

# Trends in Regulated *Salmonella* serovars in GB Livestock: 2004-2013

\*Lawes J.R.<sup>1</sup>, Kidd, S.A.<sup>1</sup>, Teale C.J.<sup>2</sup>, Davies, R.H.<sup>2</sup>

1. Epidemiology, Surveillance & Risk Group, Animal Health and Veterinary Laboratories Agency, Woodham Lane, New Haw, Addlestone, Surrey, UK KT15 3NB

2. Department of Bacteriology, Animal Health and Veterinary Laboratories Agency, Woodham Lane, New Haw, Addlestone, Surrey, UK KT15 3NB

\*joanna.lawes@ahvla.gsi.gov.uk

## 1. Introduction

- In GB, all *Salmonella* isolates from animals and their environment or animal feeding stuffs must be reported to the Competent Authority under the Zoonoses Order 1989 [1]. Additional legislation is in place for the control of *Salmonella* in breeding, layer and broiler chickens and fattening and breeding turkeys [2].
- In the EU, *S. Enteritidis* (SE) and *S. Typhimurium* (ST) are the serovars most frequently associated with human illness. Human *S. Enteritidis* cases are most commonly associated with the consumption of contaminated eggs and poultry meat, while *S. Typhimurium* cases are mostly associated with the consumption of contaminated pig, bovine and poultry meat [3].
- This poster presents surveillance trends for SE, ST and monophasic ST incidents reported from livestock in GB over the past 10 years (2004-2013).

