Chapter 2.3

REPORTS OF *SALMONELLA* IN PIGS

The 2006 June Agricultural Census showed growth in the pig sector after several years of sustained contraction. The total size of the pig herd grew by 2% to 4,546,330. The Meat and Livestock Commission also reported an increase in the size of the breeding herd, as well as a range of indicators including average carcass weight, sow productivity, and post-weaning mortality. Further increases are forecast for 2007. Exports rose slightly, though imports continued to be more competitively priced. The number of clean pigs slaughtered remained stable at just below 9 million.

There were 6,572 total pig submissions to VLA/SAC laboratories during the year, an increase of 86%. The numbers of diagnostic submissions also rose by 13% to 1776. These results reflect a change in previously declining levels.

The industry led ZAP (Zoonoses Action Plan) Scheme, established in 2002, continued to monitor the levels of *Salmonella* antibodies in samples from assured abattoirs. Of 140,000 samples taken in the year to June 2006, 23% of samples were positive. This represents a slight rise on the previous year, however there were reductions in Scotland and Northern Ireland. With no overall decline in seroprevalence, a tightening of the scoring system and a shorter time for units to act was introduced. The new ZAP categories are:

ZAP Level 3: 75 % or more of meat juice samples were positive.

ZAP Level 2: Between 50 and 75 % of samples were positive.

ZAP Level 1: Less than 50 % of samples tested were positive.

These changes, along with extensive efforts to publicise the support available, led to a sharp rise in demand for advisory visits from VLA staff. A total of 114 visits were carried out during the year – the majority by the regional laboratories at Bury St Edmunds (49%) and Thirsk (30%) where the industry in concentrated. Some producers have cooperated to make controlled evaluations of different strategies, and it is hoped that this will be further developed during the coming year. Efforts are also underway to use the data collected so far to assess the overall impact of these visits, and the different factors that contribute to *Salmonella* control. With government targets in place to reduce the

levels of the organism, further refinements to the ZAP scheme are expected.

The continuing program of research activity at VLA also includes a large project applying integrated microbiology, epidemiology, socio-economics, statistical and risk analysis methods to the control of pig *Salmonella*. This ongoing work involves collaboration with experts in a range of institutions and there has been encouraging support and feedback from the industry. Results have been sent to participants in the intervention and abattoir studies carried out during 2005.

The EU finishing pig *Salmonella* survey commenced toward the end of 2006, and results are not available as yet. A survey of *Salmonella* in the breeding herd is expected to follow.

The number of pig *Salmonella* incidents and isolations reported here have both risen slightly this year (Table 30). *Salmonella* Typhimurium remains the most commonly found isolate, being found in 66% of incidents – a further decline in the relative contribution of this serovar (Fig 30). *S*. Derby is the second most common again, at 14%, followed by *S*. Kedougou which has increased to 5% of pig incidents.

The serotypes *S*. Hadar and *S*. Virchow have not been isolated in the past five years and have been dropped from Table 30. *S*. Bredeney, *S*. Livingstone and *S*. Stanley have been added the table – they have been reported here for the first time in pigs since 2000 (*S*. Bredeney and *S*. Livingstone) and 2001 (*S*. Stanley).

The definitive phage types of *S*. Typhimurium isolated in 2006 are listed in Table 32. U288 remained the most common, being predominant since 2003. Next most common was again DT193 followed by U302. DT206 and DT108 have not been isolated since 2001 and have been dropped from this table.

There were no reports of *S*. Enteritidis from pigs in 2006.

During 2006 there have been several serotypes and phage types reported from research projects that have not been reported through routine surveillance. These are: *S*. Aberdeen, *S*. Give, *S*. Manhattan, *S*. Muenchen, *S*. Saintpaul and the following definitive types of *S*. Typhimurium: DT2a, DT56, DT85, DT170b and DT208.

