

**ANTIMICROBIAL RESISTANCE
IN COMMENSAL *E. COLI*
FROM LIVESTOCK IN BELGIUM:
*TREND ANALYSIS 2011-2017***

Veterinary Epidemiology



General objectives

Monitoring and reporting of antimicrobial resistance in zoonotic and **commensal** bacteria (**Decision 2013/652/EC**)

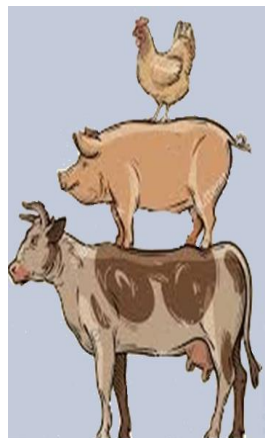
Commensal *E. coli* isolated from faeces between 2011-2017 (**trends analysis**) in:

- **Veal calves:** young cattle kept in specialized units for fattening and slaughtered at an average age of 8 months
- **Beef Cattle** (meat production): young animals (7 months or younger) from farms raising beef cattle for meat production
- **Broiler chickens**
- **Fattening pigs:** fattening pigs older than 3 months

Several statistical models are used.

Antimicrobial resistance

Isolate *E. coli* and determine Minimal Inhibitory Concentration (MIC) for



Ampicillin
Chloramphenicol
Ciprofloxacin
Colistin
Cefotaxime
Gentamicin
Meropenem (2014-)
Nalidixic acid
Sulphamethoxazole
Ceftazidime
Tetracycline
Tigecyclin (2014-)
Trimethoprim

If MIC > cut-off

Resistant

WHO list of Critically Important Antimicrobials
(highest priority) for Human Medicine

Antimicrobial Susceptibility Testing



World Health Organization

If MIC ≤ cut-off


Susceptible

National monitoring program:

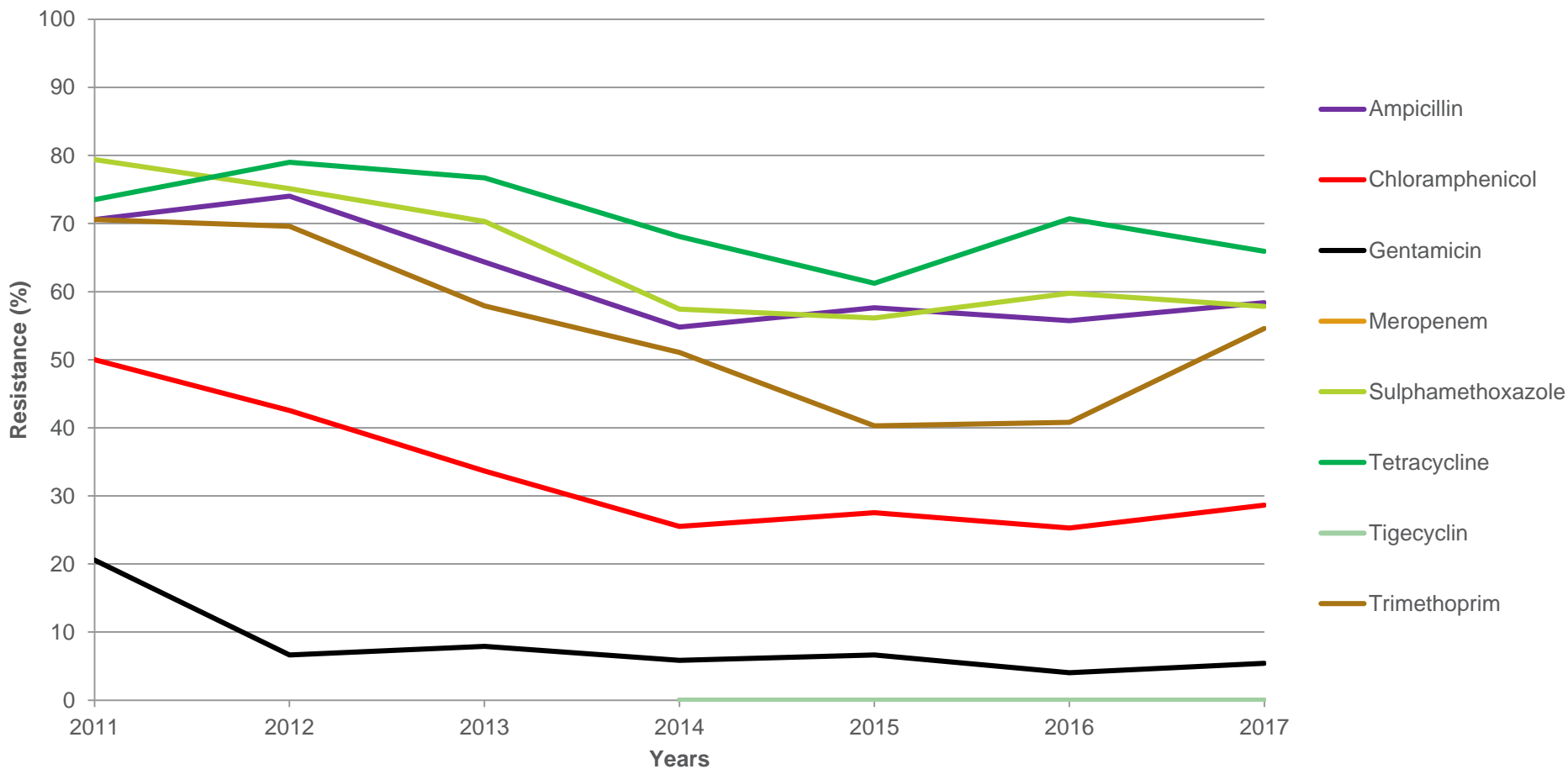
+170 faecal isolates per year (2011-2017)
for veal calves, beef cattle, broiler chickens, pigs
(n = 4 000 samples)



Results prevalence 2011-2017: Descriptive Statistics

Resistance >50% 2011-2017 Ampicillin, Tetracycline, Sulphamethoxazole
Trimethoprim 

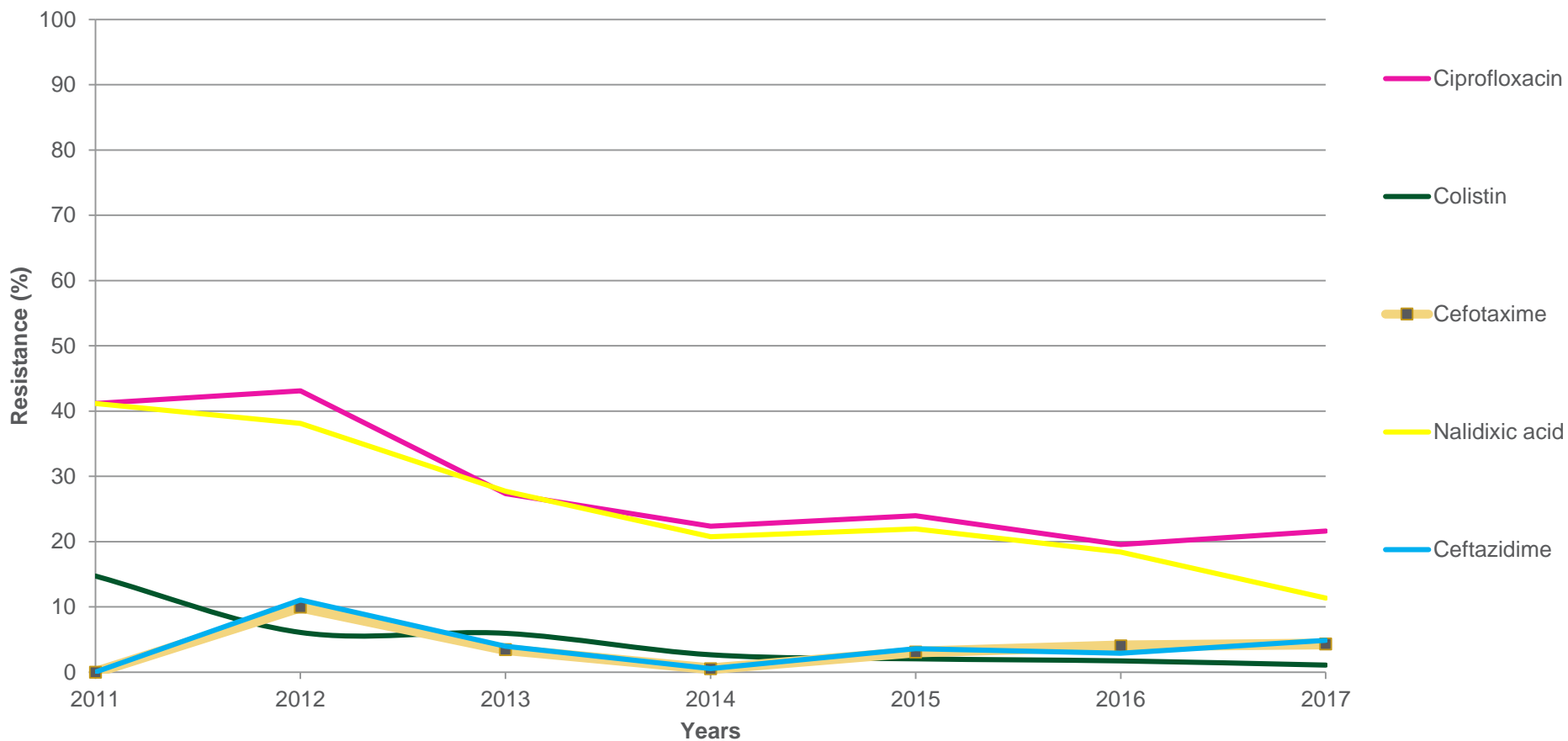
Resistance strains prevalence Veal calves - *E. coli*