## 3. Results

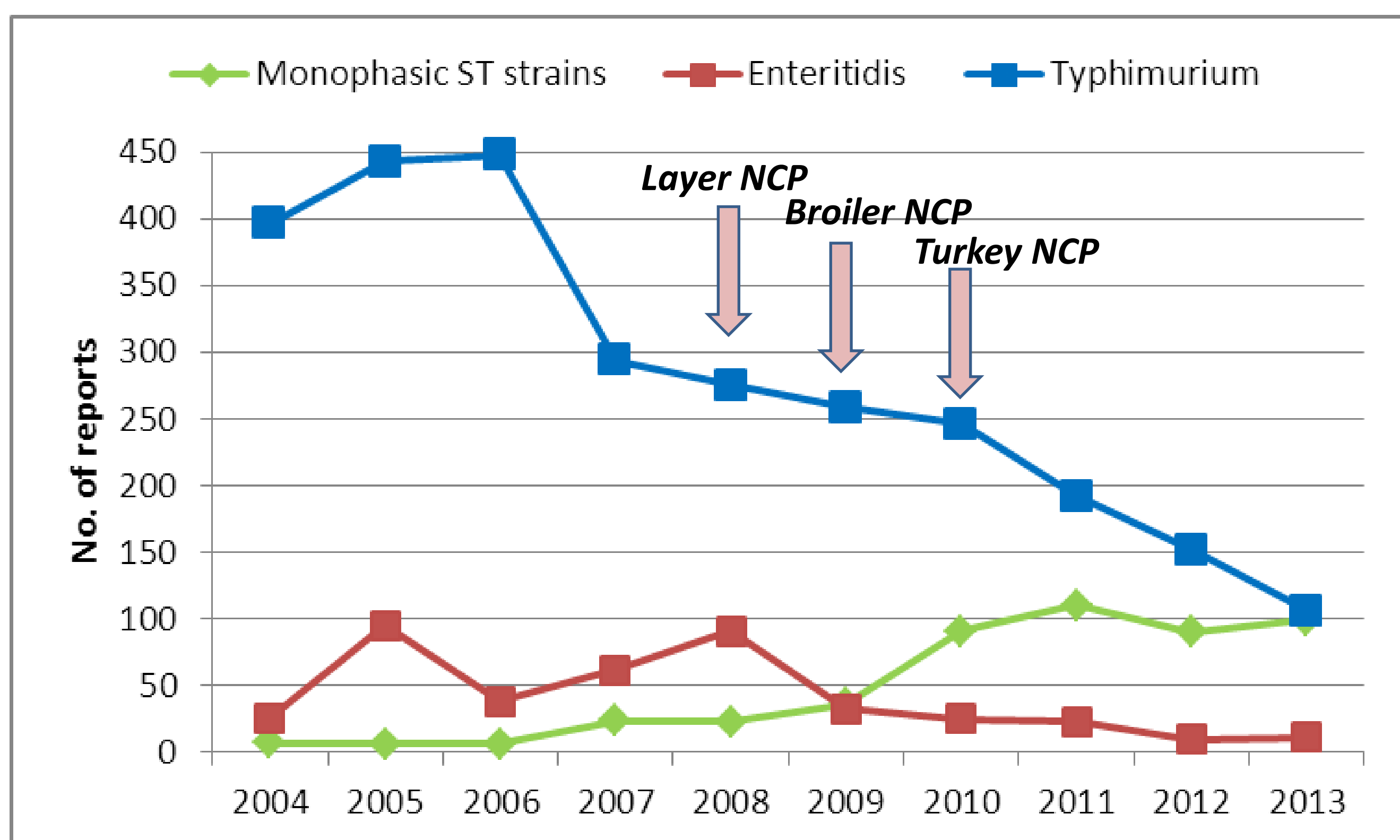


FIGURE 1: Number of reports\* of SE, ST and monophasic ST strains (*S. 4,12:i:-* and *S. 4,5,12:i:-*) between 2004-2013

## 2. Methods

- Reports of *Salmonella* serovars (SE, ST and monophasic ST) from livestock in GB were reviewed (2004-2013). In total, 3,718 reports were received from livestock species covered by the Zoonoses Order (cattle, sheep, pigs, poultry, horses and game birds).
- Serotyping was carried out using micro-slide and tube agglutination tests and serotypes were derived according to White-Kauffmann-Le Minor Scheme [4].
- Salmonella* Typhimurium (including monophasic variants *S. 4,12:i:-* and *S. 4,5,12:i:-*) and *S. Enteritidis* were phage typed according to current versions of the Public Health England phage typing schemes [5] [6].
- Salmonella* isolates were tested to determine their in vitro susceptibility to a panel of 16 antimicrobials using the BSAC disc diffusion technique on Oxoid Isosensitest agar.
- Data was analysed using Stata (Stata Statistical Software Release 12.0; StataCorp).

