

## REFERENCES

Anderson, E.H., Ward, L.R., De Sax, M.J., and DeSa, J.D.H. (1977). Bacteriophage – Typing Designations of *S. typhimurium*. *Journal of Hygiene* **78**, 297 – 300.

Annual Report of the Zoonoses Action Plan Salmonella Programme July 2007 – March 2008. Published online by the British Pig Executive at [http://www.bpex-zncp.org.uk/resources/000/320/206/ZAP\\_Annual\\_Report\\_2007-2008\\_.pdf](http://www.bpex-zncp.org.uk/resources/000/320/206/ZAP_Annual_Report_2007-2008_.pdf)

Coulson JC; Butterfield J & Thomas C (1983) The herring gull *Larus argentatus* as a likely transmitting agent of *Salmonella montevideo* to cattle and sheep. *Journal of Hygiene* **91** (3) 437-43

Defra (2009) Zoonoses Report UK 2008 (in press). <http://defraweb/animalh/diseases/zoonoses/reports.htm>

EEC (1997) European Union Council Directive 92/117/EEC and amendment 97/22/EC. *Official Journal* L062, pp 38 – 48.

EEC (2003) Zoonoses Regulations 2160/2003. *Official Journal* L325, pp 1 - 15

EEC (2003) European Union Council Directive 2003/99/EC. *Official Journal* L325, pp 31 – 40.

EEC (2003) European Union Council Regulation (EC) No. 2160/2003. *Official Journal* L325, pp 1 – 15.

EEC (2004) EC Decision 2004/665/EC. *Official Journal* L303, pp 30 – 34.

EEC (2005) EC Decision 2005/636/EC. *Official Journal* L228, pp 14 – 18.

Foster G; Patterson I A P; and Munro D S (1999). Monophasic group B *Salmonella* species infecting harbour porpoises (*Phocoena phocoena*) inhabiting Scottish coastal waters. *Veterinary Microbiology*, **65**, 227-231.

HMSO (1981) The Importation of Processed Animal Protein Order 1981 (ISBN 0 1101 6677 9)

HMSO (1982) The Importation of Processed Animal Protein (Amendment) Order 1982 (ISBN 0 1102 6459 2)

HMSO (1989) The Zoonoses Order 1989 (ISBN 0 1109 6285 0).

HMSO (1993) The Poultry Breeding Flocks and Hatcheries Order 1993 (ISBN 0 1103 4898 2).

HMSO (2007) The Poultry Breeding Flocks and Hatcheries (England) Order 2007 (ISBN 0 11 075819 6)

HMSO (2007) The Poultry Breeding Flocks and Hatcheries (Wales) Order 2007 (ISBN 0 11 091588 3)

HMSO (2007) The Poultry Breeding Flocks and Hatcheries (Scotland) Order 2007 (ISBN 0 11 072109 8)

HMSO (2008) Control of Salmonella in Poultry Order 2007

HMSO (2008) Control of Salmonella in Poultry (Wales) Order 2008

HMSO (2008) Control of Salmonella in Poultry (Scotland) Order 2008

HMSO (2002) The TSE Regulations 2002 (ISBN 0 11 039914 5).

HMSO (2005) The Animal By-Products Regulations 2005 (ISBN 0 1107 3280 4).

Keymer IF; Gibson E A; Reynolds DJ (1991). Zoonoses and other findings in hedgehogs (*Erinaceus europaeus*): a survey of mortality and review of the literature. *Veterinary Record* **128**, 245-249

Le Minor L; Popoff MY (1987) Designation of *Salmonella enterica* sp. nov., nom. rev., as the type and only species of the genus *Salmonella*. *International Journal of Systematic Bacteriology* **37**, 465-468.

