



Overview of strategies for collecting and analysing data for detecting emerging disease

ISVEE workshop 6-8/08/09

Eamon Watson

Overview of Session 3

- Overview presentation (10 mins)
- Participant presentations (10 mins each)
- Small group discussions (45 mins)
- Whole group discussions (30 mins)

Emerging disease

- A **new** condition which may result from the evolution or change in an existing pathogen or parasite causing a change of strain, host range, vector, or increase in pathogenicity; or the occurrence of any other **previously unrecognised** condition.

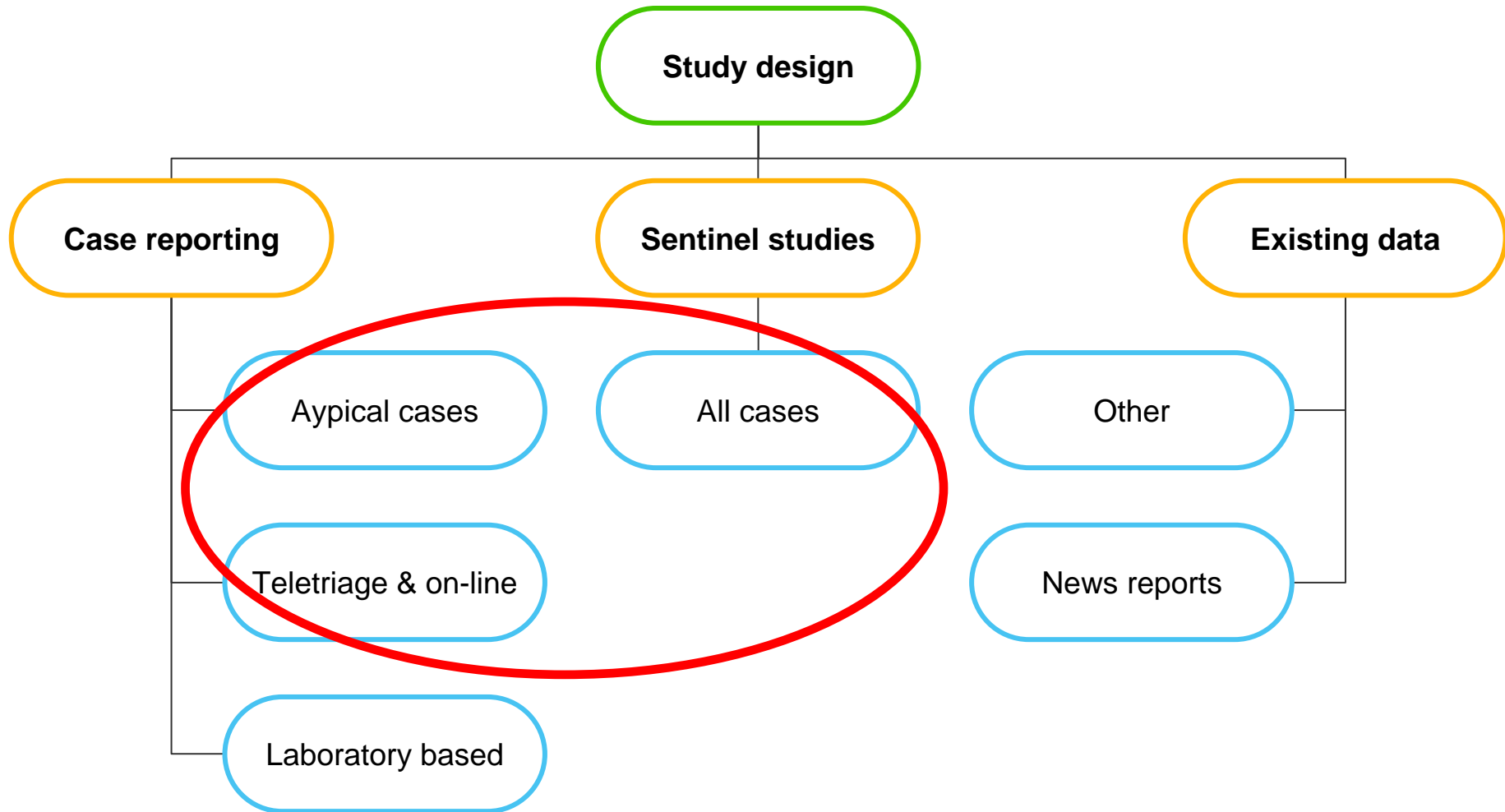
Detecting an emerging disease

- Population
 - Sick on farm (Clinical suspects)
 - Sick culled (Involuntary culls)
 - Healthy on farm
 - Healthy culled (Voluntary culls)