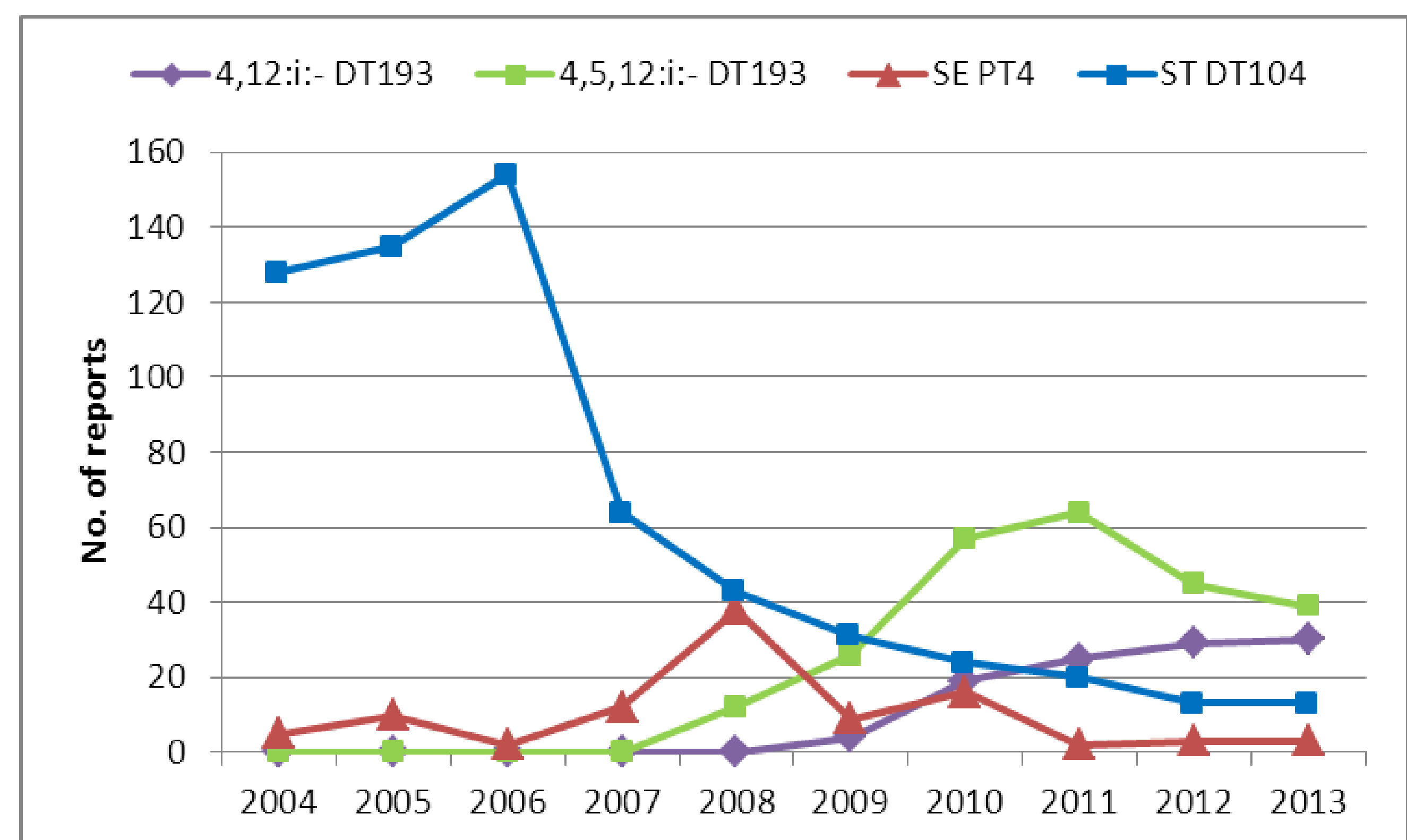


FIGURE 2: Number of reports\* of SE PT4, ST DT104, *S. 4,12:i:-* DT193 and *S. 4,5,12:i:-* DT193 between 2004-2013

