Economic evaluation of the Salmonella Dublin surveillance system in dairy cattle in Sweden using a new surveillance evaluation support tool

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RISKSUR: Providing a new generation of methodologies and tools for cost-effective risk-based animal health surveillance systems for the benefit of livestock producers, decision makers and consumers

Economic evaluations help decision makers to choose between two or more surveillance systems (SS) and/or surveillance components (SC).
The aim was to conduct an economic evaluation on the Salmonella Dublin surveillance system in dairy cattle in Sweden using a tool developed within the RISKSUR project: the EVA tool.

Context and Objective

Context: A newly component of bulk milk sampling of dairy herds is proposed with two options :

- a conventional design (sampling of all dairy herds)
- a risk-based design (the sampling depends of the risk status of the herds)

Objective: Compare the two designs using a cost-effectiveness analysis and recommend the selection of the most cost-effective option.

Materials and Method

The "EVA Tool"

The objective of this tool is to provide a comprehensive guidance to decision makers and their technical advisers to plan and conduct evaluations of animal health SS and/or SC.

The EVA tool:
✓includes the possibility to conduct an economic evaluation
✓needs information about the surveillance context, the evaluation question and the available data and resources
✓provides ranked assessment attributes with methods to assess them (existing or newly elaborated within the RISKSUR project)

Application of the EVA tool

Step 0: Description of the case study

➢ S. Dublin surveillance system in dairy cattle in Sweden.
New component: bulk milk sampling
Two options: conventional vs. risk-based design
➢ Surveillance objective: **Detect cases to allow further actions to control the infection/contamination**

Step 1: Define the evaluation question

➢ To assess the costs of surveillance components that achieve a defined objective and rank them according to costs to identify **the least-cost option**
➢ To assess if there is surveillance component that achieve **a higher effectiveness** than another one at the same cost

Step 2: Identification of the assessment criteria and selection of priority evaluation attributes

Table 1: Final list of attributes (short version)

Assessment criteria	Evaluation attributes
Effectiveness	Sensitivity
	Detection fraction (DF)
	Timeliness
Costs	Costs

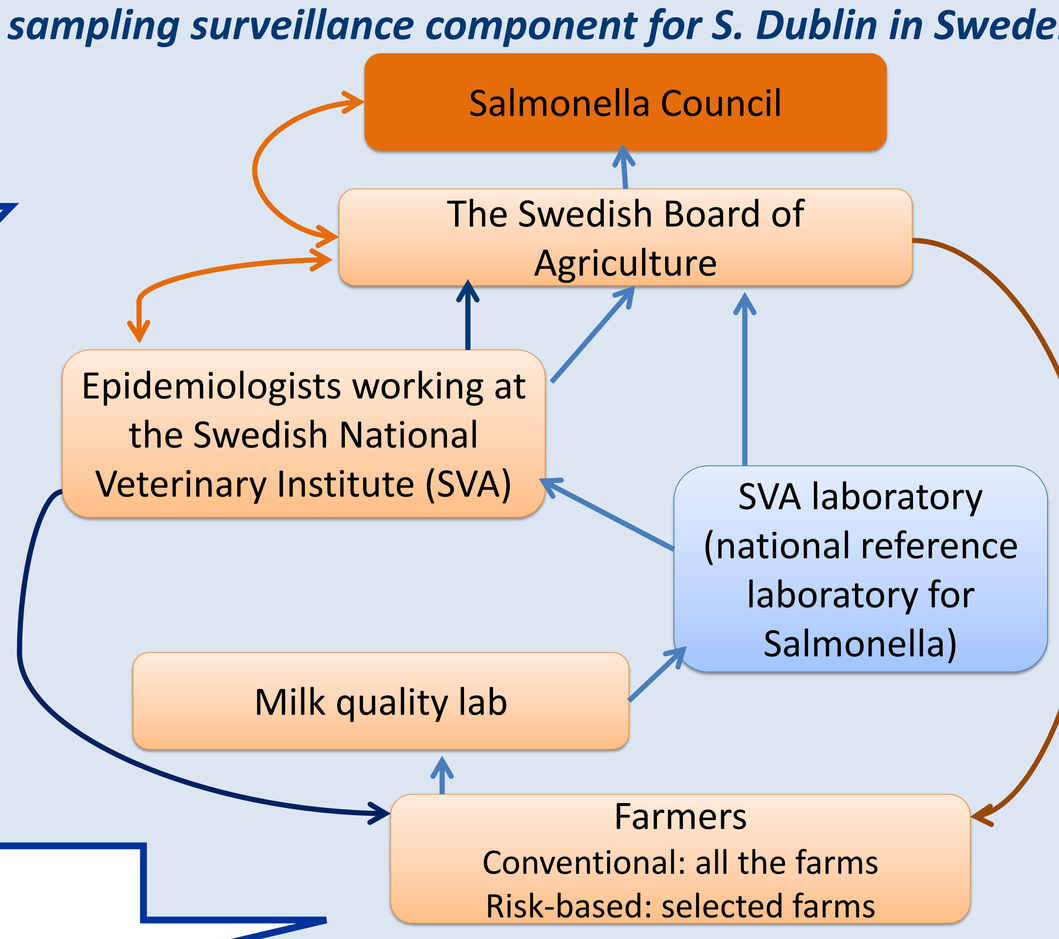
The Cost-Analysis (CA)

The aim of a CA is to estimate the total cost of a SS/ SC.

The different steps of the CA are:
✓ To make an inventory of all the surveillance activities
✓To estimate the number of units for the labour and operations and expenses for each surveillance activity
✓ To multiply the number of units by relevant market prices and wage rates
✓ To calculate the total cost of a SS/ SC considering the timeline, inflation and discounting.

The Cost-Analysis (CA)

Figure 1: Schematic organisation of the new bulk milk sampling surveillance component for S. Dublin in Sweden



Information needed :

-Overhead and communication costs

- Planning, preparation, analysis and interpretation of data, supervision, communication, evaluation and revision costs

- Sample testing, data collection, transfer and administration costs

- Sampling costs

Effectiveness assessment

According to the surveillance objective, the DF is the priority evaluation attribute to assess. The DF is the proportion of truly positive cases that are successfully detected by the SS. It is equal to the test sensitivity multiplied by the coverage of the SS. As the two options are modelled, the data collected to assess the DF will be simulated data.

The Cost-Effectiveness Analysis (CEA)

The method used here will be to estimate a cost-effectiveness ratio (CER). For both options, the SC costs are provided by the CA and the SC effectiveness by the detection fraction assessment.

$$CER = \frac{SC\ costs}{SC\ effectiveness}$$

The estimation of the CER for the two potential components informs about:
• The more effective option for the same cost
• The cheaper option for the same effectiveness
This information will help the decision makers to choose between the conventional and the risk-based design.

The RISKSUR consortium: Royal Veterinary College (UK) – Accelopment AG (CH) – Animal Health and Veterinary Laboratories Agency (UK) – Arcadia International (BE) – Cirad/Agricultural Research for Development (FR) – Complutense University of Madrid (ES) – Food and Agriculture Organization of the UNO (IT) – Friedrich-Löffler-Institut (DE) – Gezondheidsdienst voor Dieren (NL) – Safoso AG (CH) – Swedish National Veterinary Institute (SE) – TraceTracker AS (NO)

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SEVENTH FRAMEWORK PROGRAMME