Results of the 2007 EU survey of *Salmonella* in finishing pigs Survey European Food Safety Authority (EFSA) (2008). Published online at: [http://www.efsa.europa.eu/EFSA/efsa\\_locale-1178620753812\\_1178713190037.htm](http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_1178713190037.htm)

Skov M N; Madsen JJ; Rahbek C; Lodal J; Jespersen JB; Jørgensen J C; Dietz HH; Chriél M and Baggesen DL (2008). Transmission of *Salmonella* between wildlife and meat-production animals in Denmark. *Journal of Applied Microbiology*, **105**, 1558-1568.

VLA (2008) Veterinary Investigation Surveillance Report (VIDA) 2008, (ISBN 1 8995 1333 7).

Ward LR; DeSa JDH and Rowe B (1987). A Phage typing Scheme for *Salmonella enteritidis*. *Epidemiology and Infection*, **99**, 291 – 294.

## FURTHER PUBLICATIONS OF INTEREST

Amar CFL; Arnold C; Bankier A; Dear PH; Guerra B; Hopkins KL; Liebana E; Mevius DJ; Threlfall EJ (2008). Real-time PCRs and fingerprinting assays for the detection and characterization of salmonella genomic island-1 encoding multidrug resistance: application to 445 European isolates of salmonella, Escherichia coli, shigella, and proteus. *Microbial Drug Resistance* **14** (2) 79-92.

Arnold ME; Mueller-Doblies D; Carrique-Mas JJ; Davies RH (2009). The estimation of pooled-sample sensitivity for detection of *Salmonella* in turkey flocks *Journal Of Applied Microbiology* Mar 25. [Epub ahead of print] PMID: 19320955.

Atterbury RJ; Davies RH; Carrique-Mas J and Allen VM (2009). *Salmonella* colonisation of laying hens following vaccination with killed and live attenuated commercial *Salmonella* vaccines. *Veterinary Record* (In Press).

Carrique-Mas JJ; Papadopoulou C; Evans SJ; Wales A; Teale CJ; Davies RH (2008). Trends in phage types and antimicrobial resistance of *Salmonella enterica* serovar Enteritidis isolated from animals in Great Britain from 1990 to 2005. *Veterinary Record* **162** (17) 541-546

Carrique-Mas JJ; Breslin M; Snow L; Arnold ME; Wales A; McLaren I and Davies RH (2008). Observations related to the *Salmonella* EU layer baseline survey in the United Kingdom: follow-up of positive flocks and sensitivity issues. *Epidemiology and Infection*, published online by Cambridge University Press 04 Jan 2008  
doi:10.1017/S095026880700012X

Carrique-Mas JJ; Breslin M; Sayers AR; McLaren I; Arnold M; Davies R (2008). Comparison of environmental sampling methods for detecting salmonella in commercial laying flocks in the UK. *Letters in Applied Microbiology* **47** (6) 514-519.

Carrique-Mas JJ; Papadopoulou C; Evans SJ; Wales A; Teale CJ; Davies RH (2008). Trends in *Salmonella* Enteritidis from animals in Great Britain 1986-2005: Phage types and antimicrobial resistance *Veterinary Record*, **162** (17) 541-546.

Carrique-Mas J; Breslin M; Snow L; Arnold ME; Wales A; McLaren I; Davies RH (2008). Observations related to the *Salmonella* EU layer baseline survey in the UK: Follow-up of positive flocks and sensitivity issues. *Epidemiology And Infection*, **11** 1537-1546.

Carrique-Mas JJ and Davies R (2008). *Salmonella* Enteritidis in commercial layer flocks in Europe: legislative background, on-farm sampling and main challenges. *Brazilian Journal Of Poultry Science*, **10** 1-9.

Carrique-Mas JJ & Davies RH (2008). Sampling and bacteriological detection of *Salmonella* in poultry and poultry premises: A review. *OIE Sci Tech Rev*, **27** (3) 665-677.

Carrique-Mas JJ & Davies RH (2008). Bacteriological detection of *Salmonella* Enteritidis in eggs: A review. *OIE Sci Tech Review*, **27** (3): 657-64.