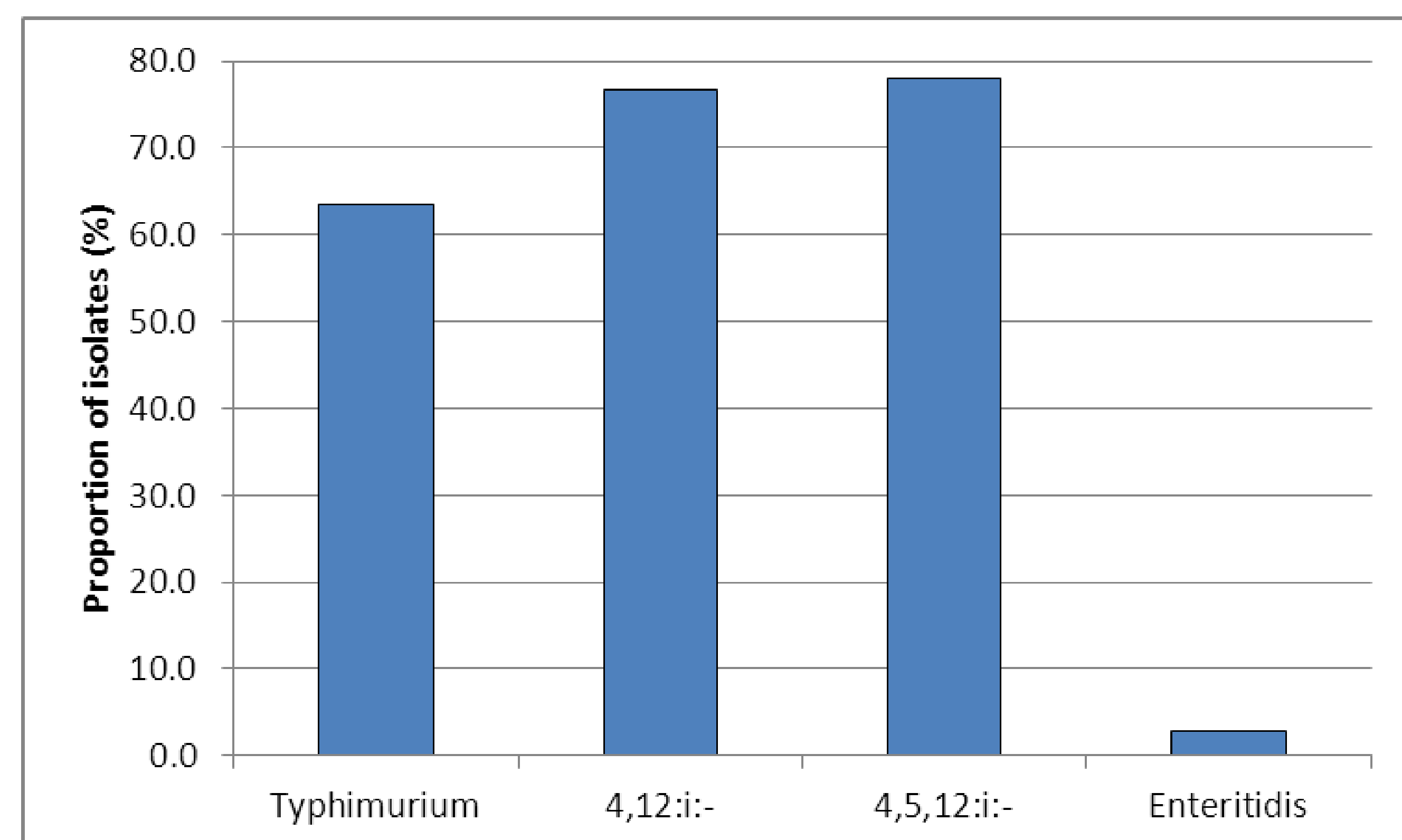
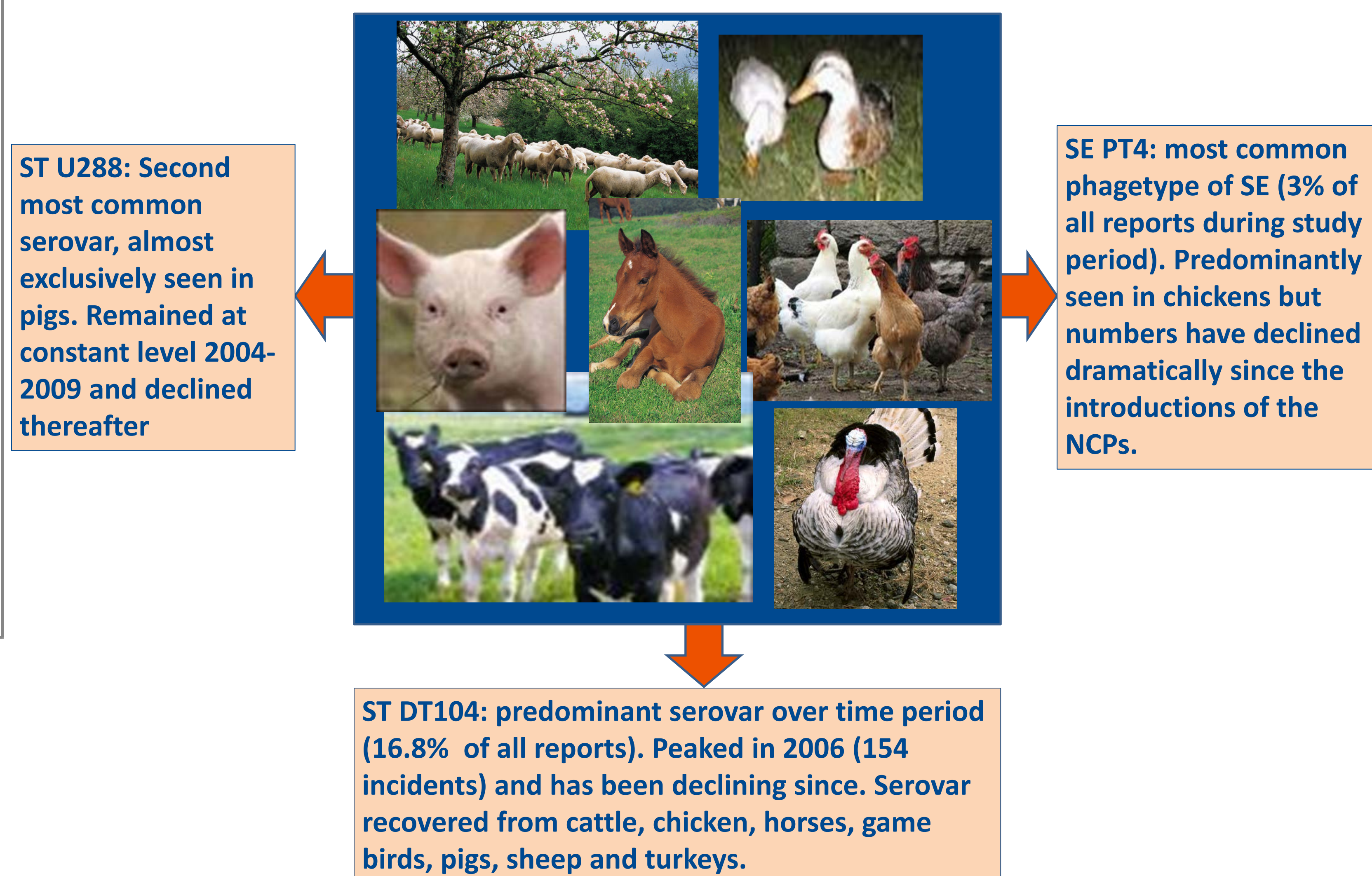