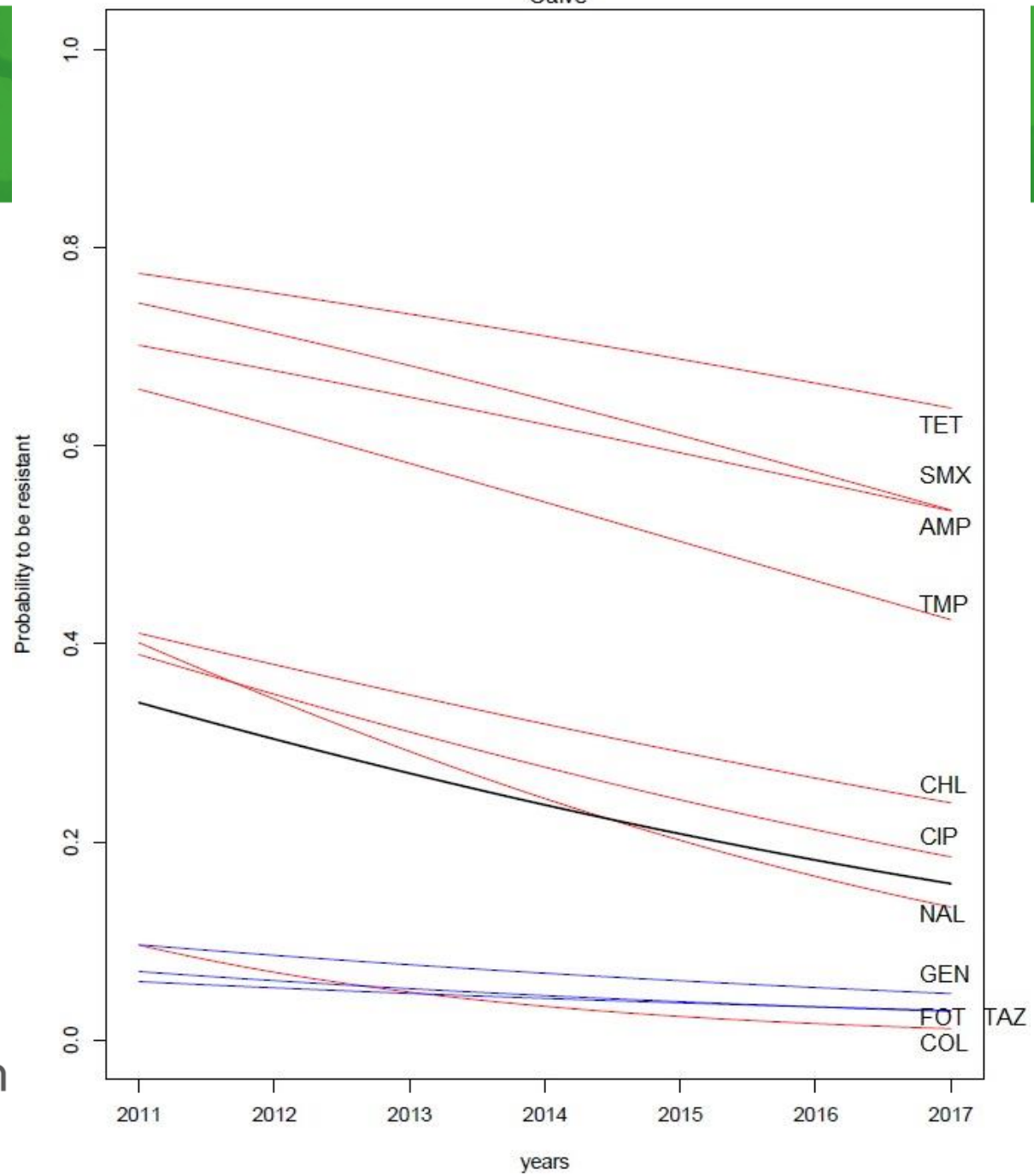


Results prevalence 2011-2017: Descriptive Statistics

Resistance strains prevalence
Veal calves - *E. coli*
Critically important antimicrobials
Highest priority



