Salmonella Surveillance in Great Britain

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Background

- EU legislation
  - Directive 2003/99/EC
  - Regulation (EC) No. 2160/2003

- National legislation
  - The Zoonoses Order 1989
  - Control of Salmonella in Poultry Orders

- Objectives of Salmonella surveillance:
  - Protect public health
  - Detect new and emerging strains
  - Mitigate threat to animal health and welfare and reduce economic burden to farming community
  - Monitor trends

Data sources

Salmonella surveillance based on data collection from:
1. Endemic disease surveillance programme: submission of clinical diagnostic samples to network of Government veterinary laboratories (AHVLA)
2. Outbreaks of clinical disease in livestock
3. Voluntary industry monitoring activities
4. Statutory Salmonella National Control Programmes in chicken and turkey sectors
5. Structured surveys, research projects
6. Government investigations
7. Incidental findings
   Collated into central database

Statutory Salmonella Programmes

Regulation (EC) No. 2160/2003 → Salmonella National Control Programmes in chickens and turkeys:
- All commercial UK poultry flocks tested for Salmonella - minimum harmonised sampling requirements
- Number positive flocks = numerator
- Number of flocks in production = denominator
  - AHVLA database and GBPR
  - Monthly returns from Defra approved laboratories
  - Industry data
- Prevalence estimate – ‘flock based’

Passive surveillance • non statutory

- Mainly cattle, sheep, pigs
- Examinations carried out to diagnose clinical disease
- Reports by private vets/laboratories & submissions to AHVLA/SAC
- Reported as ‘incidents’:
  - the first isolation and all subsequent isolations of the same Salmonella serovar from an animal, group of animals or their environment on a farm within a defined time period (usually 30 days)
- Lacking reliable denominator
Other monitoring

Voluntary industry monitoring:
- Voluntary monitoring by the duck industry sector (assurance schemes)
- Chickens and turkey: voluntary monitoring using non-NCP sample types
- Most incidents in poultry are not associated with clinical disease but subclinical carriage of Salmonella

Surveys
- EU Salmonella baseline surveys
- National survey of Salmonella in pigs at slaughter
- Future repeat abattoir survey?

Limitations (1)
1. The surveillance pyramid
2. Sampling bias
3. Defining a suitable denominator!!

Limitations (2)
Defining a suitable denominator…..
Options include:
I. Submission data
   - total number of samples submitted
   - submissions in syndrome
II. Number submissions tested for a specific disease
III. Population data
   - number of animals/farms
   - number of submitting farms

Pros and cons to each option

Limitations (3)
I. Use of submission data:
   → Submission rate affected by:
      ➢ Clinical presentation
      ➢ Economic factors
      ➢ Animal species
      ➢ Increased awareness/ individual PVS
      ➢ Changes in population/apparent population at risk over time
   → Adjusting for submission rates – impact when submission rates change due to real change in disease occurrence.
   → Private laboratories also testing – no access to number of submissions

Limitations (4)
II. Test based denominator:
   → difficult to maintain due to the requirement to continually update the definition of submissions at risk as the diagnostic tests used change
   → significant potential to mask changes in disease incidence (denominator ~ numerator)
   → no access to number private lab tests carried out

III. Farms/animal population as denominator:
   → could provide biased estimates of disease incidence if submission rates change.
   → number farms submitting samples could provide a good method of adjusting disease occurrence for submission levels

Number of reported incidents of Salmonella in cattle, sheep and pigs in Great Britain 2006 - 2011
Livestock species subject to Salmonella NCPs relatively reliable prevalence data limited only by:
- Test sensitivity issues
- Access to reliable population data

Non-NCP species no reliable prevalence data but:
- Look at trends over time
- Monitor changes in total number of incidents/serovars/phagetypes and relative changes
- Monitor differences in populations (age groups, industry sectors etc)
- Cluster detection
- EDS system to raise flags for new and emerging strains

Structured surveys best for obtaining representative data plus denominator (cost!!)

Incorporation of assurance scheme monitoring data to national Salmonella surveillance data?

Refine data analysis/presentation to limit likelihood of misrepresentation

Future access to submission data from private laboratories/other sources of information

Where practical, use of test based denominator or number of farms submitting samples as denominator with suitable quality statements

National Salmonella surveillance data published annually:
- UK Zoonoses report [http://www.defra.gov.uk/animal-diseases/zoonotic/]