FIGURE 3: Proportion of isolates serotyped as ST, mST or SE, which showed resistance to 4 or more antimicrobials between 2004 and 2013.

The proportion of isolates of SE that are fully sensitive has increased in recent years (statistically significant;  $P < 0.001$ ). Although not statistically significant the proportion of ST isolates that are fully sensitive have also increased from 20% in 2004 to 31% in 2013)



## 4. Conclusions

- There has been a marked decline in ST DT104 in cattle, since its peak in 2006.
- Reports of ST and SE from all species in the study period have decreased.
- Monophasic *Salmonella* Typhimurium emerged in 2007. These strains are particularly prevalent in pigs and cattle but have been seen in all species in low numbers.
- SE PT4 has declined in chickens and demonstrates the substantial progress that continues to be made in controlling *Salmonella* in the commercial layer sector. This is mirrored by a huge reduction in the number of non-travel-related human cases of *S. Enteritidis* PT 4 [7].
- Since 2004, the proportion of fully sensitive ST isolates has increased. This may be due to the decrease in ST DT104 from 2006 onwards which typically had the penta-resistance pattern, ampicillin, chloramphenicol, streptomycin, sulphonamides and tetracycline (ACSSuT).
- The proportion of mST isolates which showed resistance to 4 or more antimicrobials was higher than for ST or SE. The majority of these isolates are DT193 and usually show the ASSuT tetra-resistance pattern.

## 5. References

- HMSO. 1989. The Zoonoses Order 1989 (ISBN 0 11096285 0)
- EEC. 2003. Regulation EC no. 2160/2003. Official Journal L325, pp1-15
- Anon. The European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and food-borne outbreaks in 2011. EFSA Journal 2013, 11(4)3129
- Grimont, P.A.D., Weill, F.X. Antigenic Formulae of the *Salmonella* Serovars. WHO Collaborating Centre for Reference and Research on *Salmonella*, France. 2007
- Anderson, E.S., Ward, L.R., De Sax, M.J., De Sa, J.D.H. Bacteriophage – Typing Designations of *S. Typhimurium*. Journal of Hygiene 1977; 78: 297-300
- Bale, J.A., de Pinna, E.M., Threlfall, E.J., Ward, L.R. Kauffmann-White Scheme – 2007: *Salmonella* Identification – Serotypes and Antigenic formulae. 2007. Health Protection Agency, London.
- Anon. 2013. Zoonoses Report UK 2012. [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/236983/pb13987-zoonoses-report-2012.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/236983/pb13987-zoonoses-report-2012.pdf)