Table 30: *Salmonella* in pigs on all premises

Salmonella Incidents (Isolations)	2002		2003		2004		2005		2006	
ENTERICA ENTERICA										
Agona	1	(1)	1	(1)	-	(-)	-	(-)	-	(-)
Ajiobo	1	(1)	-	(-)	-	(-)	-	(-)	-	(-)
Anatum	1	(1)	-	(-)	-	(-)	-	(-)	-	(-)
Bovis morbificans	1	(1)	-	(-)	-	(-)	-	(-)	2	(2)
Brandenburg	-	(-)	-	(-)	1	(1)	-	(-)	-	(-)
Bredeney	-	(-)	-	(-)	-	(-)	-	(-)	2	(2)
Choleraesuis	-	(-)	-	(-)	1	(1)	1	(1)	-	(-)
Derby	16	(16)	26	(32)	26	(28)	23	(24)	28	(28)
Dublin	2	(2)	-	(-)	2	(2)	-	(-)	1	(1)
Durham	-	(-)	-	(-)	1	(1)	-	(-)	-	(-)
Enteritidis	1	(1)	2	(2)	-	(-)	-	(-)	-	(-)
Give	-	(-)	-	(-)	2	(2)	1	(1)	-	(-)
Goldcoast	4	(4)	1	(1)	5	(5)	5	(6)	5	(5)
Heidelberg	-	(-)	-	(1)	-	(-)	-	(-)	-	(-)
Idikan	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
Infantis	2	(2)	-	(-)	2	(2)	-	(-)	1	(1)
Kedougou	10	(11)	7	(7)	5	(5)	5	(5)	10	(10)
Kimuenza	1	(1)	-	(-)	-	(-)	-	(-)	-	(-)
Livingstone	-	(-)	-	(-)	-	(-)	-	(-)	1	(1)
London	5	(5)	3	(3)	4	(4)	2	(2)	2	(2)
Manhattan	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
Mbandaka	1	(1)	-	(-)	-	(-)	-	(-)	-	(-)
Montevideo	-	(-)	3	(3)	-	(-)	-	(-)	-	(-)
Newport	-	(-)	-	(-)	-	(-)	1	(1)	1	(1)
Ohio	-	(-)	-	(-)	-	(-)	1	(1)	-	(-)
Panama	2	(2)	-	(-)	-	(-)	-	(-)	1	(1)
Reading	5	(5)	6	(6)	6	(6)	9	(9)	7	(7)
Saint Paul	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
Senftenberg	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
Stanley	-	(-)	-	(-)	-	(-)	-	(-)	1	(1)
Typhimurium	147	(156)	142	(157)	129	(135)	125	(135)	133	(143)

Table 30: *Salmonella* in pigs on all premises

Salmonella Incidents (Isolations)	2002	2003	2004	2005	2006
UNSPECIFIED					
structure only	5 (5)	2 (2)	1 (1)	6 (6)	5 (5)
rough strain	2 (2)	- (-)	- (-)	2 (2)	1 (1)
TOTAL	207 (217)	197 (220)	185 (193)	181 (193)	201 (211)

Fig 26: Incidents of *Salmonella* serotypes in pigs in 2006

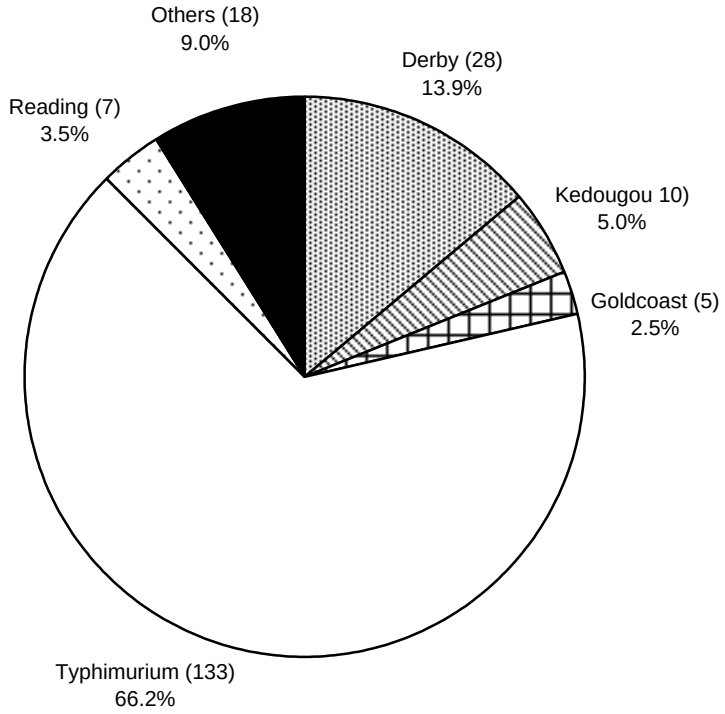

Table 31: Incidents of the top 5 *Salmonella* serotypes in pigs in 2006 as a % of all incidents compared to previous years

Serotype	**2002**	**2003**	**2004**	**2005**	**2006**
S. Typhimurium %	71.0	72.1	69.7	69.1	66.2
S. Derby %	7.7	13.2	14.1	12.7	13.9
S. Kedougou %	4.8	3.6	2.7	2.8	5.0
S. Reading %	2.4	3.0	3.2	5.0	3.5
S. Goldcoast %	1.9	0.5	2.7	2.8	2.5
Total no. incidents	207	197	185	181	201

