

## Comparison of the confidence in freedom from infection based on different control programmes between EU member states: STOC free

Newsletter 10 March 2017-9 March 2018

The STOC free project aims to construct a generic framework that will allow a standardised and harmonised comparison of the output of different control programmes of cattle diseases that are not regulated by the EU.

The project is subdivided into five work packages (WP) and for each WP the progress in the first project year (10 March 2017 – 9 March 2018) is described.

**WP5, Management:** The project started with the kick-off meeting at EFSA premises. In the first year, two PhD students (French and Dutch) were employed to complement the team. Monthly Skype meetings were held to discuss the challenges and to monitor the progress of the project. Face-to-face meetings were held in September (between PhD supervisory groups) and November (whole consortium).

**WP1, Development of STOC free model:** In year 1, the conceptual model of BVDV was developed which described the infection process at 3 levels i.e. animal, herd and territory. The model connected the biological processes of BVDV infection with information about control programmes and demographic context information. The aim of the conceptual model is to support the selection of the most appropriate statistical models that will integrate different pieces of information (data) for the estimation of probabilities of being in each single state of interest (outcome) at different levels. After a first evaluation of possible statistical methods, the development of a Bayesian network model appeared the most promising method to use in STOC free.

**WP2, Development of STOC free data:** In the first year, an approach to describe non-EU regulated control programmes implemented in EU member states was developed by tailoring a previous developed tool (RISKSUR) to the needs of STOC free. The information required by the tool was filled in by all partner countries and resulted in a first version of a questionnaire, which will ultimately evolve into the data-collection tool (STOC free data). Additionally, the information is used to describe and compare the different control programmes. At the end of year 1, a literature review/meta-analysis was also initiated to obtain default values for risk factors for BVDV infection to be included in the model.

**WP3, Case studies:** Will be conducted from year three on.

**WP4, Dissemination:** During the first project year, the STOC free website was developed ([www.stocfree.eu](http://www.stocfree.eu)) and STOC free discussion groups were created on LinkedIn and Research Gate. The global aim of the project was presented to EFSA, FESASS and national stakeholder organisations and a general article was submitted for publication in the FESASS journal.

**Deliverables 2<sup>nd</sup> year: March 2018 – March 2019**

- **April 2018:** guidelines conceptual framework (D1.1) and a first draft of the questionnaire (D2.1)
- **July 2018:** guidelines for identification and sources data (D1.2), description of the BVD control programme of all partner countries (D2.2), second draft questionnaire (D2.3)
- **September 2018:** Annual report year 1 (D5.1)

## Background

Several European Member States (MS) have implemented control programmes for endemic infections that are not regulated by the EU. Such programmes are to be strongly supported but also create difficulties for intra-community trade, as free trade has the potential to allow the movement of infectious agents into regions where freedom from infection has been achieved. Objective and standardised comparison of the outputs of different control programmes conducted in MS is very important to guarantee safe trade.

In the STOC free initiative, 6 countries collaborate to construct the generic framework that will provide for standardised and harmonised comparison of the output of different control programmes of cattle diseases that are not regulated by the EU and that are applied in the different MS. The framework will focus on comparison of the confidence of freedom from infection at different levels of aggregation such as animal, herd, region or country.

The STOC free framework will allow the integration of heterogeneous data from different regions and will result in standardised and comparable outputs. The framework will be designed and optimised using pilot-scenarios describing the control programs encountered in the consortium partner countries. During this project, BVD will act as the primary example case disease because for this disease a large variation in both programme design and prevalence exists between MS. The information about BVDV control programmes, combined with test specifications and demographic context information will form the basis of a case study where the developed methods will be applied to BVD in the consortium member states. In the final stage of the project, the developed methodology will be evaluated for possible generalisation to other cattle diseases such as BoHV1, *Mycobacterium bovis* or paratuberculosis. The knowledge and outcomes obtained in STOC free will be disseminated to stakeholders and decision makers in order to stimulate the uptake of the developed methodology.

In this document, the progress of the first year is described.

## WP5: management

*WP leader and co-leader: G. van Schaik and I. Santman-Berends (Utrecht University, the Netherlands)*

- Start date: 10 March 2017
- End date: 09 March 2021

### **WP5: Highlights of year 1**

In December 2016, this project was awarded a grant by EFSA under reference GA/EFSA/AFSCO/2016/01-03. The STOC free project started on 10 March 2017 with a kick-off meeting at EFSA's premises in Parma, Italy.

