Essential Requirements for Surveillance Systems for Emerging Diseases

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Background

Surveillance systems should support the ongoing systematic collection and analysis of data, resulting in relevant intelligence at an appropriate geographical and temporal scale to support risk managers in taking decisions to prevent and control an emerging disease. Two recent emerging disease events, reported colony losses in bees and the Q fever outbreak in the Netherlands, have highlighted important requirements for existing surveillance systems to ensure preparedness for emerging diseases at EU level.

Method

For each disease event existing surveillance data for the European Economic Area countries was collated and reviewed. In addition questionnaires were completed by reporting organisations in these countries describing the existing surveillance systems.

Results-Colony losses in bees

For the 24 countries completing the surveillance network analysis tool (SNAT) a general weakness in most of the surveillance systems was identified (Figure 1). Key system components missing included, technical committee to develop procedures, integration with laboratory services, protocols suitable to collect representative figures, relational data management tools and performance indicators.

The review of the existing surveillance data indicated a lack of representative data at country level and comparable data at EU level for colony losses (Figure 2). The major problems were inconsistent definitions of "colony losses" and the variability and validity of the epidemiological indicators reported.

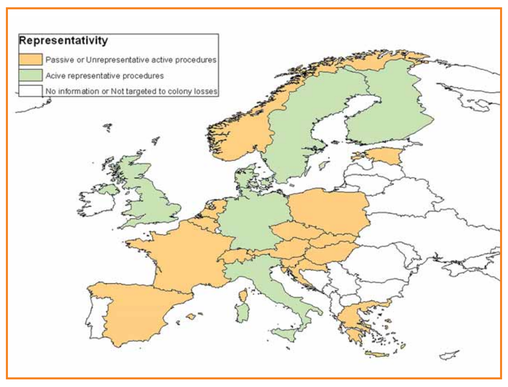

Figure 2. Countries with representative surveillance data in Europe

Results-Q Fever in ruminants

The responses from 26 countries completing the questionnaire indicated that the disease is notifiable in 14 countries but no harmonised case definition was available. In addition only a few countries operate official surveillance programmes and 5 countries do not have a national reference laboratory established.

The review of available surveillance data highlighted the considerable differences in testing protocols and programme design (Table 1). Consequently interpretation of the data was hampered by missing data, and the inability to discriminate between active and passive systems and prevalence and incidence epidemiological indicators.

Programme	Sampling stage	Test	Number Countries Reporting	Animals Tested	Herds Tested
Clinical investigations	Not reported	CF	1	1	1
Clinical investigations	at autopsy blood	ELISA	1	3	1
Clinical investigations	at farm-blood	CF	2	150	0
Clinical investigations	at farm-blood	ELISA	1	5	1
Clinical investigations	at farm-blood	IFA	1	131	4
Clinical investigations	at farm-organ/tissue	CF	1	19	15
Clinical investigations	at farm-organ/tissue	PCR	1	37	0
Clinical investigations	at farm-organ/tissue	IHC	1	2	0
Surveillance survey	Not reported	CF	1	774	51
Surveillance survey	at farm-blood	ELISA	1	31	1
Surveillance survey	at farm-bulk milk	ELISA	1	0	348
Surveillance-selective sampling	at farm-milk	PCR	1	0	2
Survey	at farm-blood	ELISA	1	513	0
random survey, non ap-parent Q fever	blood	ELISA	1	402	10
random survey, non ap-parent Q fever	vaginal swab	PCR	1	149	10

Table 1. Available data for Q fever testing in Goats for 2009
(CF = complement fixation, PCR = polymerase chain reac-tion, ELISA = enzyme linked immunosorbent assay, IFA = immuno fluorescence assay, IHC = immuno histo chemical)

Figure1. Percentage of surveillance systems for colony losses in bees complying with the 40 SNAT evaluation criteria

Conclusions

- Clear and specific case definitions should be specified for all disease events monitored by a system
- Integration with laboratory services and use of appropriate testing methods is essential, for emerging diseases negative results represent valuable information
- Consistent and robust epidemiological indicators calculated according to standard protocols for comparable populations should be defined
- Development of generic data models to facilitate data transfer and analysis at country and EU level is recommended
- Development of common performance indicators for surveillance systems would result in a robust standardised surveillance at EU level for emerging diseases.

Q fever scientific opinion 2010 (http://www.efsa.europa.eu/en/scdocs/doc/1595.pdf)

Development of harmonised schemes for the monitoring and reporting of Q-fever in animals in the European Union (http://www.efsa.europa.eu/en/scdocs/scdoc/48e.htm)

Bee Mortality and Bee Surveillance in Europe (http://www.efsa.europa.eu/en/scdocs/scdoc/27e.htm)

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