E. coli
Calve



NS Gentamicin,
Cefotaxime, Ceftazidime
but prevalence very low

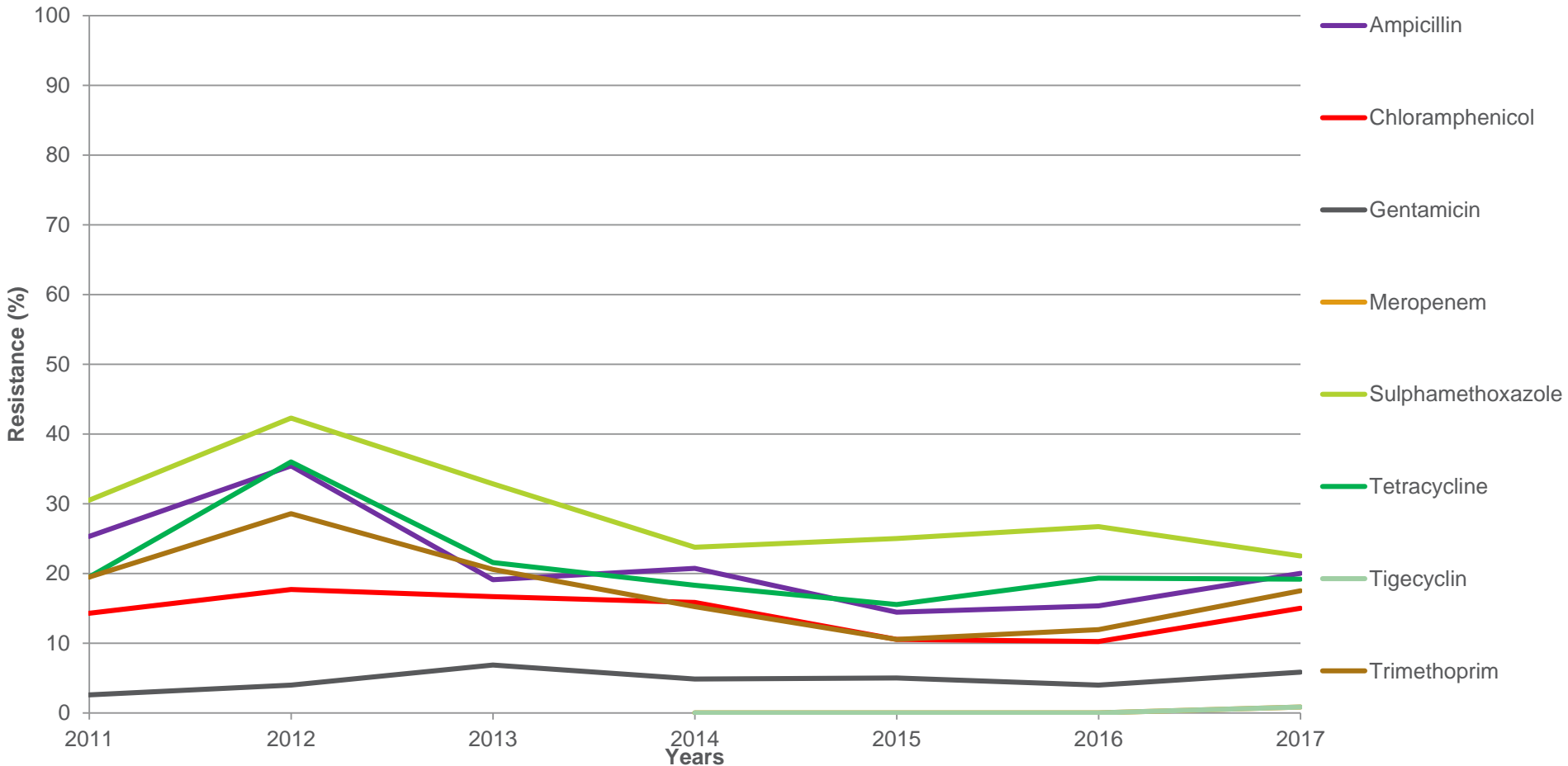




Results prevalence 2011-2017: Descriptive Statistics

Sulphamethoxazole: 22,50 % (2017)

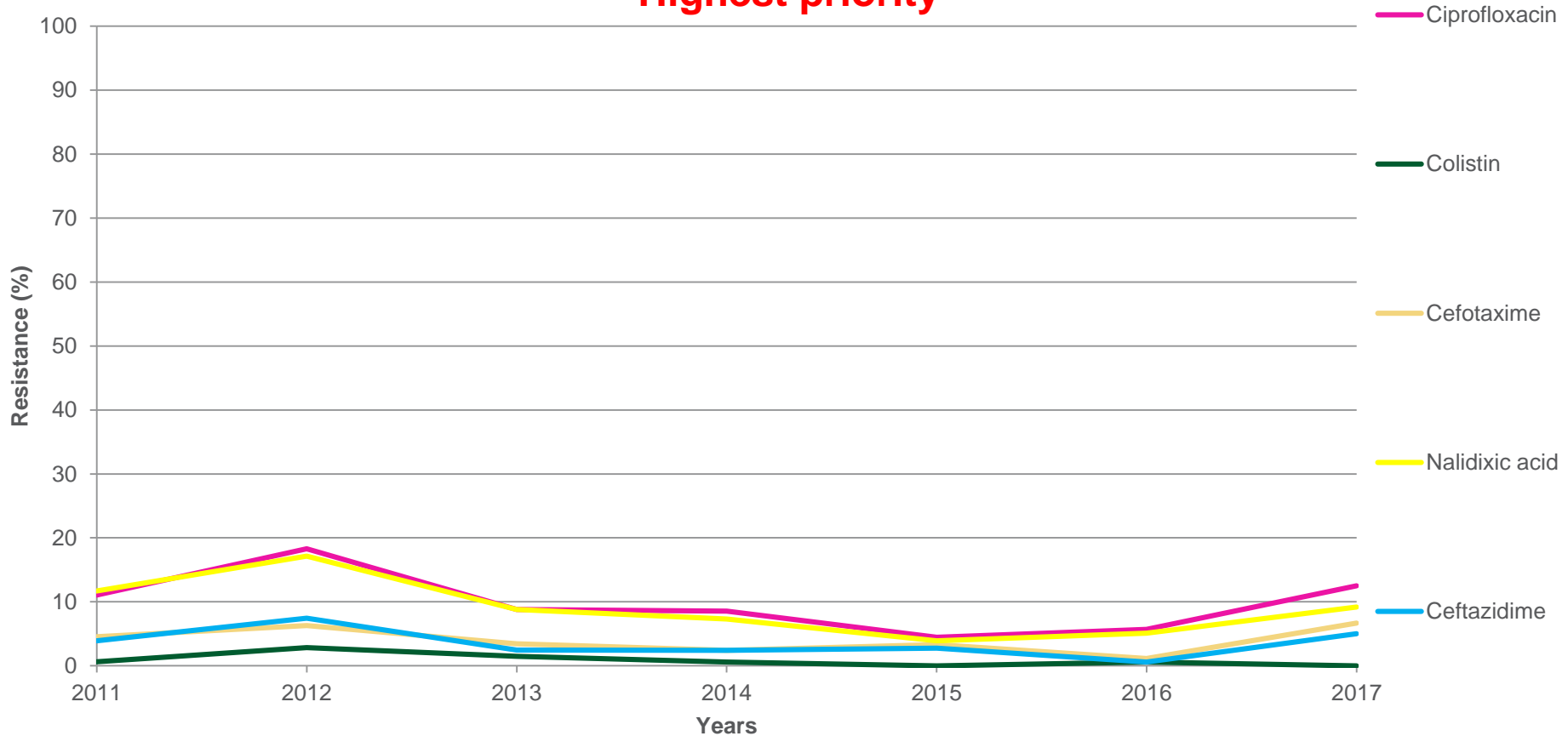
Resistance strains prevalence Beef cattle - *E. coli*





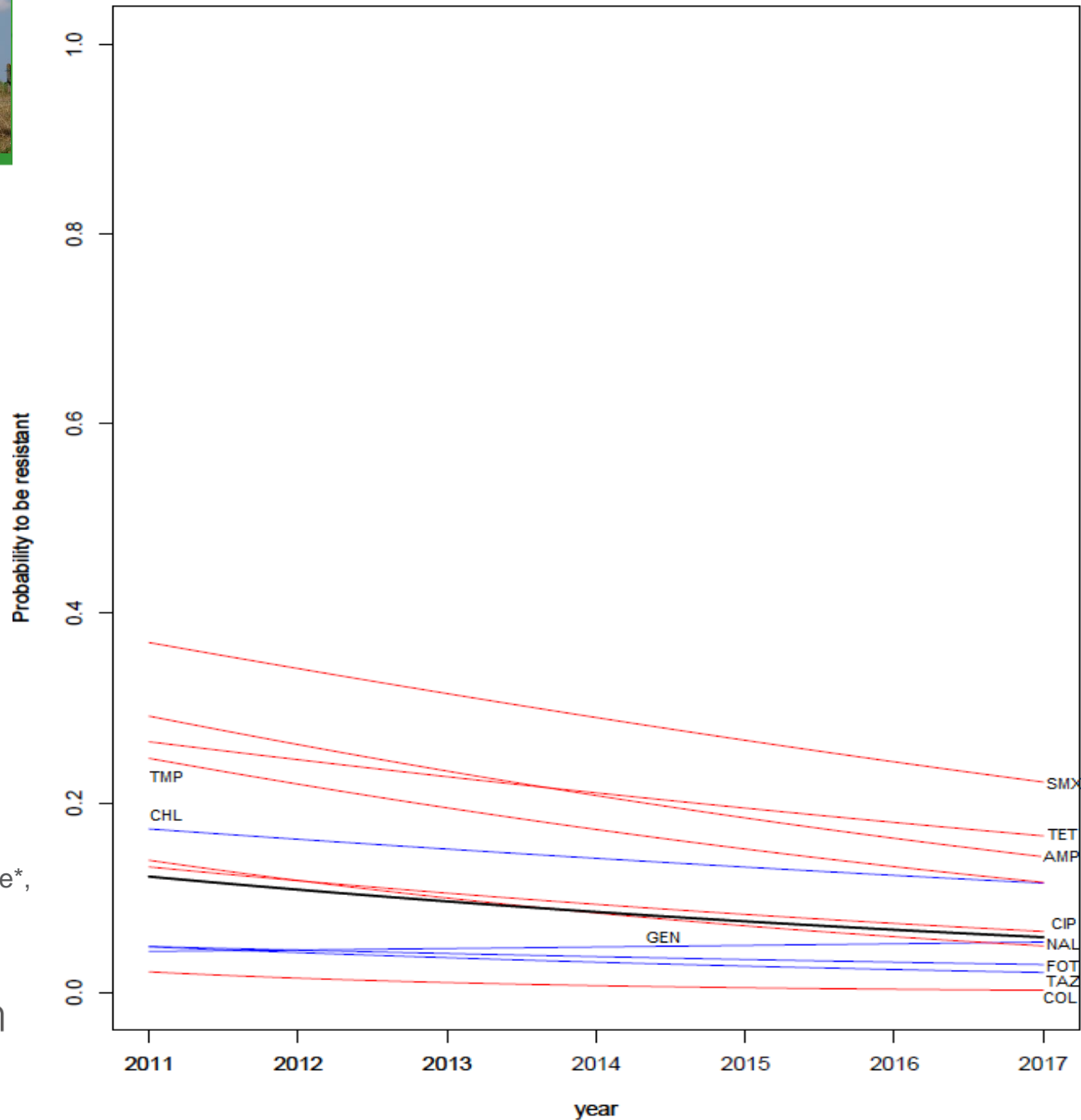
Results prevalence 2011-2017: Descriptive Statistics

