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# ANTIMICROBIAL RESISTANCE IN COMMENSAL *E. COLI* FROM LIVESTOCK IN BELGIUM:

## *ANALYSIS 2011-2018*

**Veterinary epidemiology**

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# Plan of the presentation

**Introduction**

- General objectives
- Laboratory testing

**Descriptive results**

- Prevalence of resistance in commensal *E. coli* to non-critical and critical antimicrobials (2011-2018), per species
- Prevalence of multi-resistance in commensal *E. coli* (2011-2018), per species

**Discussion**

# General objectives

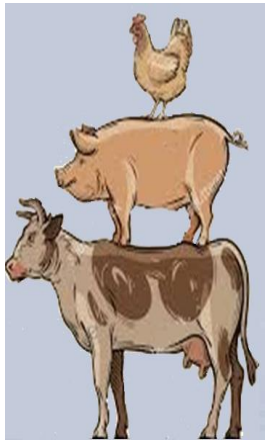
Monitoring and reporting of antimicrobial resistance in zoonotic and **commensal** bacteria (**Decision 2013/652/EC)**

Commensal *E. coli* isolated from faeces between 2011-2018 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

# Laboratory testing

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



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

If MIC>cut-off → Resistant

If MIC≤cut-off → Susceptible

WHO: Highest Priority Critically Important Antimicrobials for Human Medicine

Antimicrobial Susceptibility Testing

World Health Organization

**National monitoring program:**
+-170 faecal isolates per year (2011-2018)
for veal calves, beef cattle, broiler chickens, pigs