Fig 27: Incidents of *Salmonella* serotypes in pigs 2002 - 2006

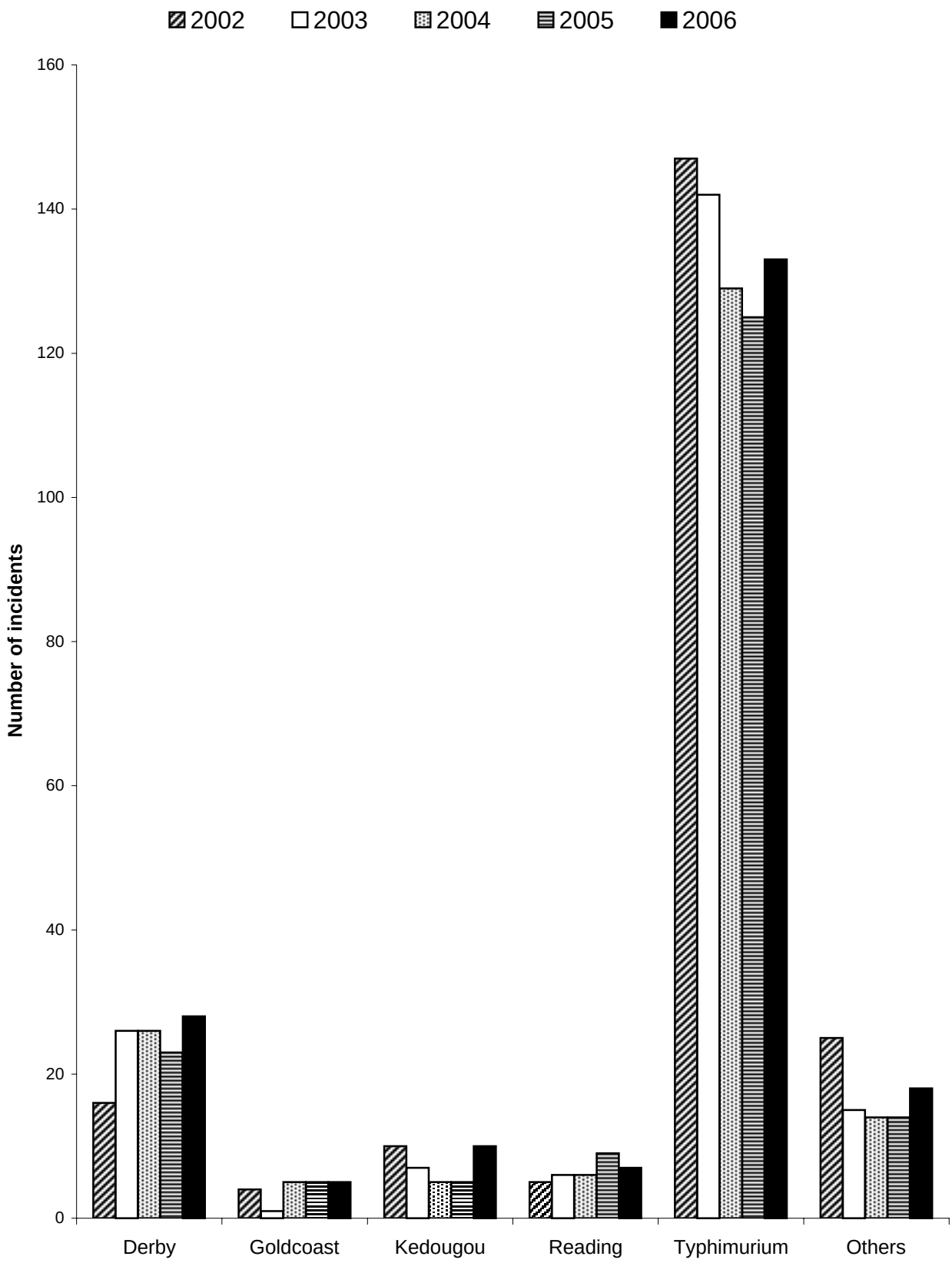

Table 32: *S*. Typhimurium in pigs on all premises

Definitive Types Incidents (Isolations)	2002		2003		2004		2005		2006	
2	1	(1)	-	(-)	-	(-)	-	(-)	-	(-)
12	2	(2)	2	(2)	1	(1)	-	(-)	-	(-)
12a	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
40	-	(-)	-	(-)	1	(1)	-	(-)	-	(-)
41	-	(-)	-	(-)	1	(1)	-	(-)	1	(1)
56	-	(-)	-	(-)	1	(1)	1	(1)	-	(-)
99	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
104	19	(22)	18	(20)	12	(12)	4	(4)	7	(7)
104a	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
104b	2	(2)	4	(4)	3	(3)	8	(9)	3	(3)
120	-	(-)	1	(1)	1	(1)	-	(-)	1	(1)
141	-	(-)	-	(-)	-	(-)	1	(1)	-	(-)
146	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
170	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
193	20	(23)	24	(27)	23	(24)	28	(29)	26	(27)
193a	3	(3)	2	(2)	1	(1)	4	(4)	1	(1)