Resistance strains prevalence
Beef cattle - *E. coli*
Critically important antimicrobials
Highest priority





E. coli cattle



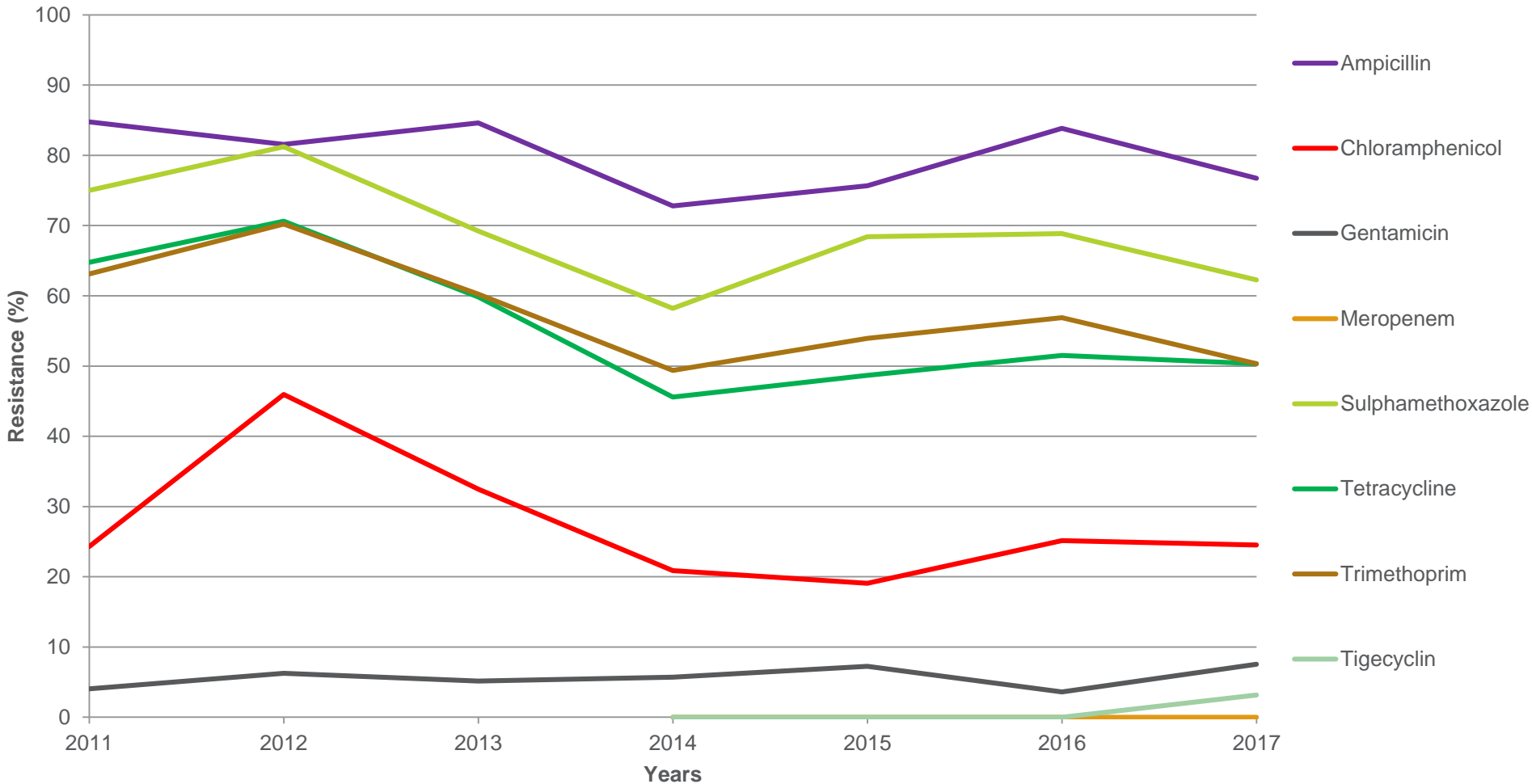
NS for Chloramphenicol, Gentamicin*, Ceftazidime*, Cefotaxime *
* Prevalence is low





Resistance >50% 2011-2017 pour:
Ampicillin, Sulphamethoxazole, Ciprofloxacon, Trimethoprim
Cefotaxime: +9,95%
Ceftazidime: +8,63%

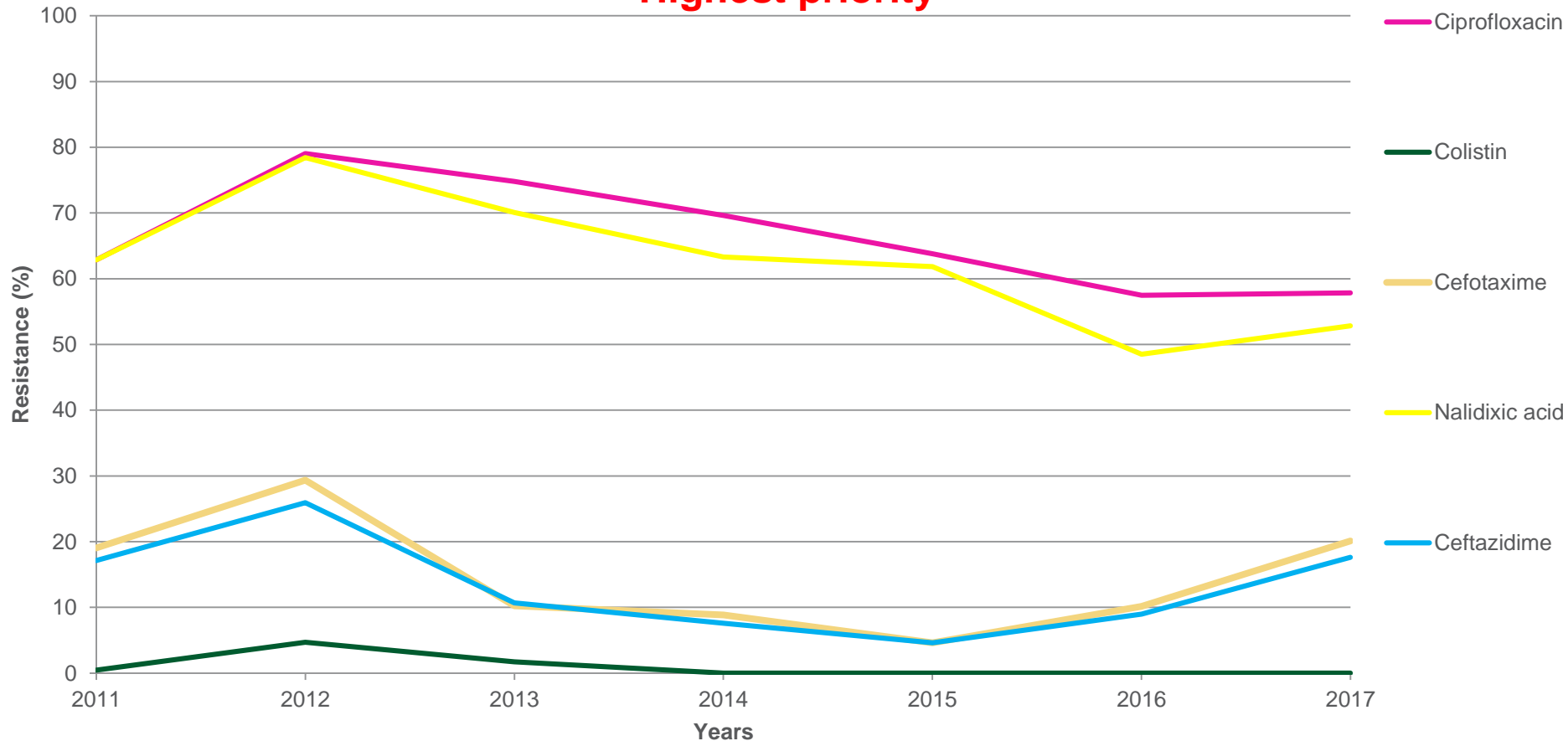
Resistance strains prevalence Chickens - *E. coli*