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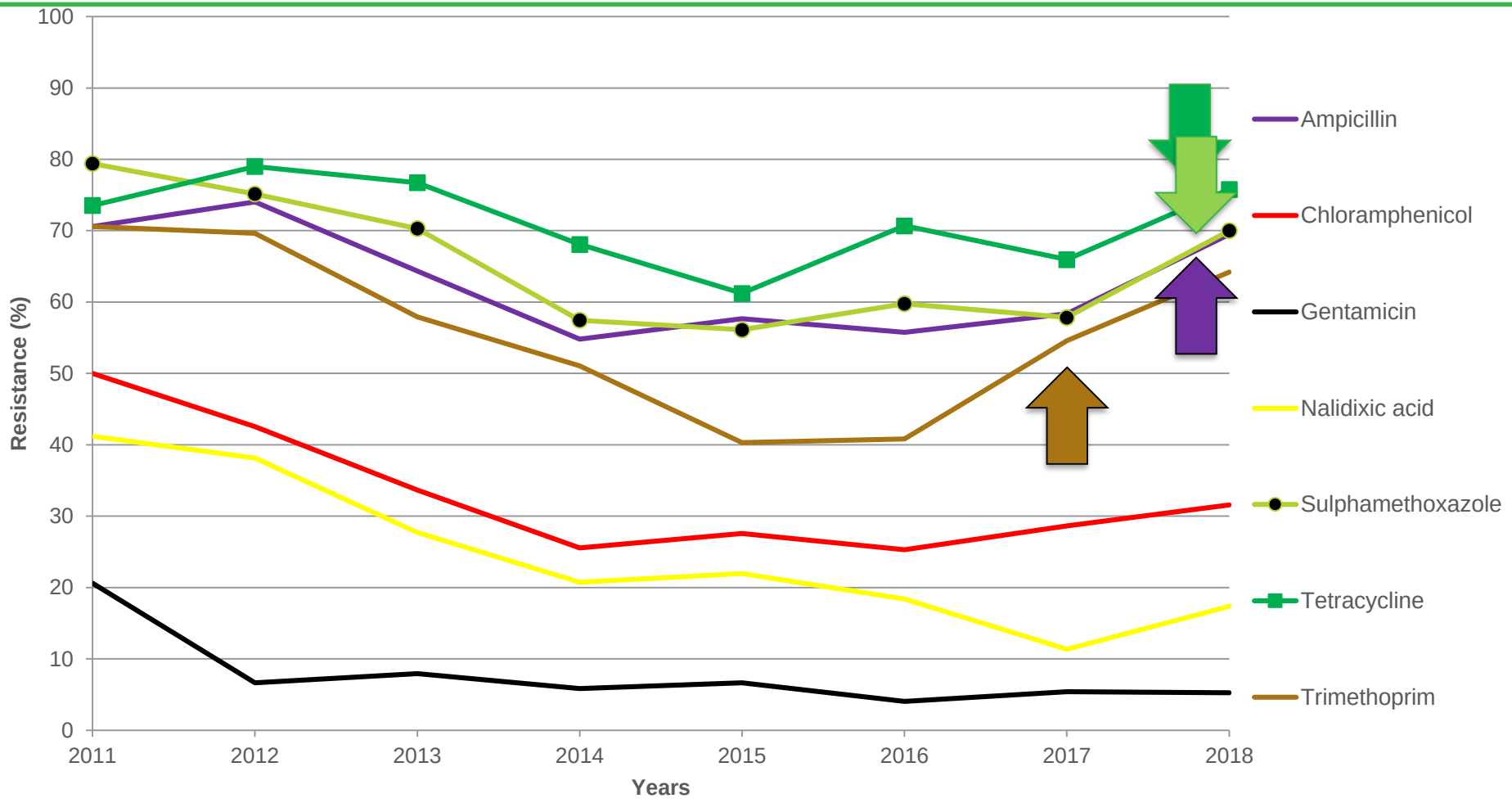
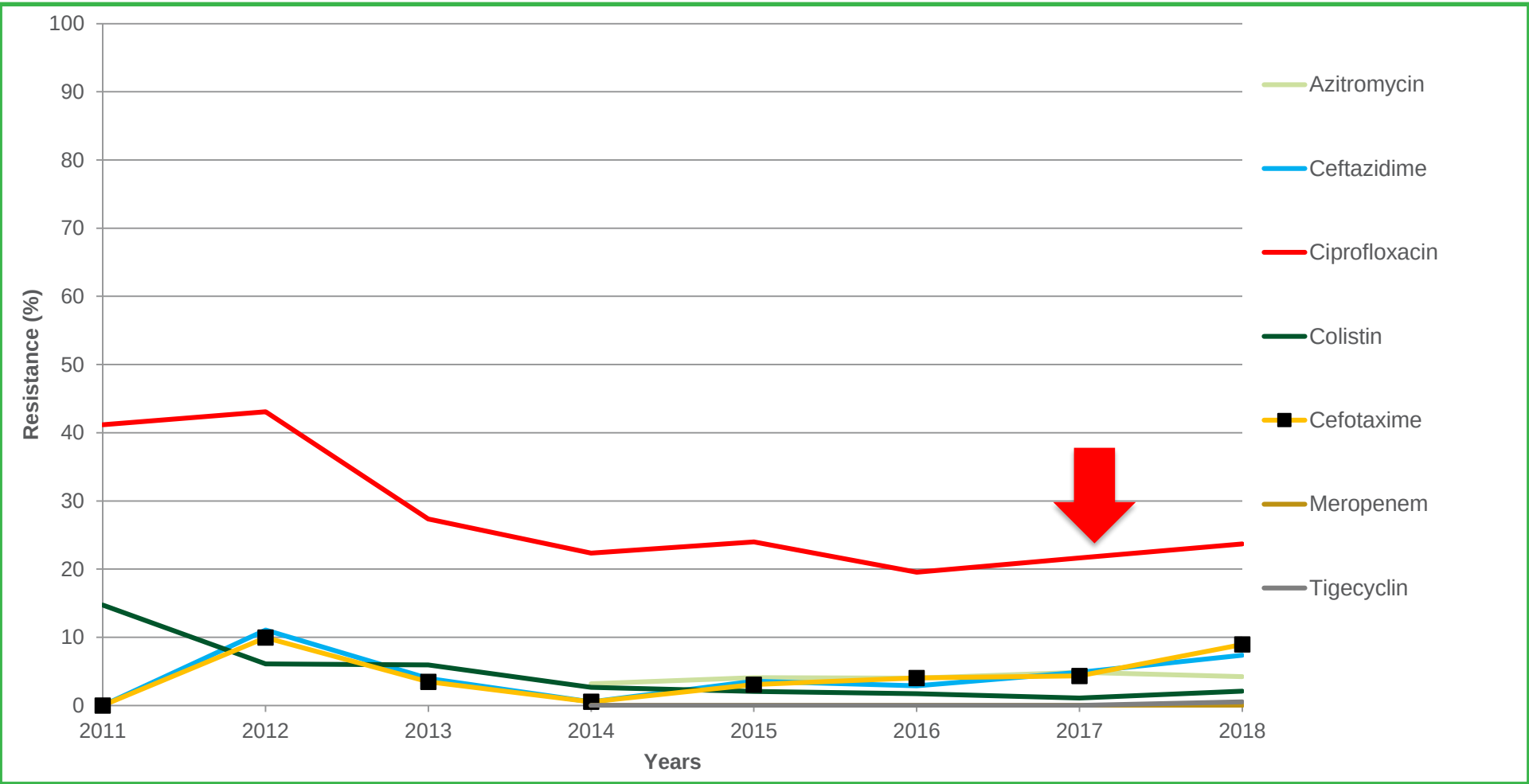
# Resistance prevalence in commensal *E. coli* in veal calves: descriptive statistics (2011-2018)

