



## Research Brief

### Mapping of surveillance systems, animal populations, trade flows, critical infrastructure and decision making processes in seven European countries

Due to factors such as globalisation, climate change, and changing food production the past twenty years have seen the European Union (EU) experiencing several animal health crises, which had severe economic, social and political impacts. These crises had dramatic adverse effects on the livestock sector and public health and resulted in significant disruptions to markets and the wider economy.

Consequently, there is a demand for more effective and efficient surveillance systems to avoid negative (economic) consequences resulting from animal disease and to improve animal health and welfare. At the same time, many decision-makers are under pressure to reduce their budgets and therefore are interested in frameworks that help to take decisions on efficient resource use. The RISKSUR consortium presents an integrated assessment for informing surveillance design, based on mapping of surveillance system components in

seven European countries and analysis of related demographic, production, infrastructure and trade characteristics as well as existing decision-making processes for resource allocation to surveillance.

The findings are based on primary and secondary data collected and collated by RISKSUR researchers in France, Germany, Great Britain, the Netherlands, Spain, Sweden, and Switzerland. Additionally, data on human and animal populations, livestock and bee holdings in Europe, gross domestic product, and farm values were collated from Eurostat. The EU's Trade Control and Expert System (TRACES) provided the data on trade. The data were then analysed descriptively in several parts. A first part mapped the distribution of human and animal populations, animal holding densities and holding size densities at NUTS2 level. Absolute trade flows of live animals and animal products between countries were also mapped. For illustration purposes these were broken down by species and purpose. Another part represented the number of slaughterhouses, livestock markets, traders, transporters, laboratories, and veterinarians. These were then compared to livestock demographics. Further, existing surveillance system components (SSC) were described in terms of target hazard, species, surveillance protocol and design, geographic focus, purpose, inclusion of risk-based sampling, multi-objective nature, coordination and expenditures.

Finally, decision-making processes were described and key decision-making criteria defined by the relevant stakeholders. Key findings are summarised here.

This report summarises findings resulting from data collection in France, Germany, Great Britain, the Netherlands, Spain, Sweden, and Switzerland.

The list of components collated resulted in a solid dataset, providing a comprehensive picture of the surveillance systems in these countries.

### Key attributes

The report brought together key system attributes of selected countries allowing a comparison between countries and systems.

Findings highlight areas for further research that can help design risk-based surveillance systems that are scientifically sound and acceptable to stakeholders.

## Overview of human and animal populations in Europe

The analysis of production data is critical to be able to understand the basic composition, characteristics, and functioning of the system that surveillance systems are trying to protect. Geographic areas with higher proportions of households keeping livestock are countries in the Baltic, East, Southeast and Balkan parts of the EU, Ireland (for cattle, sheep and equines), and Portugal (for broilers). The proportion of households involved in livestock keeping (along with the tendency for there to be more small