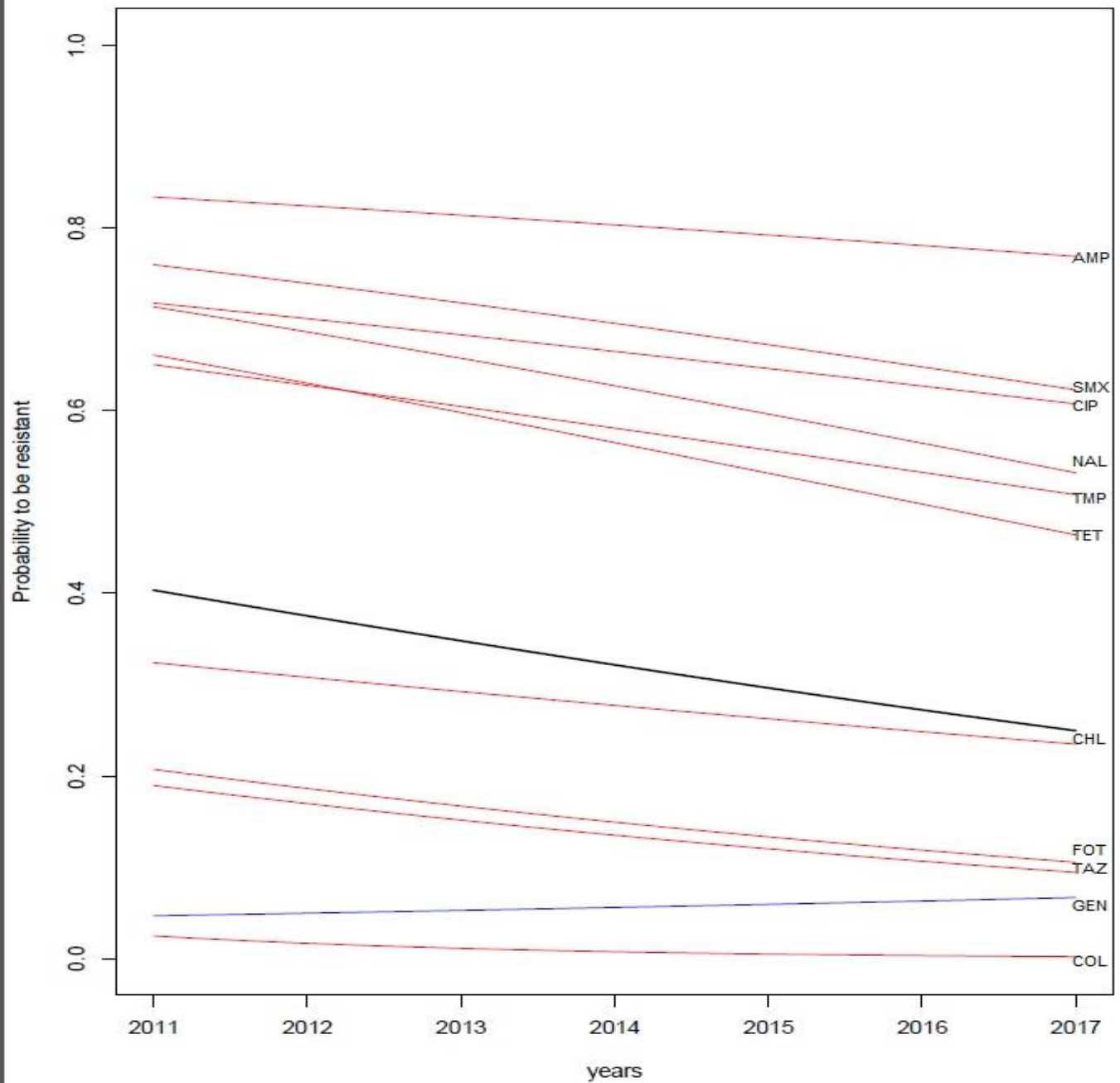
Prevalence 2011-2017: Statistiques descriptives

Resistance strains prevalence Chickens - *E. coli* **Critically important antimicrobials** **Highest priority**