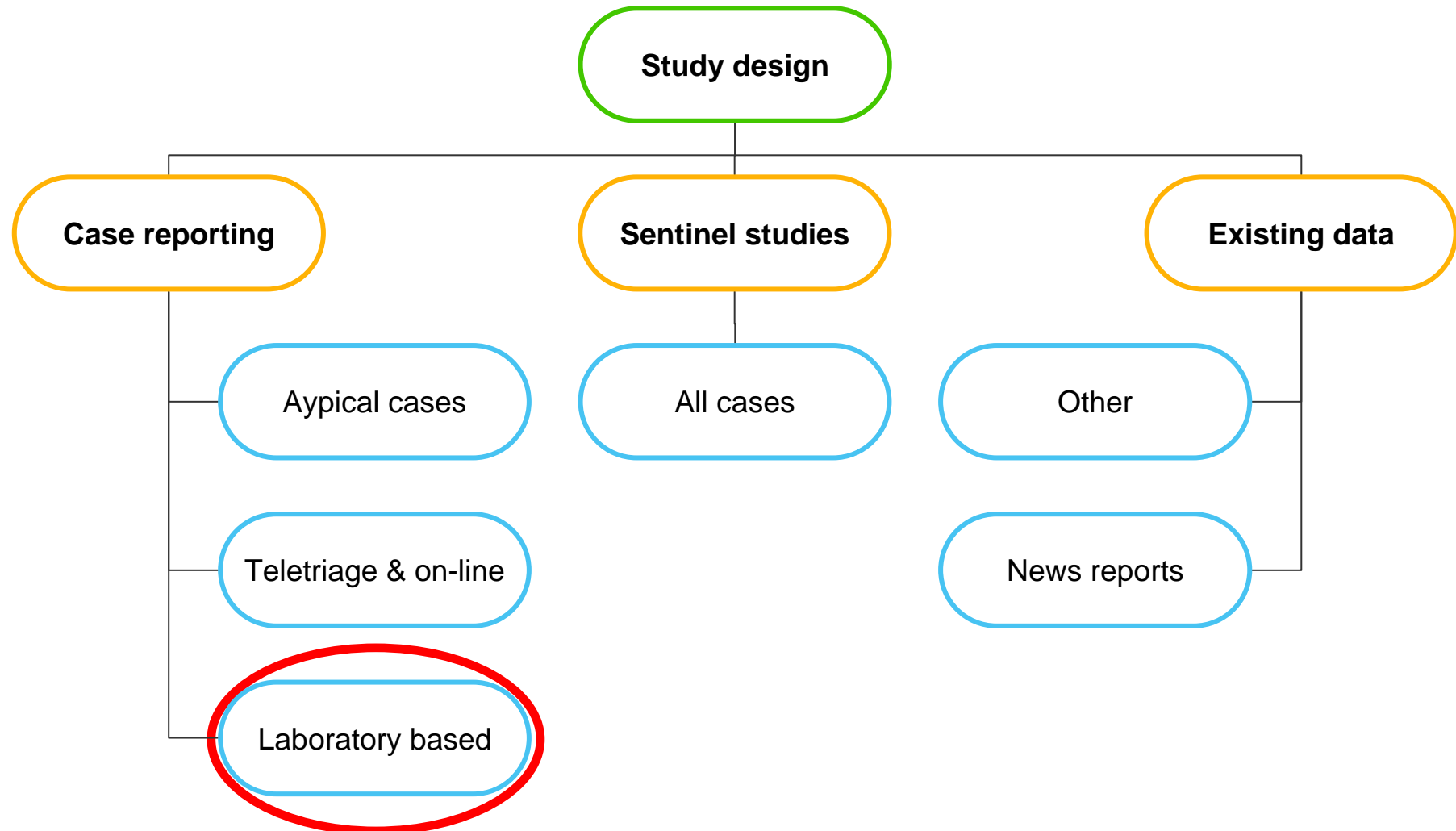
- “Epidemic intelligence” and “multi-stream surveillance”
 - Intelligence of any nature