The first face-to-face meeting with the whole consortium was on 29 March 2017 at the yearly SVEPM conference in Inverness, Scotland. During this meeting the milestones and deliverables of the work packages were discussed, a brainstorming session about the STOC free framework was held and important dates throughout the project were set.

On 3 July 2017, PhD student Annika van Roon started working on the project. In her research, which is mainly focused on development of the STOC free data tool (WP2), she will develop methods for standardized data collection on cattle disease control programmes and test the generic output-based framework developed by the French partners to determine confidence in freedom from infection. On 5 September 2017, PhD student Mathilde Mercat started to work on the project. Her work is mainly focussed on WP1. In this WP, the STOC free model will be developed. Close collaboration between the Dutch and French students is foreseen in the project as the French student will develop the methodology for the output-based, quantitative comparison of control programmes and the Dutch PhD will develop the means to uniformly gather the input for this model.

A face-to-face meeting was held with the Dutch, French and Irish partners in Utrecht, the Netherlands on 21 September 2017. This meeting was intended as an introduction between the Dutch and French PhD students and their supervisors and to discuss future collaboration between the students and to have a content related discussion on WP1 (STOC free model) and WP2 (STOC free data). During the meeting, the students presented their work and the next steps to take were discussed.

The yearly face-to-face meeting with the whole consortium was held on 13-14 November in Amsterdam. During this meeting, the final version of the RISKSUR tool + narratives was discussed. Furthermore, the first draft of the conceptual framework and possible statistical methods were presented by the French partners.

In year 1, an initiative was started with all partners for development of an extended collaboration agreement that included important aspects such as confidentiality and rights to publish.

Besides the face-to-face meetings, monthly Skype meetings have been held to discuss the progress of the project.

*Deliverables first year: None scheduled*

## **WP1: Development of STOC-free model**

*WP leader and co-leader: C. Fourichon and A. Madouasse, PhD student M. Mercat (ONIRIS, France)*

The aim is to develop a method (STOC free model) for the quantitative comparison of the confidence in freedom from infection in different control programmes for non-regulated diseases in the EU.

### **WP1: Highlights of year 1**

During the first year, WP1 focussed on the development of a conceptual model representing the course and dynamics of infection at different levels and the exploration of possible statistical methods that showed potential to be used in this specific context. From 5 September on, PhD student Mathilde Mercat started to work on the project.

#### *Conceptual model*

The conceptual model described the infection process for the STOC free case disease - BVD - at 3 levels. At the animal level, the different infection states and the transitions between states (such as susceptible, infectious or resistant) were evaluated. At the herd level, the model considered herd

demography, contact structure and the transmission pathways. At the territory level, the model represented possible transmission pathways from outside to within the territory. The conceptual model was developed and mapped the different types of information that existed for a given infectious disease onto the true status regarding infection.

The model connected:

- The biological system: the true status regarding infection which is of interest for different levels of analysis: animal, herd and territory.
- Information that is extremely diverse. Conceptually, two types of information that are different in nature can be distinguished:
  - Information generated and collected to specifically detect the pathogen of interest such as test results from control programmes
  - Information associated with an increased probability of pathogen presence such as risk factors of infection

The conceptual model was delivered in April 2018 and will be used to design the appropriate statistical models that will integrate different pieces of information (data) for the estimation of probabilities of being in each single state of interest (outcome) at different levels.

#### *Statistical model*

After evaluating and discussing different statistical approaches, development of a Bayesian network model appeared the most promising method to use in STOC free. Bayesian networks are flexible and allow for heterogeneous input information. Such information can be incorporated by inclusion of prior distributions for the parameters in the model. The prior distributions can be based on default information on for example country level but can be tailored to each specific situation by entering more specific information. Data to specify the distributions to specific situations can be obtained from databases of control programmes, demographic data and contact structures between herds that will have a heterogeneous nature. In addition, frequency of occurrence and risk estimates for factors that influence either the probability of introduction or delayed detection of the infection in an animal or herd will be included in the model.

*Deliverables first year: None scheduled*

## **WP2: Development of STOC-free data**

*WP leader: S. More (UCD, Ireland), PhD student A. van Roon (Utrecht University, the Netherlands)*

The aims of WP2 are two-fold:

1. To develop a generic data collection framework named STOC-FREE DATA, guided by the methodology developed in WP1, and
2. To use this framework to provide a thorough description of the BVDV control/eradication programmes (CPs) conducted in defined EU MS and to, subsequently, collect specific quantitative information about the CPs.