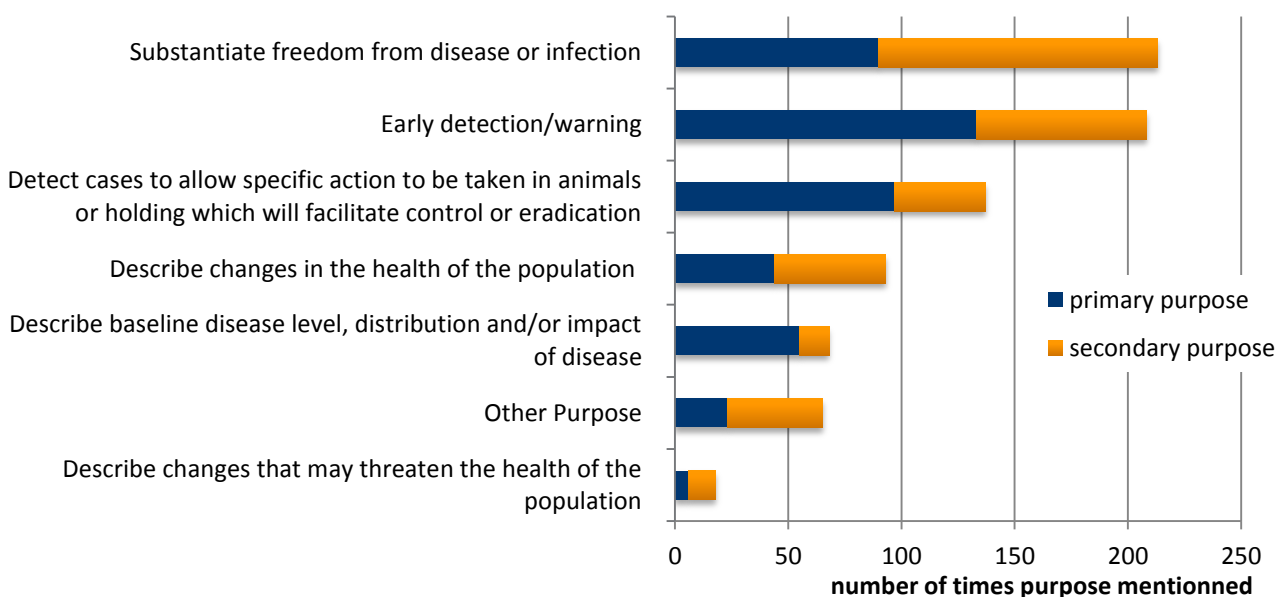
herds/flocks when more households are involved) has implications for supply of veterinary services in general and surveillance in particular. The infrastructure data showed that there were variations in densities and throughput between countries: for example the number of slaughterhouses per head of livestock species was highest in Germany for cattle, pigs and ruminants and in Sweden for poultry.

## Surveillance systems

A total of 484 active or enhanced passive surveillance components were recorded and analysed. The primary surveillance purpose most frequently mentioned was “early detection/warning”, followed by “detect cases to allow specific actions to be taken in animals or holdings which will facilitate control or eradication”, and “substantiate freedom from disease or infection” (Figure 1). The least frequently mentioned surveillance purpose was to “describe changes that may threaten the health of populations”.

When looking at the number of surveillance components reported by threat, disease,

health event and country, most frequently recorded were salmonellosis, brucellosis, bluetongue, avian influenza, bovine spongiform encephalitis, classical swine fever, Aujeszky’s disease, bovine tuberculosis, trichinellosis, enzootic bovine leukosis and bovine viral diarrhoea. Species most frequently identified as targets for surveillance were cattle, pigs and poultry (Table 1). The findings suggest that the single threats or health events covered most frequently by surveillance and the predominance of certain species likely reflect their economic importance and the expected high impact if disease occurs.



**FIGURE 1** REPORTED OVERALL TOTALS OF SURVEILLANCE PURPOSE

**TABLE 1** NUMBER OF SURVEILLANCE COMPONENTS RECORDED, BY TARGET SPECIES IN EACH COUNTRY  
(COUNTRIES WERE ANONYMISED IN THE REPORT)

Species	TOTAL	Country 1	Country 2	Country 3	Country 4	Country 5	Country 6	Country 7
All species	<b>8</b>		1	1				6
Avian <sup>a</sup>	<b>3</b>						1	2
Bats	<b>2</b>			1			1	
Bees	<b>1</b>		1					
Camelids and Deer	<b>2</b>							2
Cattle	<b>130</b>	7	20	28	12	11	23	29
Equidae	<b>18</b>		7	6	3		2	
Feed	<b>4</b>		3				1	
Fish	<b>8</b>		3	2	1		2	
Insect vectors	<b>4</b>		1	2		1		
Multi	<b>42</b>		15	11	3	2	6	5
Other	<b>13</b>			10	1		2	
Pigs	<b>83</b>	2	24	12	7	6	18	14
Poultry	<b>66</b>	8	18	10	1	4	16	9
Ruminants	<b>13</b>		3	4		3	1	2
Small Ruminants	<b>55</b>	2	10	17	6	4	8	8
Wildlife	<b>32</b>		15	5	3	1	7	1
<b>TOTAL</b>	<b>484</b>	<b>19</b>	<b>121</b>	<b>109</b>	<b>37</b>	<b>32</b>	<b>88</b>	<b>78</b>