Carrique-Mas, Juan; Breslin, Mark; Sayers, Anthony; McLaren, Ian; Arnold, Mark; Davies, Rob. (2008) Comparison of environmental sampling methods for detecting *Salmonella* in commercial laying flocks in Great Britain. *Letters In Applied Microbiology*. **47** (6): 514-519.

Carrique-Mas J and Davies R (2008). *Salmonella* in turkeys: On-farm observations and field research approaches. In: *Proceedings of the 2<sup>nd</sup> Turkey Science and Production Conference*, Macclesfield, UK, 16-18 April 2008, pp 79-82.

Carrique-Mas J; Mueller-Doblies D; McLaren I & Davies R (2008). *Salmonella* infection dynamics in turkey holdings in the UK. In: *Proceedings of 7th International Symposium on Turkey Diseases*, Berlin, Germany, 19-21 June 2008, pp 274-283.

Carrique-Mas JJ; Breslin M; Snow L; McLaren I; Sayers AR; Davies RH (2009). Persistence and clearance of different *Salmonella* serovars in buildings housing laying hens. *Epidemiology And Infection*, **137**: 837-846.

Carrique-Mas, Juan; Barnes, Simon; McLaren, Ian; Davies, Rob. Comparison of three plating media for the isolation of *Salmonella* from poultry environmental samples in Great Britain using ISO 6579:2002 (Annex D). *Journal Of Applied Microbiology* (Published electronically, doi:10.1111/j.1365-2672.2009.04386.x).

Davies R; Mueller-Doblies D; Carrique-Mas J and McLaren (2008). Recent observations on improved monitoring and control of *Salmonella* in turkey production. In: *Proceedings of 7th International Symposium on Turkey Diseases*, Berlin, Germany, 19-21 June 2008, pp 284-299.

Havelaar AH; Braunig J; Christiansen K; Cornu M; Hald T; Mangen MJJ; Molbak K; Pielaat A; Snary E; Van Pelt W; Velthuis A; Wahlstrom H (2007). Towards an integrated approach in supporting

microbiological food safety decisions. *Zoonoses and Public Health* **54** (3-4) 103-117.

Hill AA; Snary EL; Arnold ME; Alban L; Cook AJC (2008) Dynamics of salmonella transmission on a British pig grower-finisher farm: a stochastic model. *Epidemiology and Infection* **136** (3) 320-333.

Karatzas KAG; Randall LP; Webber M; Piddock LJV; Humphrey TJ; Woodward MJ; Coldham NG (2008). Phenotypic and proteomic characterization of multiply antibiotic-resistant variants of *Salmonella enterica* serovar typhimurium selected following exposure to disinfectants. *Applied and Environmental Microbiology* **74** (5) 1508-1516.

Mueller-Doblies D; Sayers AR; Carrique-Mas JJ; Davies RH (2009). Comparison of sampling methods to detect *Salmonella* infection of turkey flocks. *Journal Of Applied Microbiology* Mar 14 [Epub ahead of print] PMID: 19302307.

Papadopoulou C; Kidd S (2008). Trends in salmonellosis in cattle, sheep and pigs in Great Britain: 1995-2004. *Government Veterinary Journal* **162** (6) 191-191

Papadopoulou C; Carrique-Mas JJ; Davies RH (2008). *Salmonella* in turkey flocks in Great Britain - a review. In: *Proceedings of 7th International Symposium on Turkey Diseases*, Berlin, Germany, 19-21 June 2008, pp 264-273.

Papadopoulou C; Carrique-Mas JJ; Davies RH; Sayers, AR (2009) A retrospective analysis of *Salmonella* isolates recovered from animal feed in Great Britain. *Veterinary Record* (in press).

Papadopoulou C; Davies RH; Carrique-Mas JJ; Evans SJ (2009) *Salmonella* serovars and their antimicrobial resistance in British turkey flocks in 1995-2006. *Avian Pathology* (in press).

Randall SP; Cooles SW; Coldham NG; Penuela EG; Mott AC; Woodward MJ; Piddock LJ; Webber MA (2007). Commonly used farm disinfectants can select for mutant *Salmonella enterica* serovar Typhimurium with decreased susceptibility to biocides and antibiotics without compromising virulence. *Journal of Antimicrobial Chemotherapy* **60** (6) 1273-1280.