- Eyes and ears

Data collection



Data collection

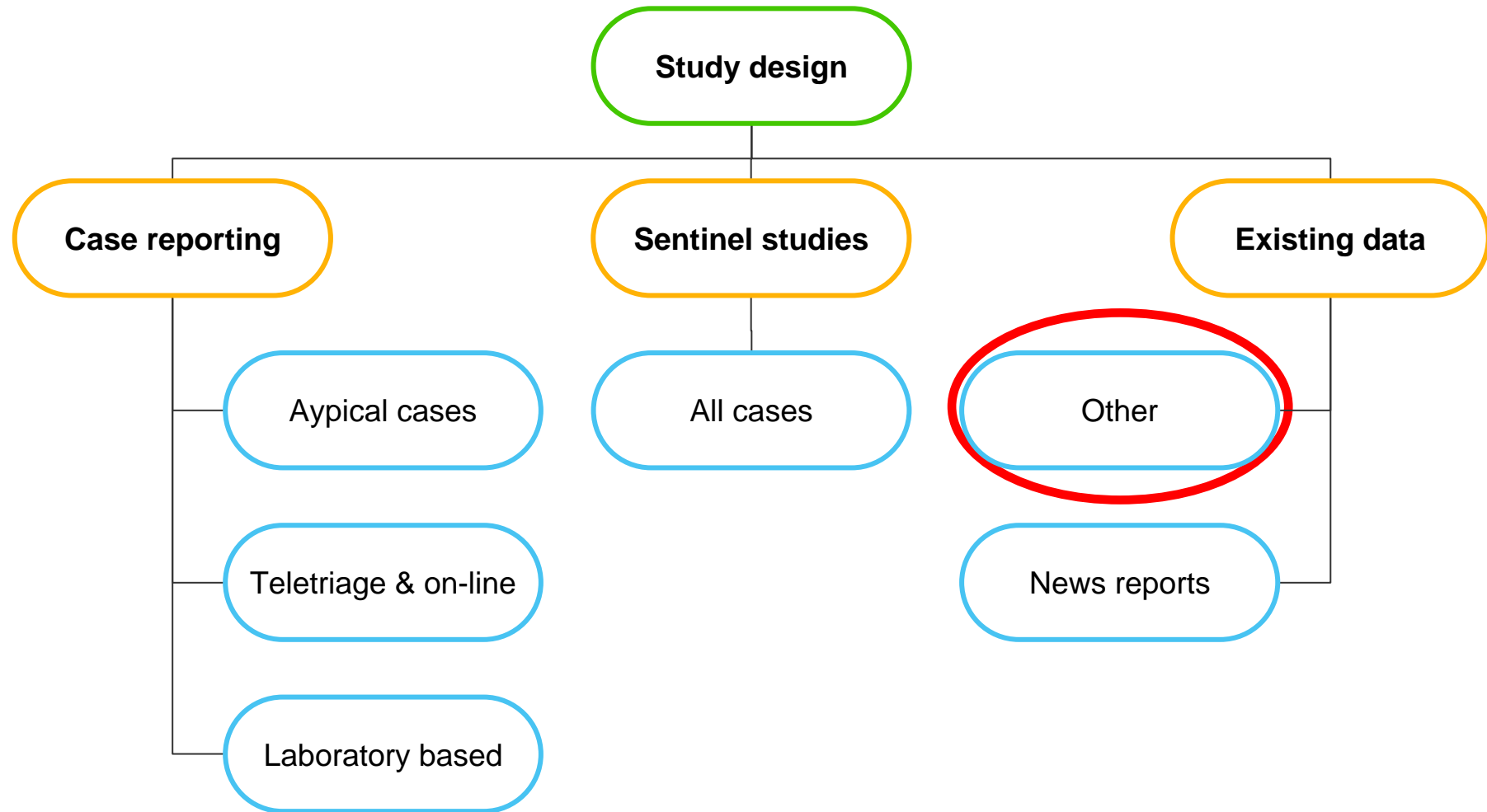




1.1 Overall Changes in DNR rates for Pig by Syndrome to Q3 for 2008 and prior years

Syndrome	Overall			Prior years			2008			diff	SE Year to Year	z
	DNR	Subs	% DNR	DNR	Subs	% DNR	DNR	Subs	% DNR			
Circulatory	5	79	6.33 %	5	69	7.25 %	0	10	0.00 %	-7.25 %	8.24 %	-0.88
Enteric	259	1,127	22.98 %	226	977	23.13 %	33	150	22.00 %	-1.13 %	3.69 %	-0.31
Mastitis	0	6	0.00 %	0	4	0.00 %	0	2	0.00 %	0.00 %		
Musculo-skeletal	13	150	8.67 %	11	121	9.09 %	2	29	6.90 %	-2.19 %	5.82 %	-0.38
Nervous / Sensory	14	184	7.61 %	8	152	5.26 %	6	32	18.75 %	13.49 %	5.16 %	2.62
Reproductive	167	272	61.40 %	138	233	59.23 %	29	39	74.36 %	15.13 %	8.42 %	1.80
Respiratory	60	819	7.33 %	56	709	7.90 %	4	110	3.64 %	-4.26 %	2.67 %	-1.60
Skin	21	107	19.63 %	20	92	21.74 %	1	15	6.67 %	-15.07 %	11.06 %	-1.36
Systemic & Misc	128	1,575	8.13 %	119	1,371	8.68 %	9	204	4.41 %	-4.27 %	2.05 %	-2.08
Unknown (999,990,991,980,970)	45	51	88.24 %	42	48	87.50 %	3	3	100.00 %	12.50 %	19.17 %	0.65
Urinary	2	31	6.45 %	2	24	8.33 %	0	7	0.00 %	-8.33 %		