Resistance is **>50% (**2011-2018) for Ampicillin, Tetracycline, Sulphamethoxazole
Increases* in 2018 compared to 2017 for Ampicillin (+ 11,09%), Tetracycline (+9,84%), Sulphamethoxazole (+12,16%), Trimethoprim (+9,84%) (*statistically significant)
Trimethoprim + 23% in 2018 compared to 2016



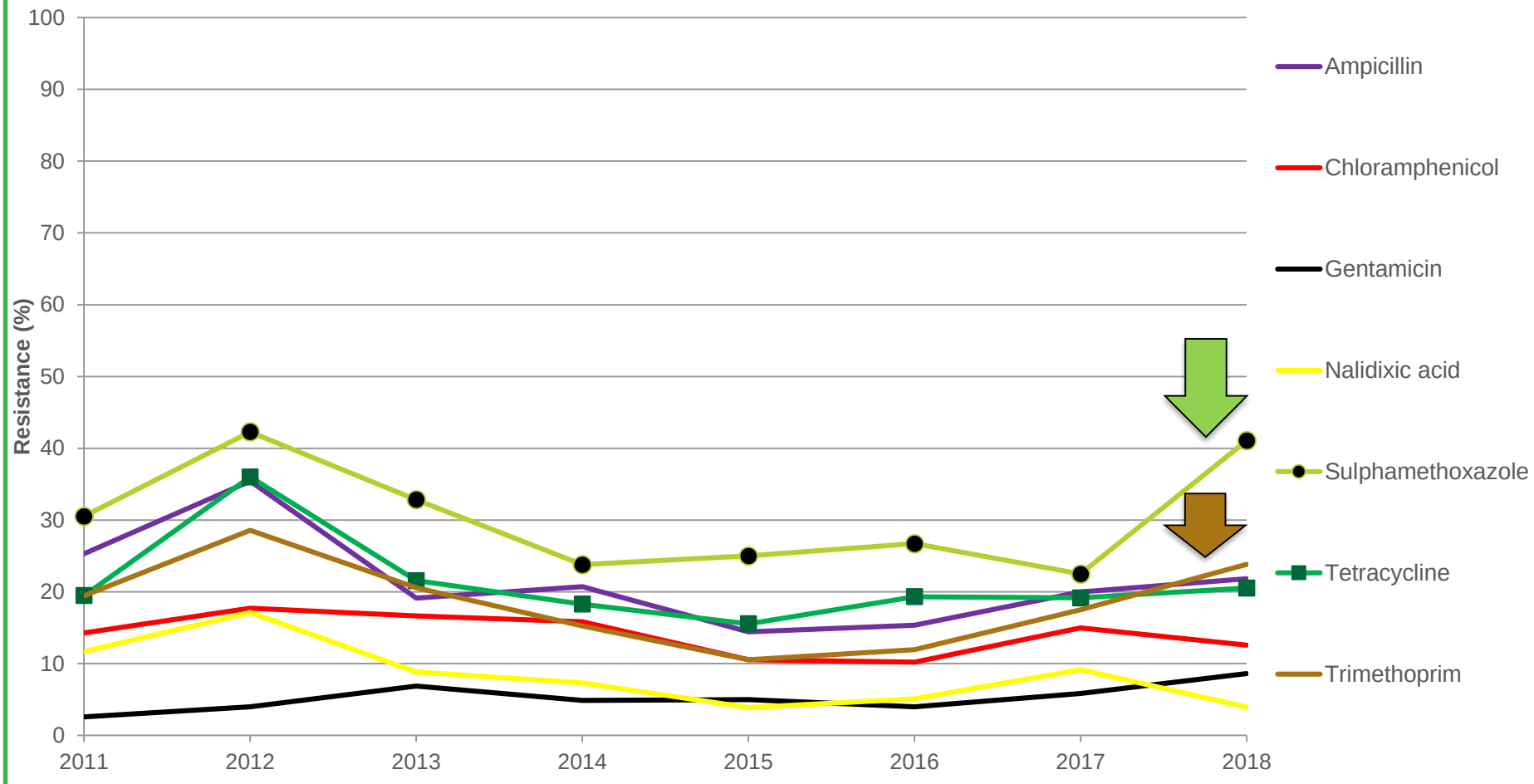
# Resistance prevalence in commensal *E. coli* in veal calves: descriptive statistics in critical antimicrobials (2011-2018)