### **WP2: Highlights of year 1**

In the first year of the project, the PhD student developed an approach to describe non-EU regulated control programmes implemented in EU member states. The BVDV control programme currently in place in the Netherlands was used as an example in the development of the approach. The information about BVDV control in the Netherlands was gathered using an existing tool for harmonized description of surveillance programmes (the RISKSUR tool, <http://www.fp7-risksur.eu/results/tools>). This tool was initially made for building and improving surveillance systems. As it did not meet all the needs for the STOC free project, the tool was expanded to enable it to gather information related to surveillance but also to the control of the disease. The improved version was subsequently tested for the Irish BVDV programme. By filling in the tool, the first aspects of control programmes that influence the confidence of freedom from infection were identified. The tool was discussed during the first annual meeting. In agreement with WP1 and the other consortium partners, it was decided to focus on risk factors for introduction of BVDV infection and delayed detection as a first step in the evaluation of confidence of freedom in-between test moments. At the end of November 2017, the final version of the adapted RISKSUR tool was distributed to all partners requesting to fill-in all country specific information. The information was returned in January 2018. Based on the information that returned a first version of a questionnaire was drafted, which will ultimately evolve into the data-collection tool. The first draft questionnaire was discussed with all partners and feedback to improve the questionnaire was returned to the PhD student. The improved questionnaire will be the first deliverable of WP2 which is due in April 2018. Additionally, the PhD student started to describe and compare the different CPs based on the information that was returned in the RISKSUR tool and started a literature review/ meta-analysis in collaboration with WP1.

*Deliverables first year: None scheduled*

### **WP3: Case studies and generalisation**

*WP leader and co-leader: A. Lindberg and J. Frössling (SVA, Sweden)*

The objective is to validate and optimise STOC free model and STOC free data that are developed in WP1 and WP2, respectively, in case studies that are conducted by all partners.

### **WP3: Highlights of year 1**

The work foreseen in WP3 will be conducted from 2019 on. During the annual meeting in year 2, the case studies that will be carried out by each of the partner countries will be discussed.

*Deliverables first year: None scheduled*

### **WP4: Communication and dissemination**

*WP leader: J. Gethmann (FLI, Germany)*

### **WP4: Highlights of year 1**

During the first project year the following dissemination activities were conducted:

- The STOC free website was developed.

On the website background information of the project is provided and interested people are informed through a news page. An internal area was included on the website to enable the possibility to share information between the project members in a safe and secure way.

- A STOC free group was created on LinkedIn and Research Gate

The group pages aimed to frequently disseminate news updates about the project to the scientific community and other interested stakeholders.

- On 1 December 2017, the project was presented during a FESASS board meeting in Deventer, the Netherlands.

During this meeting the general project was presented and discussed with the FESASS members. Additionally, a short questionnaire was developed for this meeting and the board members were requested to provide anonymous feedback by filling in the survey.

- On 1 December 2017, an abstract describing the general project was submitted to the InnovSUR conference and was granted an oral presentation (from 16-18 May 2018).
- On 24 January 2018, the project was presented during an EFSA expert panel meeting in Parma, Italy.
- On 7 February 2018, the Dutch partners discussed the progress of the project with their national financiers (the Dutch ministry of Economic Affairs).
- On 20 February 2018, an article describing the general outline of the project was submitted for publication in the FESASS journal of March 2018.

*Deliverables first year: Website is developed and online (delivered June, 2017)*

## **Planning year 2**

In year 2, the conceptual framework will be finalised and delivered to EFSA. Additionally, WP1 will proceed with the development of the statistical method and will identify the data needed to fill the model. The latter will be done in close collaboration with WP2. As part of WP2, the information about the different CPs in the partner countries and the questionnaire will be delivered and the work on development of the data collection tool will proceed. Together with WP1, a literature review/ meta-analysis will be conducted to identify and possibly quantify the most important risk factors for introduction and delayed detection of BVDV. At the end of year 2, the specific case studies will be discussed and during the year the communication and dissemination will proceed. In March, two posters of the STOC free project were presented at the SVEPM conference in Tallinn, Estonia and the project was presented during a FESASS conference in Brussels. In May, the project was presented and discussed during the InnovSUR conference.



In the second year, monthly Skype meetings are held to discuss the project. Additionally, the Dutch PhD student visits the French team for a week to work on several deliverables. The annual meeting is planned for 9 and 10 October 2018 in Nantes, France.