Searle LEJ; Best A; Nunez A; Salguero FJ; Johnson L; Weyer U; Dugdale AH; Cooley WA; Carter B; Jones G; Tzortzis G; Woodward MJ; La Ragione RM (2009). A mixture containing galactooligosaccharide,

produced by the enzymic activity of *Bifidobacterium bifidum*, reduces *Salmonella enterica* serovar typhimurium infection in mice. *Journal of Medical Microbiology* **58** (1) 37-48.

Snow LC; Davies RH; Christiansen KH; Carrique-Mas JJ; Wales AD; O'Connor JL; Cook AJC; Evans SJ (2007). Survey of the prevalence of salmonella species on commercial laying farms in the United Kingdom. *Veterinary Record* **161** (14) 471-476.

Snow LC; Davies RH; Christiansen KH; Carrique-Mas JJ; Cook AJC; Teale CJ; Evans SJ (2008). Survey of the prevalence of salmonella on commercial broiler farms in the United Kingdom, 2005/06. *Veterinary Record* **163** (22) 649-654.

Wales AD; Carrique-Mas JJ; Rankin M; Bell B; Thind BB and Davies RH. (2009). Review of the carriage of zoonotic bacteria by arthropods, with special reference to *Salmonella* in mites, flies and litter beetles *Zoonoses and Public Health* [Epub ahead of print] PMID: 19486496.

## Quality Statement

### SECTION A

#### 1. Coherence

Reports are obtained by various routes: direct submissions to VLA Regional Laboratories, submissions of avian isolates to the VLA serotyping centres, reports of *Salmonella* isolations by private laboratories and Scottish submissions to Scottish Agricultural Colleges.

VLA is responsible for collation of data. Submissions result from investigation of clinical disease in livestock, voluntary monitoring of healthy livestock for *Salmonella*, compulsory monitoring of chicken breeding and egg laying flocks for *Salmonella* under the Control of *Salmonella* in Poultry Order (CSPO) 2007, follow-up investigations of *Salmonella* incidents under the Zoonoses Order 1989 and investigations of possible links with a human *Salmonella* outbreak.

All private laboratories submitting reports of *Salmonella* isolates to VLA do so using the standard VLA submission & Supplementary forms or customised forms developed for them by VLA. Scottish submissions use the SAC submission form & supplementary forms which are compatible with the VLA system and interpreted in the same way. All use the same definitions and essential categorisation. The CSPO authorised laboratories must comply with legislative requirements and are subject to inspections by VLA.

Only approved submissions (submissions with no pending results) are included in this report.

A sensitivity test is performed for surveillance purposes against an extended panel of 16 antimicrobials on *Salmonella* isolates sent for serotyping to VLA Weybridge and VLA Lasswade.

	<b>Antimicrobial</b>	<b>Concentration ( µg per ml)</b>	<b>Code</b>
1	Nalidixic acid	30	NA
2	Tetracycline	10	T
3	Neomycin	10	N
4	Ampicillin	10	AM
5	Furazolidone	15	FR
6	Ceftazidime	30	CAZ
7	Sulphamethoxazole/trimethoprim	25	TM
8	Chloramphenicol	30	C
9	Amikacin	30	AK

10	Amoxicillin/clavulanic acid	30	AMC
11	Gentamicin	10	CN
12	Streptomycin	10	S
13	Sulphonamide compounds	300	SU
14	Cefotaxime	30	CTX
15	Apramycin	15	APR
16	Ciprofloxacin	1	CIP

This panel is updated when there is a clear need to detect new or emergent types of resistance or to replace outdated antimicrobials. On specific occasions (e.g. detection of *Salmonella* vaccine strains, characterisation of 3<sup>rd</sup> generation cephalosporins resistance) more than 16 antimicrobials are used for sensitivity testing.