Data collection



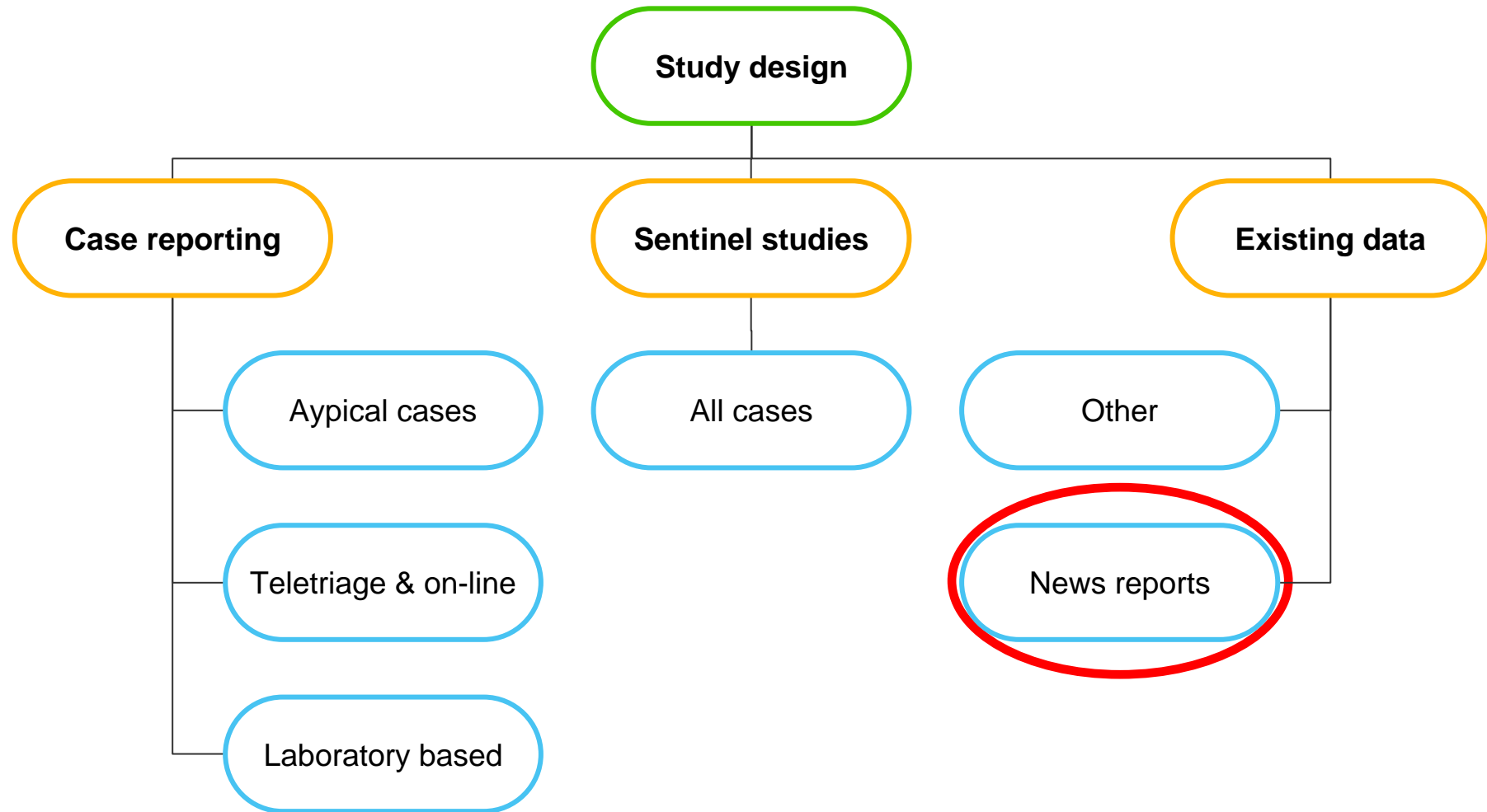
Other – mixture of data sources

- Veterinary health
 - Livestock markets
 - Abattoir
 - Livestock production records

- Public health
 - Drug sales
 - Culture requests
 - Bacteriology results

- Death certificates
 - Surveillance for unexplained deaths due to possible infectious causes
 - International Classification of Diseases

Data collection



Analysing data

Common objective

- Systematic detection
 - Outbreak verification
 - Alert
 - Field investigation
- Statistical
 - Simple
 - Spatio-temporal
 - Automated outbreak detection algorithms
 - Non-statistical
 - Expert review



A surveillance pool?

Formal and informal intelligence

- "...supplement to traditional disease surveillance", "...check other surveillance systems" (Burns, 2006)
- "...a complimentary tool", "...augment current syndromic surveillance systems" (Van Dijk, 2008)
- "...enhance the performance of traditional surveillance system" (Paquet, 2006)
- "...augment disease surveillance strategies" (Cowen, 2006)

Eyes and ears

- Intelligence of any nature – data and rumours?

Practical to implement and sustainable?

Participant presentations

- **Chris Bartels**, Deventer, The Netherlands. Space time cluster analyses on occurrence of unspecified mortality in dairy herds
- **Angus Cameron**, AusVet Animal Health Services, France. Non-veterinary reporting of clinical observations using an expert system and pattern anomaly detection as the basis of a syndromic surveillance system for early warning
- **Kamina Johnson**, USDA, USA. Electronic global emerging disease surveillance

Small group discussions

- Consider scenario and identify **innovative** approach(es) for data collection & analysis
- Consider constraints for implementation
- All **developing** Countries

- What are the key characteristics of the approach or emerging disease scenario that make the chosen strategy the best?

Small group discussions

1. New congenital deformity in calves
2. New haemorrhagic disease in calves
3. New nervous disease in pigs
4. New infectious abortion disease in sheep
5. New strain of potentially zoonotic bacteria
6. New toxin in livestock feed