E. coli chicken



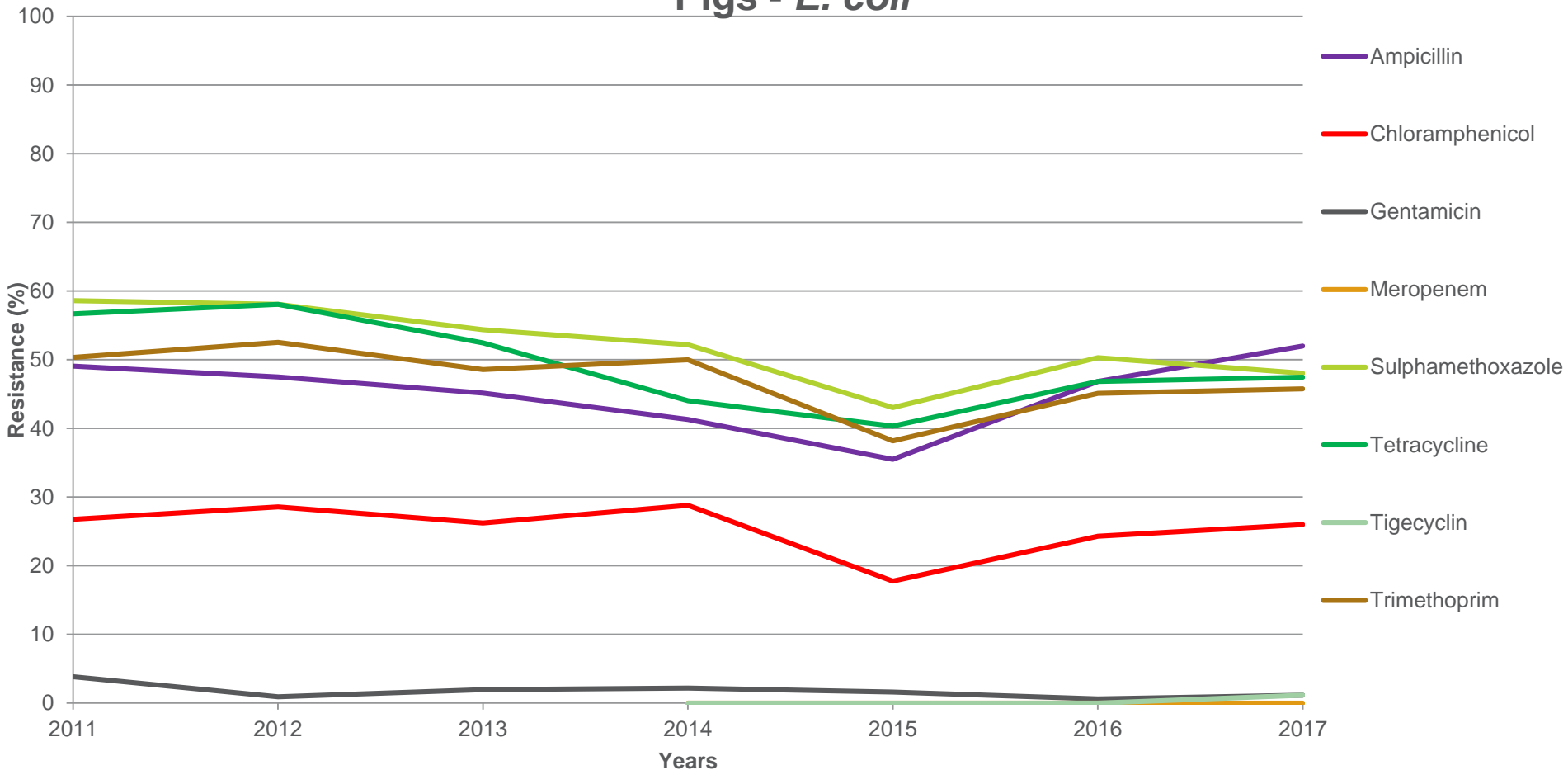


Results prevalence 2011-2017: Descriptive Statistics

Sulphamethoxazole, Tetracyclin, Trimethoprim

Ampicillin ↑

Resistance strains prevalence Pigs - *E. coli*

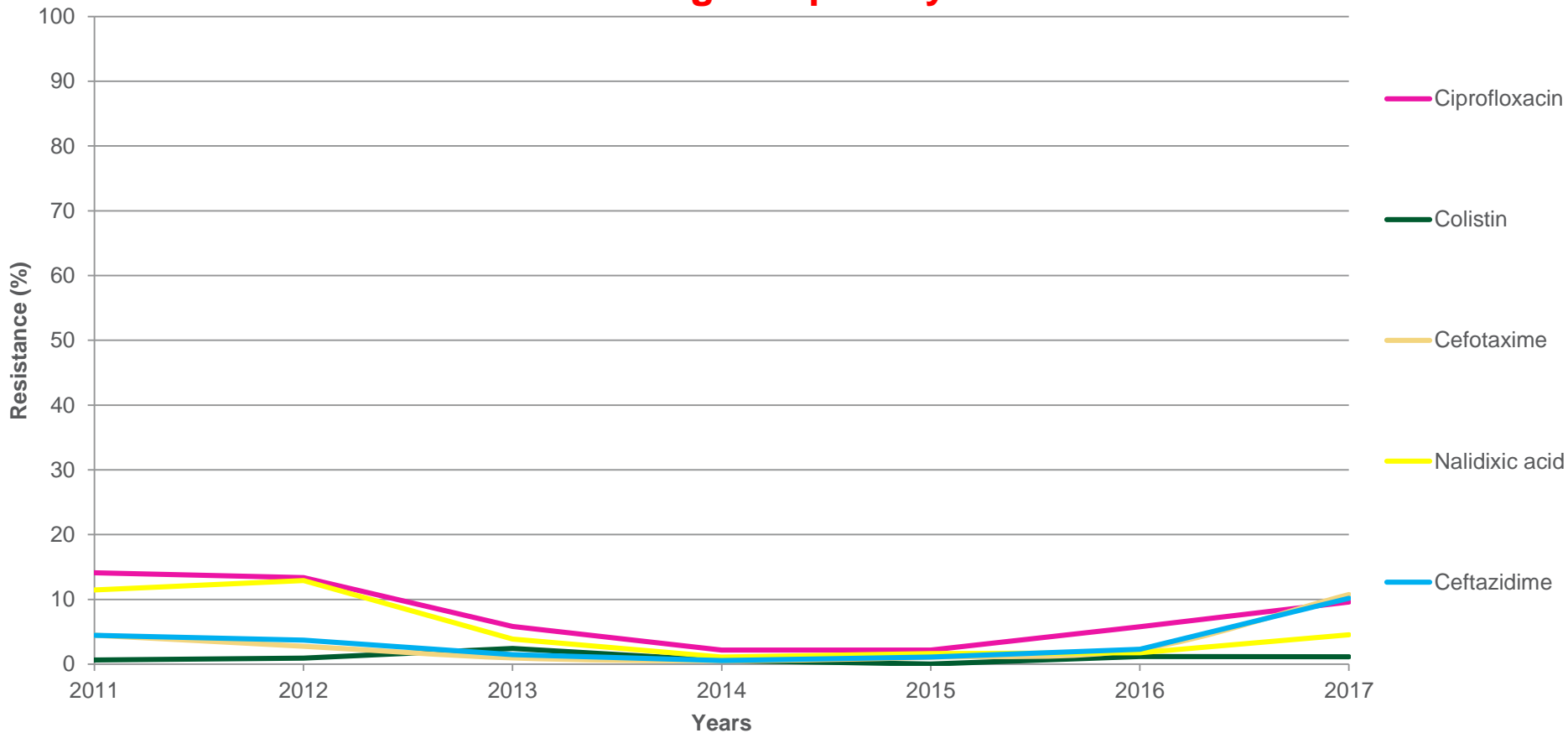




Results prevalence 2011-2017: Descriptive Statistics

Resistance strains prevalence
Pigs - *E. coli*