From 1<sup>st</sup> January 2007 some of the breakpoints used in assessing antimicrobial resistance, which were previously set at less than or equal to 13, have changed. These new breakpoints are: Ceftazidime (CAZ) less than or equal to 27, Amikacin (AK) less than or equal to 18, Ciprofloxacin (CIP) less than or equal to 19 and Cefotaxime (CTX) less than or equal to 29. This may result in an increased number of isolates resistant to these antimicrobials in 2007 in comparison with previous years. The breakpoint for all other antimicrobials used remain at less than or equal to 13.

In 2008, the disc concentrations for streptomycin and chloramphenicol were changed to adopt the disc concentrations recommended by BSAC. In the case of streptomycin, the disc concentration was reduced from 25µg to 10µg. The zone size remained unchanged, so this change would be expected to increase the detection of isolates with lower level streptomycin resistance. Work done at VLA has shown that the 10µg disc provides much better discrimination between resistant and sensitive isolates (defined using the gold standard measure of MIC determination) than the 25µg disc. Similarly, the chloramphenicol 10µg disc was replaced with a 30µg disc. Zone size criteria which were changed in 2008 comprised ceftazidime, resistant  $\leq 29$ mm (formerly R  $\leq 27$ mm), sulphamethoxazole/ trimethoprim resistant  $\leq 15$ mm (formerly R  $\leq 13$ mm), amoxicillin/ clavulanate resistant  $\leq 14$ mm (formerly R  $\leq 13$ mm), chloramphenicol resistant  $\leq 20$ mm (formerly R  $\leq 13$ mm) and gentamicin resistant  $\leq 19$ mm (formerly R  $\leq 13$ mm).

Some of the *Salmonella* serotypes are recorded and reported in VLA under the old nomenclature. The nomenclature for these serotypes under the Kauffmann-White scheme is clarified in the following table:

### **VLA Serotype**

Pullorum  
Binza  
Thomasville  
Java  
Newington

### **Kauffmann-White**

Gallinarum (biovar Pullorum)  
Orion 15+var  
Orion 15+ and 34+var  
Paratyphi B var Java  
Anatum var 15+var

The maps in this report have been constructed by combining data from the following sources: *Salmonella* incidents from the Farmfile *Salmonella* dataset, numbers of cattle holdings from the Cattle Tracing Scheme February 2008 dataset (RADAR), numbers of chicken, duck and turkey premises from current GB Poultry Register data from RADAR, numbers of sheep and pig holdings from the Welsh Agricultural Census 2007 (Welsh Assembly Government), the English Agricultural Census 2007 (DEFRA Farming Statistics Branch, York) and the Scottish Agricultural Census 2007 (The Scottish Parliament).

Data in the maps has been aggregated within 69 “new county” geographic regions with areas of 395 – 8,740 km<sup>2</sup> (except Highlands, 26,100 km<sup>2</sup>), as defined for use in Farmfile from February 2009. These regions include the current metropolitan counties and shire counties in England, with clusters of unitary authorities with small areas being merged. Wales is divided into its seven agricultural regions. Scotland is divided into its 14 agricultural areas.

*Salmonella* incidents from Farmfile were allocated to counties as recorded in the database. Cattle holdings from CTS were individually identified, allowing georeferencing of individual incidents and holdings, which were aggregated spatially within new county areas using ArcMap 9.2 ([www.ESRI.com](http://www.ESRI.com)). Poultry register and census data were supplied aggregated to various geographic regions equivalent to or smaller than the new counties. They were aggregated into new counties using lookup tables and standard SQL queries in Microsoft Access and ArcMap.

There may be counties in GB that have a large number of poultry premises, each with a few poultry present. This may be the reason for some of the apparent variations in the poultry premises density from county to county in GB.

An animal holding is defined as a holding that has at least one animal present. There may be counties in GB that have a large number of animal holdings, each with a few animals present. This may be the reason for some of the apparent variations in the animal holding density from county to county in GB.

