

Economic evaluation of surveillance - a Bovine Virus Diarrhoea case study

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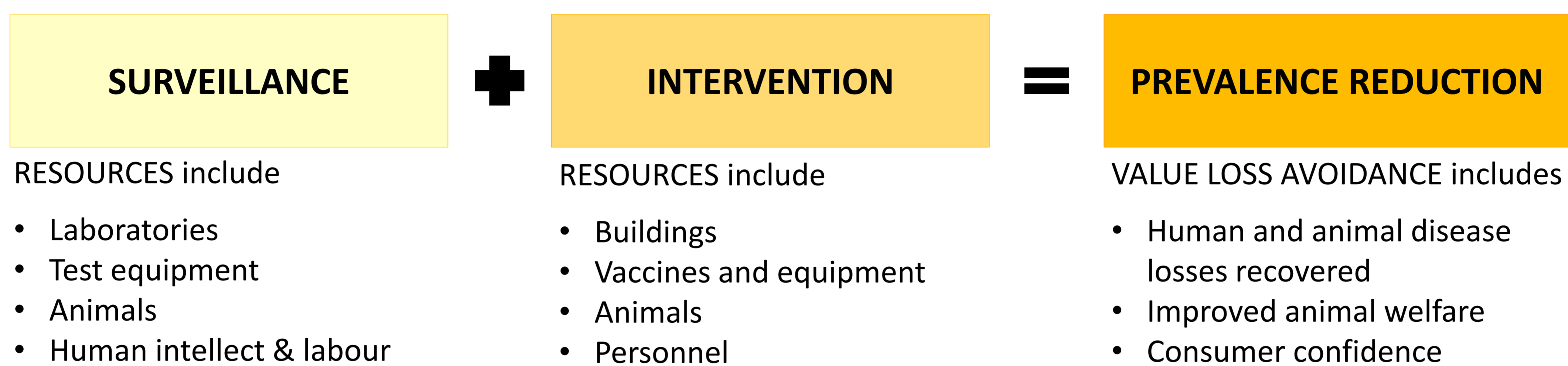
Aim

Sound **economic evidence** is needed to justify **veterinary surveillance and intervention** programmes because resources are scarce and governments have limited budgets. **Surveillance** is the activity of data collection, analysis and communication of information to guide decisions on interventions for disease control. The Swiss **Bovine Virus Diarrhoea Virus (BVDV)** surveillance and intervention programme is used as a case study to illustrate an algorithm for the economic evaluation of surveillance that allows the comprehensive definition, documentation, estimation and comparison of all relevant sources of costs and benefits.



Conceptual framework

Surveillance (S) is a source of information acquired with the objective of taking decisions about what, if any, interventions (I) should be made for disease control (=Prevalence reduction PR). Understanding the technical relationships between S, I and PR is the precursor to economic analysis to identify combinations that maximise social net benefit. Optimal combinations vary over time with changes in the relative prices of resources and animal products, and technical possibilities. Not all economic 'values' are determined by conventional markets, so other approaches must be taken to evaluate animal welfare and other sources of people's concerns such as protection of human health.



Case study

In 2008, the Swiss government initiated a compulsory **national eradication programme for BVDV** based on individual identification and elimination of persistently infected (PI) animals. After testing the whole national herd (S) and eliminating all detected PI animals (I), the programme moved to the 'calf-phase' where all newborn calves are antigen tested and positive animals slaughtered [1]. The 'calf-phase' will last until the end of 2011, when BVDV freedom is expected to be reached, followed by a phase of surveillance to demonstrate freedom from disease and to allow quick reaction if disease reoccurs.

Surveillance options under consideration are:

- Antibody testing in blood of young calves
- Milk testing of first lactating cows
- Combination of the two

Resource-using S and I activities have resulted in a progressive prevalence reduction in the national cattle herd [1], thereby causing a continuous growth in total benefit. The comparison of this total benefit and the S and I costs from 2007-2014 is expected to result in an economic surplus available for the surveillance activities adapted to confirm freedom from disease:

SURVEILLANCE

Aggregate surveillance costs during eradication= Expenditures accruing from preparation of sampling plans, taking of tissue samples, and antigen testing.

After eradication, the residual sum available for surveillance to confirm freedom from disease is the change in value of disease losses avoided minus change in intervention costs.