Ciprofloxacin: resistance is stable (± 25%) since 2013
Others: <10% since 2013



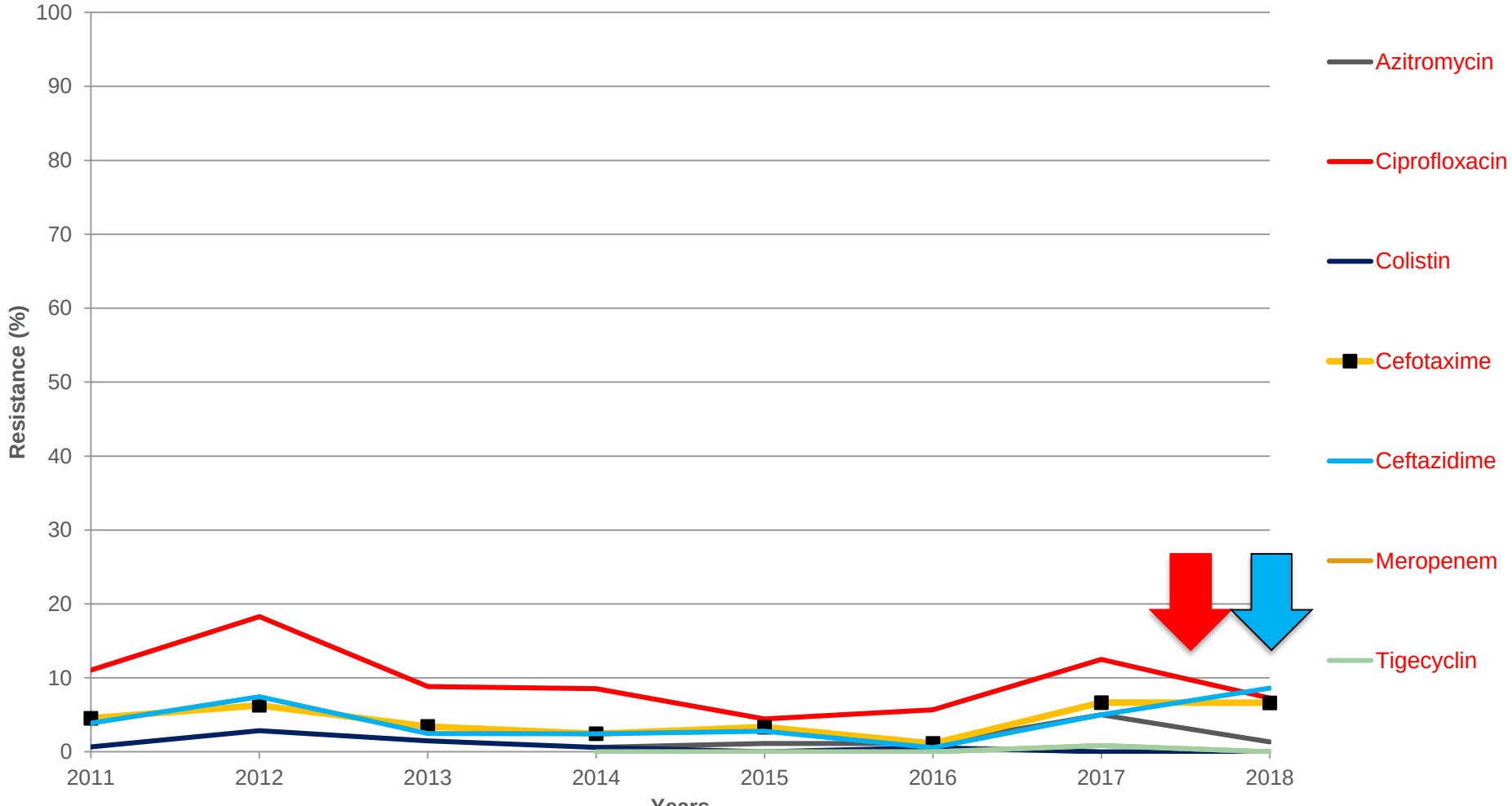
# Resistance prevalence in commensal *E. coli* in beef cattle: descriptive statistics (2011-2018)