## **2. Accuracy and precision**

Sampling error: Isolations of *Salmonella* from statutory species are required to be reported, however this depends on submission of samples for laboratory investigation by private vets as well as on economic factors e.g. distance to laboratories etc.

A sensitivity test is performed on *Salmonella* isolates before the allocation of an automatic incident reference by the computer system. It is important for the RLs to provide information to the testing laboratory on whether the submitted isolates are considered to comprise new incidents. As some companies perform extensive testing for *Salmonella*, the large numbers of isolates recovered could skew the overall sensitivity data and patterns obtained in that case might merely reflect the intensity of sampling procedure. Testing the first isolate from a new incident reduces the influence of that bias. Also, limited resources in some years may prevent sensitivity testing of all isolates.

Coverage error: The reasons for sample submissions need to be considered, as sources of error can be dependent on this factor. Also the ability to isolate *Salmonella* needs to be considered (dependent on sample type taken, age of sample, storage and transport, culture method used, laboratory staff technical expertise etc).

Location error: At the level of aggregation and precision presented in the maps, errors in location of records in the databases may be considered negligible. Larger errors will be due to incomplete reporting of incidents and animal populations. It should also be remembered that the numbers of birds and animals at each holding or premises range through several orders of magnitude. Thus the distribution of animal numbers differs from the distribution of premises and holdings, especially in the case of poultry.

All cattle holdings were recorded with CPH numbers, over 99% of which could be georeferenced using a table on RADAR. The table is considered reasonably reliable and has been cleaned, but its reliability has not been formally tested. Of the remaining holdings, over 80% could be georeferenced using recorded postcodes, leaving less than 0.2% of holdings with less than 0.05% of animals unlocated. There were also about 230,000 cattle without CPH or location. Less than 0.05% of premises in the poultry register could not be assigned to a county. In the Welsh agricultural survey, 0.7% of sheep holdings and 3.9% of pig holdings were not allocated to regions. In the English agricultural survey, 0.18% of sheep holdings and 0.84% of pig holdings had their locations suppressed, but regional totals were available, allowing estimation of the distribution of suppressed holdings among the

county areas on the maps. The main source of error in the agricultural survey is probably the interpolation required because each year's survey is based on a partial sample. However, such errors probably have little impact on a classification at county level to five levels of holding density. Densities of poultry holdings may be an underestimate of actual densities because some premises do not have to register; these are premises that have fewer than 50 poultry or do not use their birds for commercial purposes. The number of unregistered premises is not known. The GB Poultry Register receives registrations via various data sources. These differing data capture methods are open to different types of potential error.

Non-response error: Although all *Salmonella* isolations from statutory species are required to be reported, not all data items requested are mandatory under the Zoonoses Order. Different categories of submissions may have different non-response rates for different data items.

It is apparent that there are missing records caused by the non-reporting of movements in CTS. Where possible, a RADAR transformation algorithm addresses some of the apparent non-response.

Measurement error: Different *Salmonella* culture methods vary in their sensitivity, which varies according to sample type, type of *Salmonella* present and profile of competitive flora in the sample. Data on the VLA and SAC forms are subject to individual interpretation by the person submitting the information, although guidance is provided to relevant personnel.

The requirement of this report is to include as much data as is available. This necessitates the inclusion of unapproved submissions, however only approved test results are included. Data are scrutinised to remove errors in false positives for strategically important isolates (e.g. resistant to 3<sup>rd</sup> generation cephalosporins, resistant to ACSSuT pattern). It is expected that resistance to amikacin, ciprofloxacin, ceftazidime or cefotaxime will be detected only rarely or not at all in isolates. Resistance to these antimicrobials is usually followed up at the time of detection.

Both labs at VLA Lasswade and VLA Weybridge that perform the expanded susceptibility testing have UKAS accreditation.

Data processing error: It is difficult to obtain the required information from the customers for non mandatory data. It is the responsibility of the NO to ensure that the data are accurate and complete. A validation

exercise is carried out on a weekly basis at the VLA Regional Laboratories and by CERA.