**Critically important antimicrobials
Highest priority**



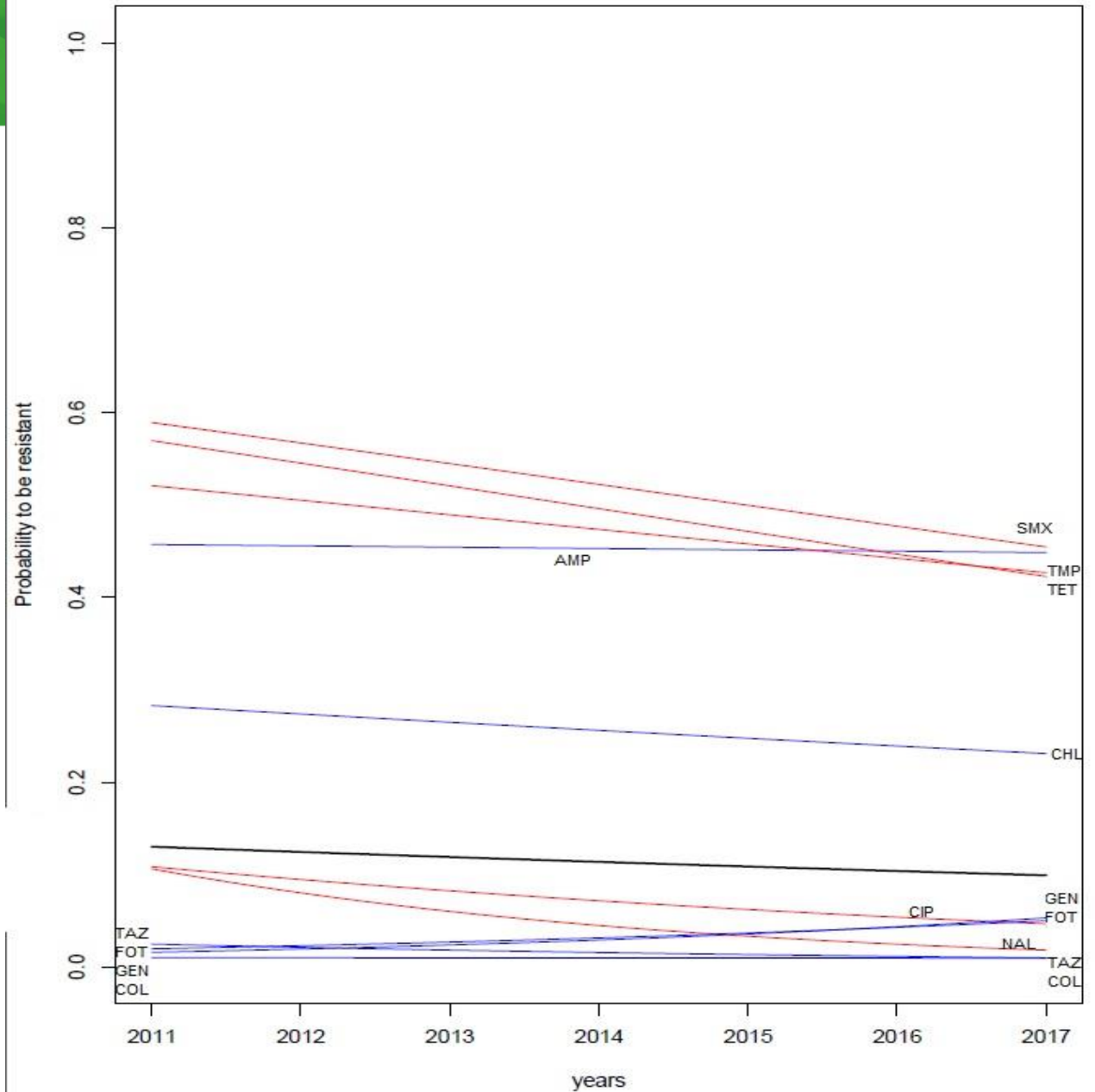


NS Ampicilin, Chloramphenicol,
Ceftazidime,, Cefotaxime,
Gentamicine*, Colistine*

*low prevalence

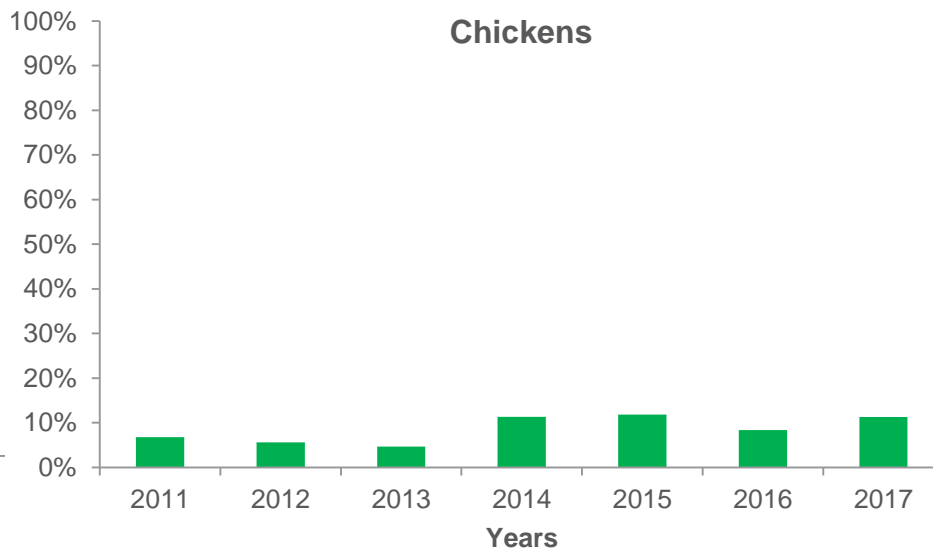
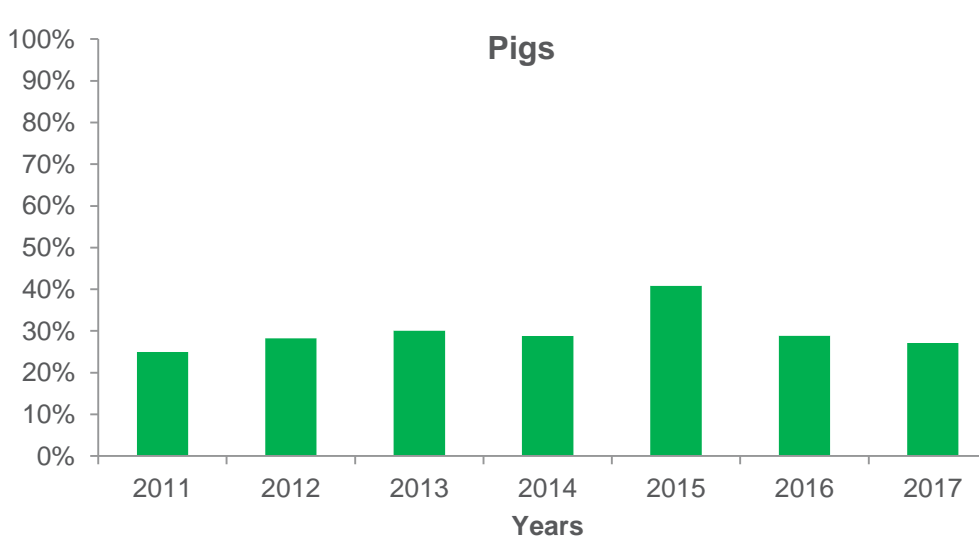
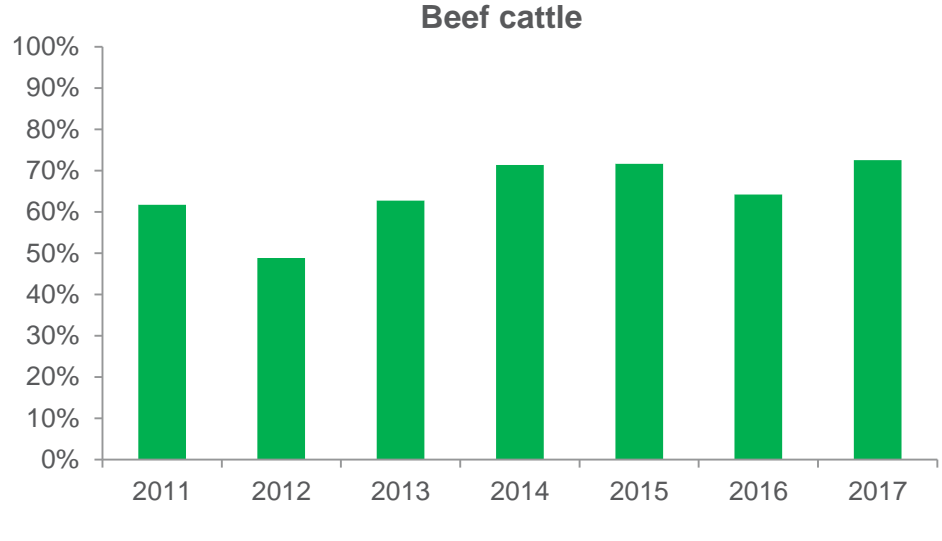
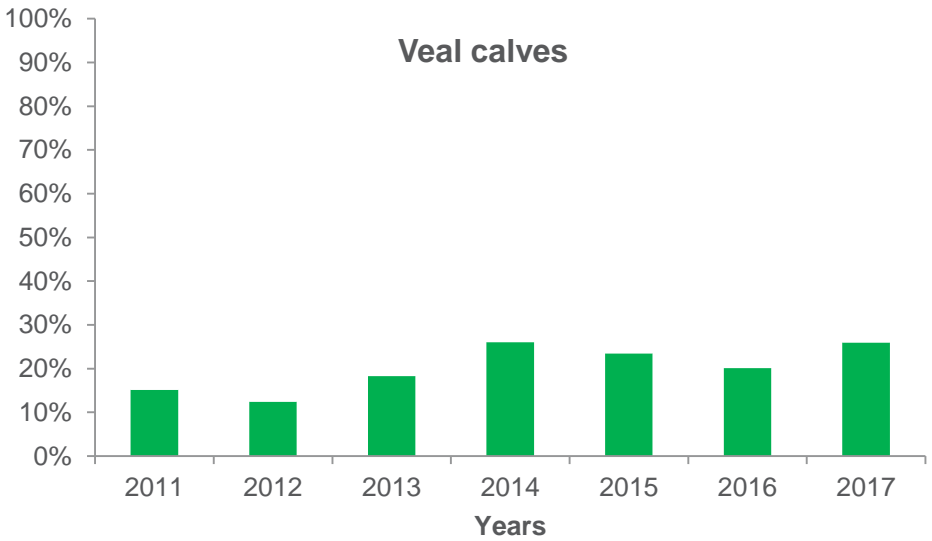


