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.

0.00% 100% Relevant and detailed surveillance objectives Expectations of partners and institution defined and relevant Diseases, syndromes and contamination relevant to situation in country Control strategy implemented for bee diseases Appropriate and sufficient budget devoted to MDW surveillance Image: Control strategy implemented for bee diseases Operating central unit with sufficient operational means Image: Control strategy implemented for bee diseases

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.

	Steering committee established to define orientations of surveillance				
	Technical committee supporting the development of all technical documents				
	Provincial units formalized on the whole territory	uo			
•	Active role of the provincial units in the system	sati			
•	Surveillance field agents with exhaustive field coverage	Fie			
•	Sufficient material and financial means of provincial units and field agents	oré			
	Formalization and efficient integration of the diagnostic laboratory	Ż			
•	Skilled human resources for the diagnostic needs	'ato			
•	Sufficient diagnostic equipment or formalized link to a reference laboratory	Ioda			
•	Standardized and recognized diagnostic techniques				
	Surveillance system organization and operation registered in the regulation or in a charter	ion			
	Surveillance objectives clearly formalized and relevant				
	Formalized surveillance protocol	mal			
	Complete surveillance protocols and standardization of data collected	For			
	Existence of a centralized database and data management	_			
	Routine use of a geographic information system for data analysis	ita			
	Trained personnel for data entry, management and analysis				
	Multi-disciplinary analysis of data (interpretation of data)				
•	Existence of coordination meetings at the central provincial level	uo			
	Coordination meetings of predetermined frequency and a report produced	nati			
	Central unit active for field agents supervision	ordi			
	Provincial unit active for field agents supervision	Õ			
•	Satisfactory epidemiology training level at the central unit	_			
	Initial training implemented for all field staff				
•	Objectives and content of the training adequate for operational needs				
•	Regular refresher course of all field staff	•			

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=complementfixation, PCR=polymerase chain reac-tion, ELISA=enzyme linked immunosorbent assay, IFA=immuno fluorescence assay, IHC = immuno histo chemical)

Easy access for all actors to communication means	on ent
OIE notifications and reports realized at 100%	atio
Solid policy of external communication stakeholders	form
Broad diffusionof an epidemiological bulletin and restitution of laboratory analysis results	lnf ma
Performance indicators developed and validated by the central unit	C.
Performance indicators regularly calculated, interpreted and disseminated	atio
External evaluation of the surveillance system	/alu
Correcting measures implemented based on performance indicators /external evaluation	— ́ ́ ́

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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