As a result of refinements to the method of defining incidents, it may not always be possible to reproduce figures from previously published reports.

There are anomalous records caused by incorrect data capture of movements in CTS. Where possible, a RADAR transformation algorithm addresses some of the apparent data processing anomalies.

### **3. Timeliness and punctuality**

Any *Salmonella* reports that are confirmed or identified after the publication of this report will be incorporated into the revised tables that appear in the following year's publication. This may cause the number of incidents and/or isolations to differ from that previously given for a particular year. The most recent version of the report should therefore be used when comparing incidents from year to year.

### **4. Accessibility and clarity**

Salmonella (VLA) has a related metadata profile (see section B).

### **5. Comparability**

Changes in the number of *Salmonella* isolations from poultry and pigs over time may reflect changes in the monitoring activity conducted by the livestock industry and not necessarily changes in incidence in *Salmonella* infection. Number of tests carried out by CSPO authorised laboratories is collated by DEFRA and reported in a different way to the EU.

In January 2008 the Control of Salmonella in Poultry Order 2007 ('The Poultry Order'), replaced and revoked the Poultry Breeding Flocks and Hatcheries Order 2007. The CSPO 2007 enforced a new National Control Programme (NCP) for laying flocks of domestic fowl, which implements enhanced monitoring and controls for *Salmonella* (EU Regulations 2160/2003 & 1168/2006). According to the new Order statutory testing of chicken layer flocks takes place during the rearing phase and during the production of eggs for human consumption, and an enhanced sampling (boot swabs or composite faeces, and dust) and detection (Modified Semi-Solid Rappaport Vassiliadis culture medium) method is used. This change may have an effect on the number of reports received since the implementation of the CSPO 2007 and in comparison with previous years. In 2009 the CSPO 2007 was revoked and replaced by the CSPO 2009, which included the requirements for the implementation of an NCP in meat production flocks of *Gallus gallus*

and, in addition, continues to provide for the statutory monitoring of chicken breeding flocks under the National Control Plan for chicken breeding flocks which was implemented in March 2007.

From the start of implementation of the NCP in 2008, data on positive findings of *Salmonella* in laying and breeding chicken flocks, is reported as number of positive flocks, as required by the legislation, as well as number of positive incidents detected during the year. The number of reported incidents of *Salmonella* detection in chickens does not equate directly to the overall number of positive flocks that are detected during the year. A flock is counted as positive only once, irrespective of the number of incidents occurring and the multiplicity of serovars determined.

A bovine animal is deemed to have been present on a premise in RADAR if it was recorded as having been there just after midnight (00:01 hours) on the date in question.

The GB Poultry Register is being constantly updated; both new registrations and de-registrations ensure that the GB Poultry Register remains up to date.

If this report was to be re-run in the future, with updated cattle and *Salmonella* data for the same period, the figures might well differ due to anomalous movement histories being rectified and new *Salmonella* incidents being confirmed.

From 1<sup>st</sup> January 2006, any hatchery isolates where there are no supply flock details available are treated as isolations only and not incidents as they cannot be traced back to a specific supply flock. The species that were mainly affected by this differential reporting from 2006 onwards were chickens and ducks.

Submissions received from the Scottish Agricultural Colleges (SAC), and any submissions received without a sample are allocated an incident reference whereas previously these were not allocated such references. This improvement was put in place for all reports on the database in 2008.

Not all isolates of new incidents of *S. Typhimurium* from bovine animals received from the Scottish Agricultural College (SAC) are phage typed. As the system does not allocate an incident reference number to a report of *S. Typhimurium* until the phage type result is received, this means that some isolates of *S. Typhimurium* from SAC will not be allocated an incident reference and therefore the actual number of

reports of *S. Typhimurium* may be higher than the number recorded on the database.

The antimicrobial sensitivity chapter (Chapter 6) contains data from routine surveillance and other surveillance projects and is therefore not directly comparable with the data presented in the tables and figures of the species chapters which include routine surveillance data only and exclude data from research projects and surveys.