E. coli pig



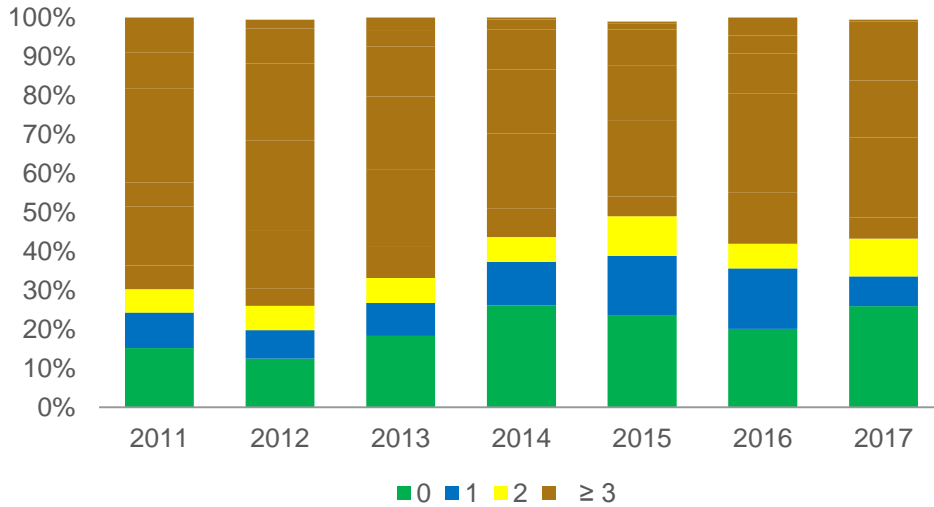
MULTI-RESISTANCE

Resistance to at least three different antimicrobials,
representing different antimicrobial families

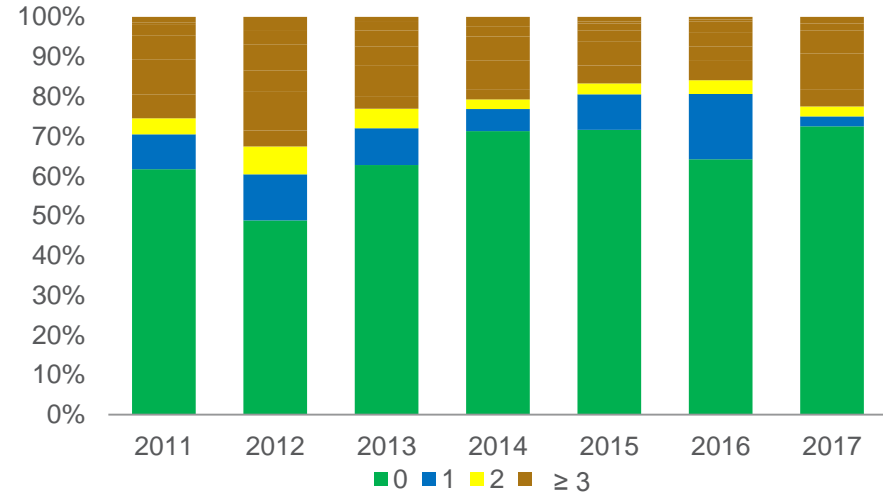


Resistance to 0, 1, 2 and 3 or more antimicrobials

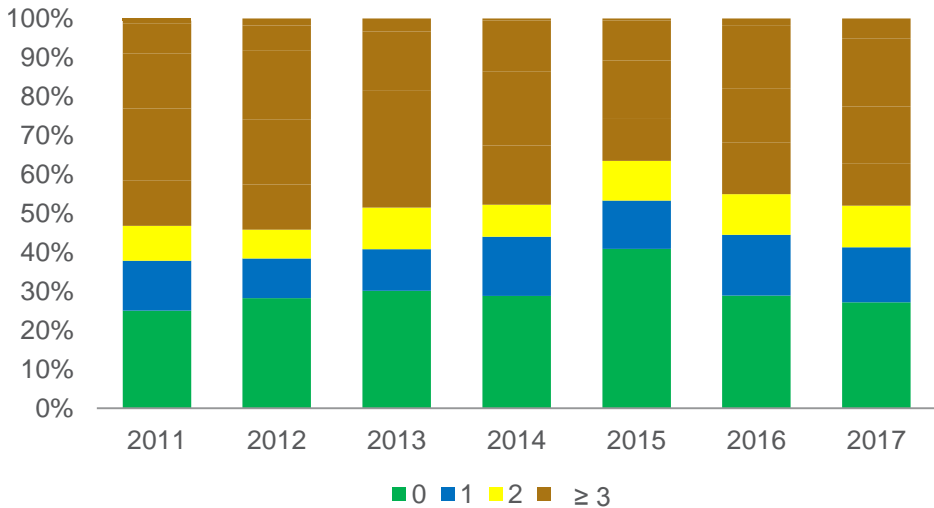
Veal calves



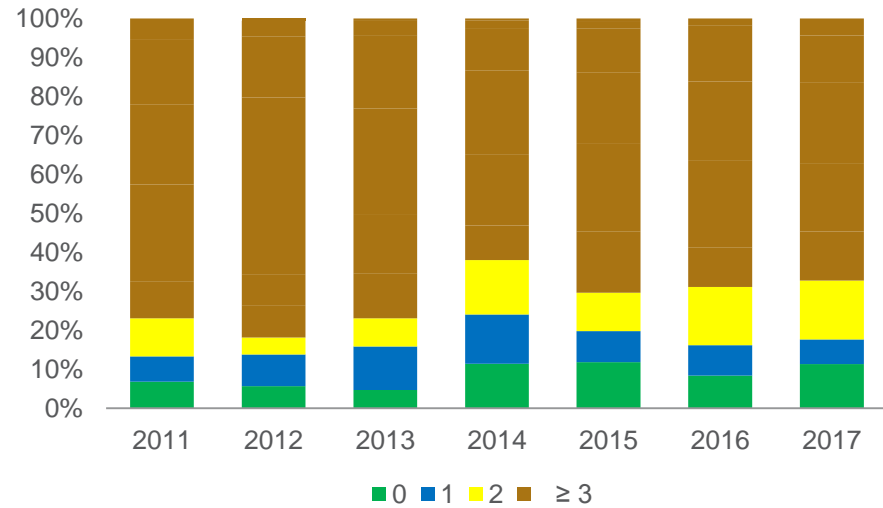
Beef cattle



Pigs



Chickens





Discussion

Phenotypic data: genotypic analysis could confirm

Probability to be resistant globally **decreases in all species**

Veal calves: constant decrease of resistance of highest priority AB, but is slowing down in the last years.

Beef cattle: resistance remains lower compared to other species.

Increases/decreases from one year to another should be nuanced in view of the low sample size and laboratory methodologies,

Pigs: Other AB: situation similar as last year,

Chickens: substances with a high level a resistance but statistically significant decrease in resistance over time. However, prevalences of cefotaxime and ceftazidime have been increasing since 2015.

No resistance to carbapenems (mero) and glycylicyclines (tig) for the fourth year on a row: two classes not authorized for use in animals

Proportion of **full sensitive and non-multiresistant** strains is stable over time

**THANK YOU FOR
YOUR ATTENTION**

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