Multi-Objective surveillance approaches: An inventory from 7 European countries
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Background
Faced with a plethora of available methods, **surveillance designers** usually lack tools that allow them to choose the best methods for specific scenarios. RISKSUR is a project involving 12 partners from 10 European countries. The objective of the project is to provide 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.

Multi-objective surveillance allows designers to reduce costs by combining surveillance activities for several hazards, but it can be challenging to use risk-based approaches when multiple hazards must be accounted for.

Multi-objective surveillance components: type MULTIPLE
The same samples are always tested for multiple specific and pre-identified hazards. Only ACTIVE surveillance components were considered.

### Species Sampling point COUNTRY
#### Pigs
- Farm or abattoir: PRRS, AD
- Farm: CSF, Bruc.

#### Cattle
- Farm collection centres: EBL, Bruc.
- Milk: Chlam., Lepto.

#### Small Ruminants
- Farm: BD, Bruc.
- Milk: CAE, Other mycobact.

#### Poultry
- Farm: AI, ND

#### Equids
- Farm: CSF, Bruc., PRRS

#### Insect
- Natural habitat: BT, others with same vector

#### Wild bears
- Natural habitat: CSF, AD, BD, Bruc.

#### Wild carnivores
- Natural habitat: Echinococcus multilocularis, Trichinella spiralis

#### Wild cervids
- Natural habitat: TBE, Bruc.

#### Wild bovids
- Natural habitat: Peste des Petes, Bruc., sarcoptic mange

### Methods
As a first step to developing frameworks that can be useful for the design and implementation of multi-objective surveillance, an inventory of approaches used in seven RISKSUR partner countries was extracted from a survey of surveillance components in place. Countries were anonymised to comply with data protection issues.

The following definition was used:

“Surveillance component: single surveillance activity used to investigate the occurrence of one or more hazards or health events in a specified population, which has a self-contained surveillance protocol that focuses on a particular data source.”

Multi-objective surveillance components: type MOTHER/CHILD
The samples collected for investigation of a specific hazard (Mother component), are used to test for other specific and pre-identified hazards (Child components).

### Species Sampling point Mother Child components by country
#### Pigs
- Farm + Abattoir: PRRS
- Farm: CSF, AD

#### Cattle
- Farm: Brucella, BT
- Milk collection centres: BVD

#### Small Ruminants
- Farm: EBL, CBPP

#### Birds
- Farm: Bruc., Q fever
- Wild: *Avian influenza* West Nile

Other surveillance designs identified as Multi-Objective:

**Event-based:** Mandatory reporting events are investigated for a number of specific and pre-identified hazards.

**Multi-hazard surveillance:** Surveillance is designed and executed in conjunction for a number of specific and pre-identified hazards.

**Vector surveillance:** covers more than one vector-borne disease

**Common events triggering testing:** Abortion; death in food producing animals and in wild animals.

**Common tests:** Brucellosis, CSF, PRRS and swine influenza.

**General purpose programs:** Surveillance is not focused on a specific hazard, but on monitoring indicators of health.

**Abattoir surveillance** (potentially multi-objective):

**Health surveillance:** Specific surveillance components with collection of data during slaughter (Ex.: tuberculosis or trichinellosis) were not considered multi-objective. However, many countries pointed out that abattoir surveillance can serve several surveillance programs/components.

### Conclusions
The use of multi-objective surveillance was common among the European countries investigated. There are differences in the number and variety of threats investigated in conjunction, or which threat is the main purpose of sampling. However a number of common components were identified. The extent of multi-objective surveillance used must be considered when developing frameworks for designing surveillance, especially when risk-based strategies are to be used.

It was interesting to note that there were many different interpretations of the concept of ”multi-objective” surveillance. It was initially intended to represent only relationships of the type “multiple” and “mother/child”, but abattoir surveillance and general purpose surveillance were other types reported by the countries as “multi-objective”. A terminology agreement is needed.

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² All RISKSUR members received these results

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