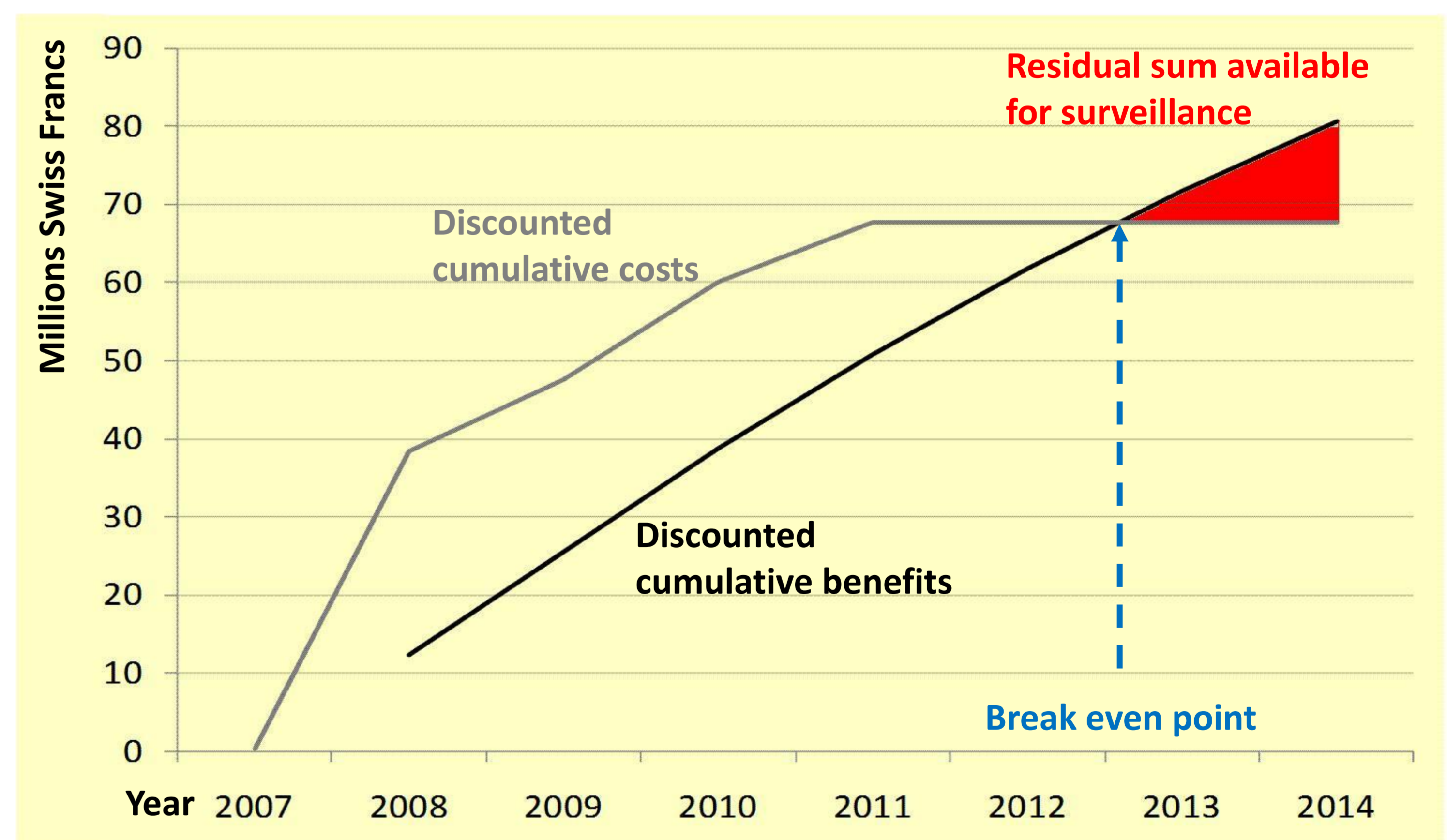
INTERVENTION

Aggregate intervention costs = Expenditures accruing from epidemiological modelling, elimination of PI animals, data transfer and analysis, IT support, communication, and improvement/adaptation of programme.

PREVALENCE REDUCTION

Total benefit = Value of disease losses avoided by S and I (reductions in mortality, premature culling, reproductive disorders, milk yield, veterinary treatment).

Preliminary results



Comparison of costs and benefits over time show that the **break even point** of the eradication programme is reached at the end of 2012. After that point the eradication programme yields a net benefit. This represents the maximum value of surveillance expenditures justified to confirm sustained freedom from disease.

Next, the costs of alternative surveillance strategies to confirm freedom from disease will be compared to identify the **least cost option**.

The present case study is one of a series looking into the economic value of different forms of surveillance.

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Reference: [1] Presi, P., Heim, D., 2009. BVD eradication in Switzerland-A new approach. Vet Microbiology (in press).