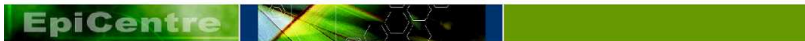


Data analysis strategies for assessing the prevalence of endemic disease

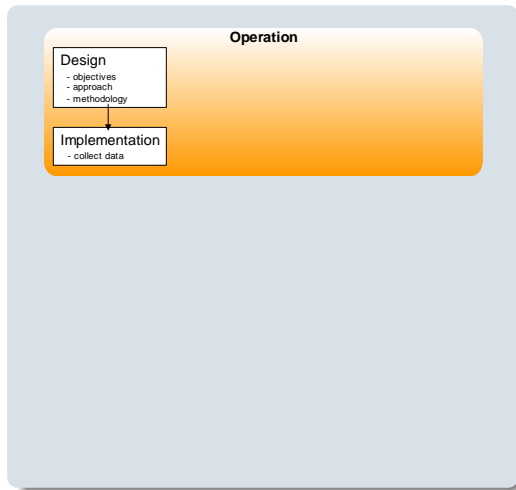
Daan Vink

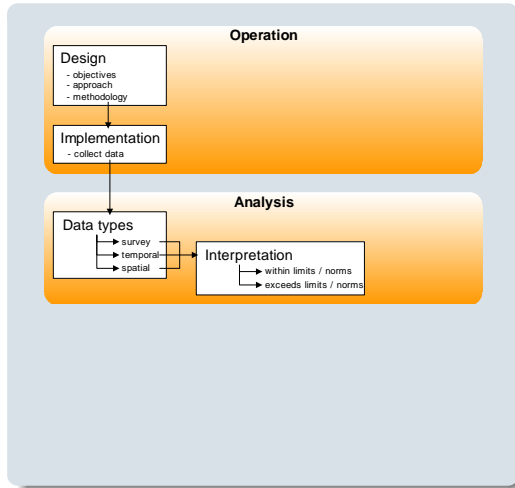
August 3, 2009

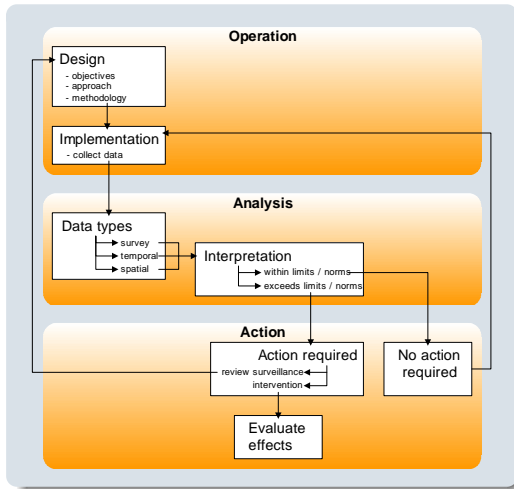


- 1 Recap: the surveillance system
- 2 What's distinctive about endemic disease surveillance?
- 3 Analysis of data generated by endemic disease surveillance

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- 1 Recap: the surveillance system
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- Endemic diseases differ from exotic or emerging diseases in that:
 - they persist in populations and are always present;
 - they are often present at an appreciable level (e.g. mastitis, lameness, endo- or ectoparasites);
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 - they persist in populations and are always present;
 - they are often present at an appreciable level (e.g. mastitis, lameness, endo- or ectoparasites);
 - information from multiple data sources is often required.
- Consequently:
 - prevalence estimation is more relevant than detection;
 - hence, **sensitivity** of the surveillance system is more important than **specificity**.

- Despite causing substantial economic damage, they may be somewhat overlooked:
 - multifactorial nature makes costs difficult to accurately quantify;
 - accepted as “a fact of life”;
 - hence, surveillance is often not well developed.



Bovine Digital Dermatitis

- 1 Recap: the surveillance system
- 2 What's distinctive about endemic disease surveillance?
- 3 Analysis of data generated by endemic disease surveillance**

Surveillance system design

Disease characteristics

- biological properties: aetiology, clinical features, transmission etc.
- endemic, exotic, emerging
- knowledge of reservoir systems
- economic importance; relevance and priority

Operational surveillance

- objective of surveillance
- inputs and logistics: size of the spend, and available capacity / expertise
- required accuracy

Analysis of the surveillance system

Data characteristics

- active / passive / risk based
- single or multiple data sources
- survey / temporal / spatial
- level of detail and accuracy

Data analysis

- approach:
 - descriptive
 - analytic
 - explanatory
 - predictive
- clustering: stratified / hierarchical / multilevel
- frequentist / probability-based / Bayesian

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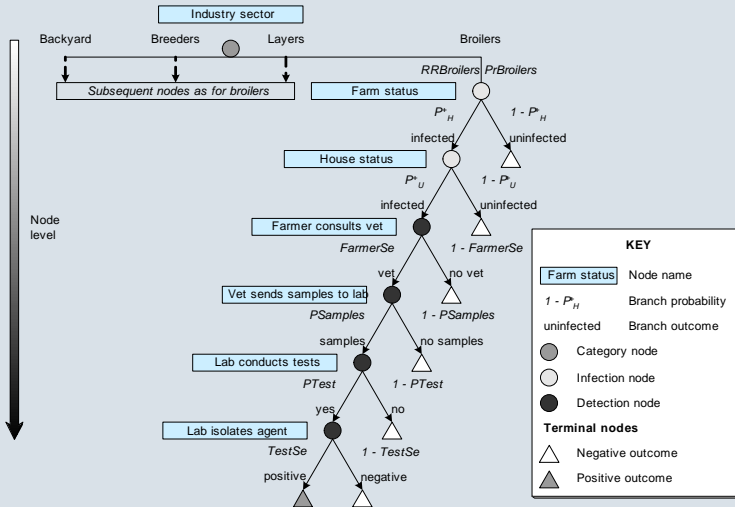
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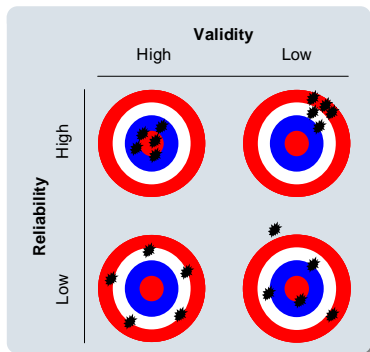
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- Steps in the analysis:
 1. Data compilation, validation, manipulation etc.;
 2. Descriptive analysis to identify trends and assess data quality (distributions, outliers);
 3. Formal analysis: model specification, variable selection, model selection;
 4. Model diagnostics / sensitivity analysis;
 5. Interpretation of results and conclusions.

- Post-analysis: also consider **reliability** and **validity**:
 - how good are the data?
 - how well is the analysis performed?
 - how relevant are the conclusions?



Objective of the analysis

To maximise the information generated by surveillance through application of appropriate analytic techniques and strategies, and correct interpretation of results; and using this information to review the surveillance methodology.

Discussion groups:



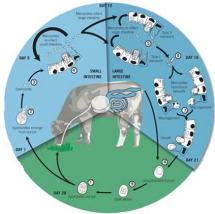
Lameness in sheep



Campylobacteriosis
in broilers



Bovine TB



Coccidiosis in cattle



TBD in cattle and
goats



Anthrax