### **VLA Quality Assurance Statement**

The policy of the Veterinary Laboratories Agency (VLA) is to maintain a high standard of quality in all aspects of its operation and to continually satisfy our customers in respect of all the services offered.

The laboratory facilities are UKAS accredited to BS EN ISO 17025:2000 (Lab Nos. 0941, 1769 and 2112) for an extensive range of tests supported by proficiency testing accredited to ISO/IEC Guide 43-1 1997 (Lab No. 0004). VLA is certificated to BS EN ISO 9001:2000 for 'the provision of a range of specialist veterinary scientific services to the Government and other interested parties worldwide (Certificate Nos. LRQ 4000436, 4001071, 0962413 and 4001392).

Additionally VLA holds Good Laboratory Practice and Good Manufacturing Practice approval and complies with the Joint Code of Practice for Research projects and Good Clinical Veterinary Practice quality standards.

VLA Weybridge is accredited to BS EN ISO 14001:2004 for environmental management systems.

**SECTION B****METADATA ELEMENTS**

<b>Metadata elements</b>	<b>Definition</b>
Creator	Salmonella Surveillance Team, CERA, VLA Weybridge, New Haw, Addlestone, Surrey KT15 3NB
Date created	17/03/2009 data retrieval from FarmFile/Salmonella database
Identifier	Salmonella Annual Surveillance Report 2008, Version 2
Quality	See Section A
Publisher	Salmonella Surveillance team, CERA, VLA Weybridge, New Haw, Addlestone, Surrey, KT15 3NB
Source	Farmfile/Salmonella database.
Title	Salmonella in Livestock Production in GB 2008

### ADDITIONAL REPORT METADATA ELEMENTS

<b>Metadata elements</b>	<b>Definition</b>
Coverage spatial	Salmonella reports made in Great Britain
Date. Issued	28/08/2009 – Version 1 28/01/2010 – Version 2
Date. Updating frequency	Annually
Format medium	Word document
Language	English
Mandate authorising statute	Data collected under: Zoonoses Order 1989 PBFHO 2007 CSPO 2007 ABPR 2005 IPAPO 1981
Rights. copyright	Crown copyright
Subject. Category	Zoonoses, Animal Health
Subject. Keywords	Salmonella, Livestock
Subject. programme	Food and Environmental Safety
Subject. project	Surveillance of Salmonella in animals (FZ2000) Monitoring of Antimicrobial Resistance in Bacteria from Animals and their Environment (FZ2200) Microbiological monitoring of Animal By Products, laboratory inspection scheme and Quality Assurance sample supply (ABPR & PBFHO) (FZ2800)
Status	Approved by: Christina Papadopoulou (c.papadopoulou@vla.defra.gsi.gov.uk) Version 2
Type	Report

## Acknowledgements

Incidents were reported by Nominated Officers of the Veterinary Laboratories Agency for England and Wales and Divisional Veterinary Managers for Scotland and, through them, by private laboratories.

Divisional Veterinary Managers of Animal Health (formerly State Veterinary Service) are responsible for the collection of samples of processed animal protein.

Staff of the Veterinary Laboratories Agency processed the data.

The following reference laboratories made or confirmed the majority of isolations:

- Veterinary Laboratories Agency, Weybridge and Lasswade.
- HPA Laboratory of Enteric Pathogens, Colindale.
- Scottish *Salmonella* Reference Laboratory, Glasgow.

This report was compiled by:

Christina Papadopoulou, Joanna Lawes and Sue Kidd  
Centre for Epidemiology and Risk Analysis,  
Veterinary Laboratories Agency,  
New Haw,  
Addlestone,  
Surrey,  
KT15 3NB

Telephone: + 44 (0)1789 - 750212  
Fax: + 44 (0)1789 - 750281  
E-mail [s.a.kidd@vla.defra.gsi.gov.uk](mailto:s.a.kidd@vla.defra.gsi.gov.uk)

Further copies of the report are available from the above address

VLA is an Executive Agency of the Department for Environment, Food and Rural Affairs.