<sup>a</sup> Includes all birds, i.e. domestic birds and wild birds

Most countries reported that the majority of components listed were publicly funded, but there were also countries where a considerable percentage of SSC was privately funded. However, expenditure estimates were only available for 28% of the components thereby indicating that such data are not readily available and/or accessible. The interviews with decision-makers and technical advisors showed that a multitude of private-public partnerships are in use across countries.

Two-thirds of all components recorded were of risk-based sampling nature; the majority of them categorised based on risk without making a differentiation when selecting the units within this population (e.g. targeting the entire population of males in artificial insemination centres or all animals over 6 months of age).

The data also showed that multi-objective surveillance is common in the seven countries with 39% of all components being multi-objective. Multi-objective surveillance has the possibility of reducing overall expenditure, since the same sample is being tested for multiple pathogens.

Importantly, all components relied on case definitions that included a laboratory diagnosis. This has considerable implications since it requires the provision of the necessary laboratory infrastructure to conduct surveillance and may constitute a significant cost factor. If surveillance systems are heavily dependent on such infrastructure, the fixed costs of these systems should be part of analyses assessing the economic value of surveillance.

## Decision-making

The information from the 34 interviews conducted with decision-makers and technical advisors showed that decision-making processes for public surveillance in the partner countries are highly variable with a multitude of institutions involved and a varying degree of collaboration and input from private bodies. For the allocation of resources to surveillance the most frequently mentioned decision criteria were ‘international legal requirement’ (including EU obligations) and national legal requirement. The decision-makers ranked economic decision-making criteria high, whereas technical advisors frequently men-

tioned ‘disease situation in the country’ and ‘impact’ related criteria (impact on animal production, national economy, and human health). They also mentioned effectiveness criteria (e.g. ‘timeliness’, ‘sensitivity’), especially when asked what criteria are relevant when considering how to do surveillance. For the resource allocation process many constraints were listed: most people interviewed said they would like to have further information (e.g. epidemiological, economic information, standardisation and harmonisation) when taking decisions related to resource allocation to surveillance.

## Further activities

- **RISKSUR at SVEPM 2014 in Dublin:** Several RISKSUR partners attend the annual conference of the Society for Veterinary Epidemiology and Preventive Medicine (SVEPM) in Dublin, 26-28 March 2014 and present latest RISKSUR results.
- **RISKSUR at ICAHS 2014 in Havana:** RISKSUR is represented with three oral presentations and one poster presentation at the 2nd International Conference on Animal Health Surveillance (ICAHS) in Havana, Cuba, 7-9 May, 2014.
- **RISKSUR Surveillance Surgery:** A “Surveillance Surgery” on May 15, 2014 on “African Swine Fever (ASF) Surveillance” taking the format of an online meeting, where participants have the unique opportunity to get answers to all questions related to ASF surveillance.
- **Best practice workshop and guidelines:** A RISKSUR workshop with the goal to develop best-practice guidelines for animal health surveillance for 25-50 participants, with a mixed background in surveillance research, practice and policy. September 30, 2014, The Hague, The Netherlands.



## Conclusions

- The mapping provides a useful **overview of populations, trade flows, surveillance systems, infrastructure and decision-making** in seven RISKSUR partner countries which can be used to inform further activities in RISKSUR.
- Within RISKSUR there is potential to address some of the **constraints mentioned by decision-makers** and their request for further information.
- RISKSUR can address the lack of evidence in an epidemiological and economic context, including social and political dimensions, in the **conceptual framework** and the **evaluation tool** it is developing.

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