195	-	(-)	1	(1)	-	(-)	2	(2)	2	(2)
203	-	(-)	1	(1)	-	(-)	3	(3)	-	(-)
208	9	(9)	5	(6)	3	(4)	-	(-)	-	(-)
U288	8	(9)	51	(52)	64	(64)	47	(52)	64	(69)
U302	13	(13)	15	(16)	3	(3)	9	(9)	12	(12)
U308	8	(8)	2	(2)	2	(2)	2	(2)	3	(3)
U308a	16	(17)	-	(-)	-	(-)	-	(-)	-	(-)
U309	-	(-)	-	(-)	-	(-)	1	(1)	-	(-)
U310	7	(7)	1	(1)	2	(2)	5	(5)	5	(7)
U314	-	(-)	-	(-)	1	(1)	-	(-)	-	(-)
U315	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
RDNC	5	(5)	-	(5)	-	(4)	-	(3)	-	(-)
NOPT	1	(1)	-	(-)	-	(-)	-	(-)	-	(1)
UNTY	13	(13)	7	(8)	10	(10)	10	(10)	8	(8)
untyped	20	(21)	-	(1)	-	(-)	-	(-)	-	(-)
untypeable	-	(-)	2	(2)	-	(-)	-	(-)	-	(-)
TOTAL	147	(156)	142	(157)	129	(135)	125	(135)	133	(143)

Fig 28: Incidents of *Salmonella* Typhimurium definitive types in pigs in 2006

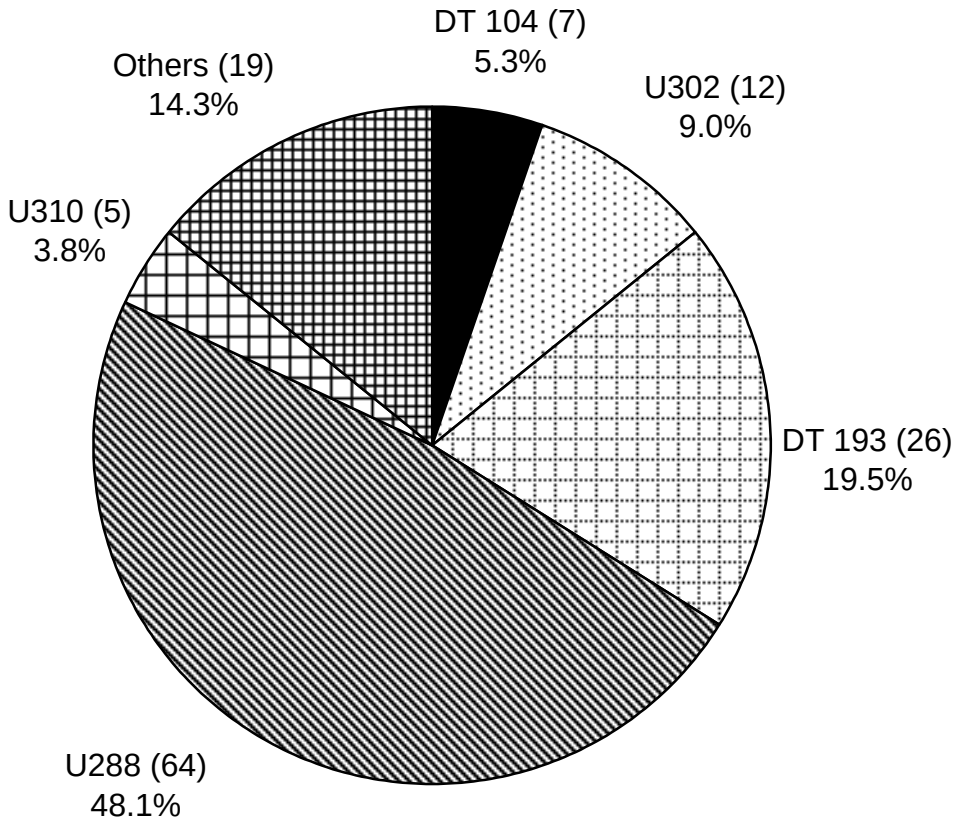

Fig 29: Incidents of *Salmonella* Typhimurium definitive types in pigs (2002 - 2006)

