status are modelled. That model allows the level of inference when the country is infected. To summarize a hierarchical model proceeds from a higher level of the hierarchy to the lowest, asking if the infection is present and thus estimates the probability of infection at the animal-level.

The STOC-free model describes a statistical framework that estimates the probability of infection incorporating all the available information generated by different CPs for the estimation, including context, information on the CPs, test results and risk factors.

Lastly, Bayesian networks can be applied to estimate the probability of freedom from infection, because it is possible to model the conditional probabilities between the variables decreasing the number of independent parameters. Prior knowledge can be very helpful for all of the above methods.

Eleftherios MELETIS during his STSM in Nantes, France

Selected topic

Considering the application of a systems/socio-ecological approach to a disease control output-based framework

Marit BIESHEUVEL, Royal GD, the Netherlands
Jasmeet KALER, University of Nottingham, United Kingdom

The cattle farming industry is still facing economic losses due to health issues of their animals, even though enough scientific evidence is available with regard to disease prevention. So, 'If farmers know what behaviours are good for their animals' health, why don't they do them? This literature review identified that although there has been an increase in appreciation of social science approaches in veterinary science to understand impact of stakeholders' behaviour on disease control in the past five years, still knowledge is largely lacking on key determinants that impact farmer disease control behaviour for cattle diseases and what theoretical underpinnings have been used to understand farmer behaviour. Only ten North-Western European countries studied farmer behaviour resulting in 42 reviewed papers with half having no theoretical underpinning at all. Limitations of papers with a theoretical underpinning is that the majority of these theories are mainly based on individual components and intention towards a behaviour (i.e. theory of planned behaviour), but what about the interpersonal and contextual components influencing farmers' decision-making? These determinants were largely lacking. In this STSM, time was spent to evaluate more recent developed frameworks like the socio-ecological framework and COM-B framework. A good understanding of complex structures of farmer behaviour could lead to more successfully implemented interventions and from behavioural economics it is known that cost-benefits components could be modelled by using the basic concepts of game theory. From this review it was concluded that there is a need for better understanding and application of social sciences approaches in veterinary science to be able to use components related to farmer behaviour in our traditional epidemiological models, which are still assuming farmer behaviour to be homogenous and constant over time.

Marit BIESHEUVEL (4th from the left) during her STSM in Nottingham, UK and **Jasmeet KALER** (1st from the left) and her team at joint dinner

SOUND control
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SOUND control in numbers

31 participating countries

>100 experts from different fields

5 working groups

5 face-to-face meetings

9 STSMs

52 % ITC countries

47 % ITC MC members

31 % ECI MC members

60 % female leadership roles

Project duration:
Oct 2018 - Oct 2022

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EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

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