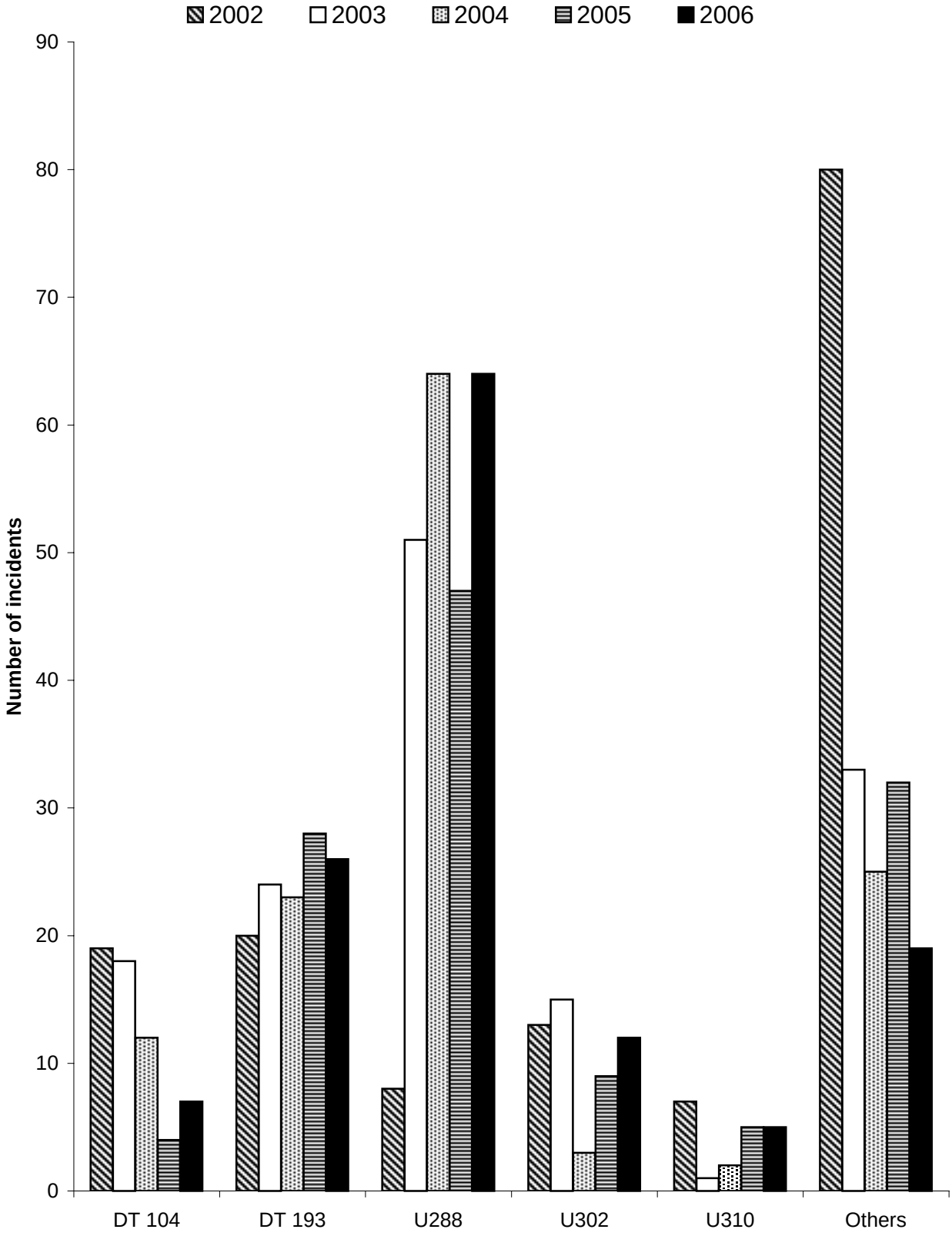

Table 33: *S.* Enteritidis in pigs on all premises

Phage Types	2002		2003		2004		2005		2006	
Incidents (Isolations)										
4	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
8	1	(1)	-	(-)	-	(-)	-	(-)	-	(-)
35	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
TOTAL	1	(1)	2	(2)	-	(-)	-	(-)	-	(-)

Fig 30: *S.* Enteritidis, *S.* Typhimurium and *S.* Derby as a proportion of all incident reports in pigs (1986- 2006)