Resistance is <25% from 2013 to 2018 exept for sulphamethoxazole
Sulphamethoxazole and Trimethoprim: prevalence of resistance increased* by 18,56% and by 6,34% in 2018 compared to 2017 (*statistically significant)



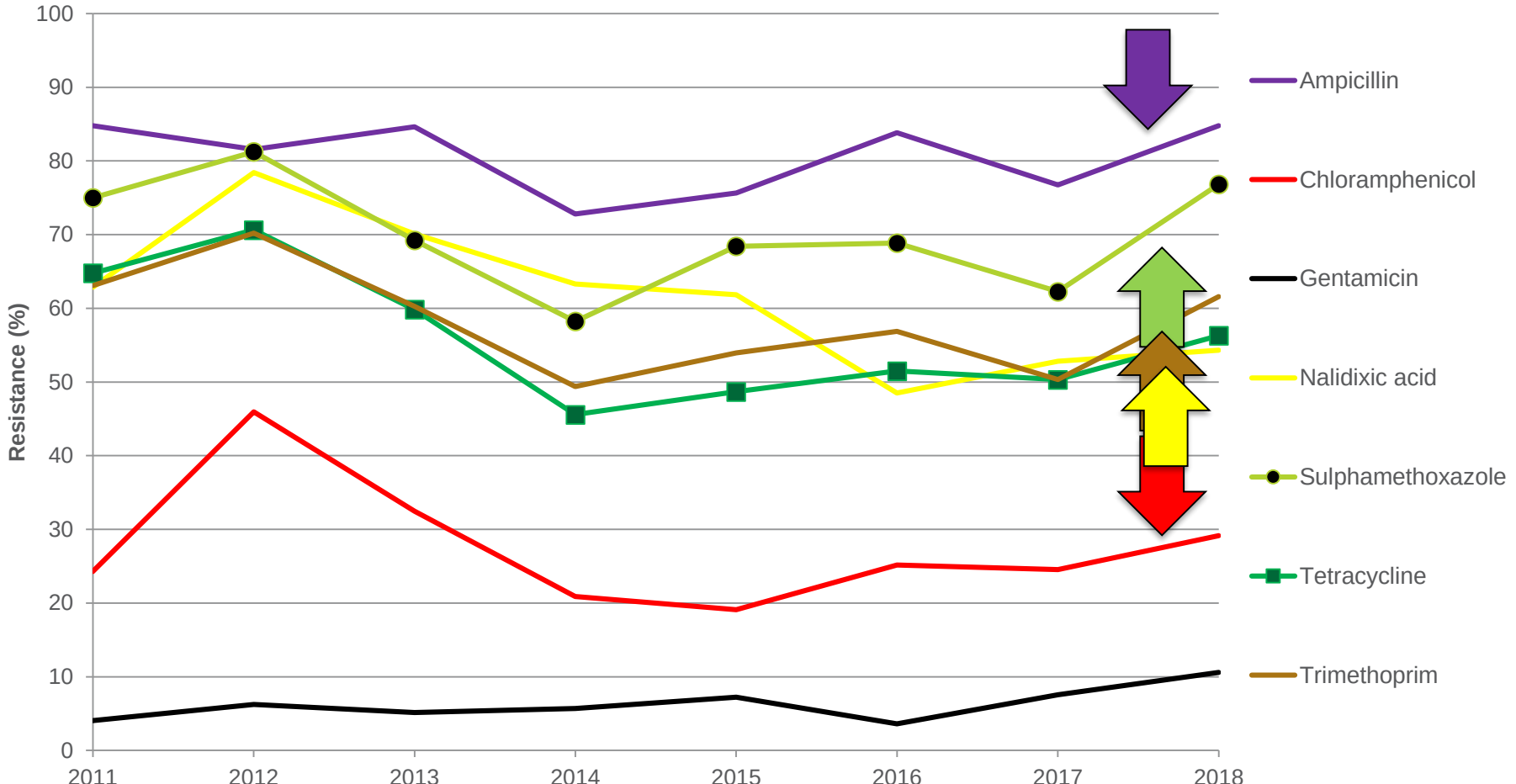
# Resistance prevalence in commensal *E. coli* in beef cattle: descriptive statistics in critical antimicrobials (2011-2018)

In 2018: prevalence is in a range from 0% to <10%
Ciprofloxacin: -5,22% in 2018 compared to 2017
Pay attention to Ceftazidime: 0,57% in 2016 was 8,61% in 2018



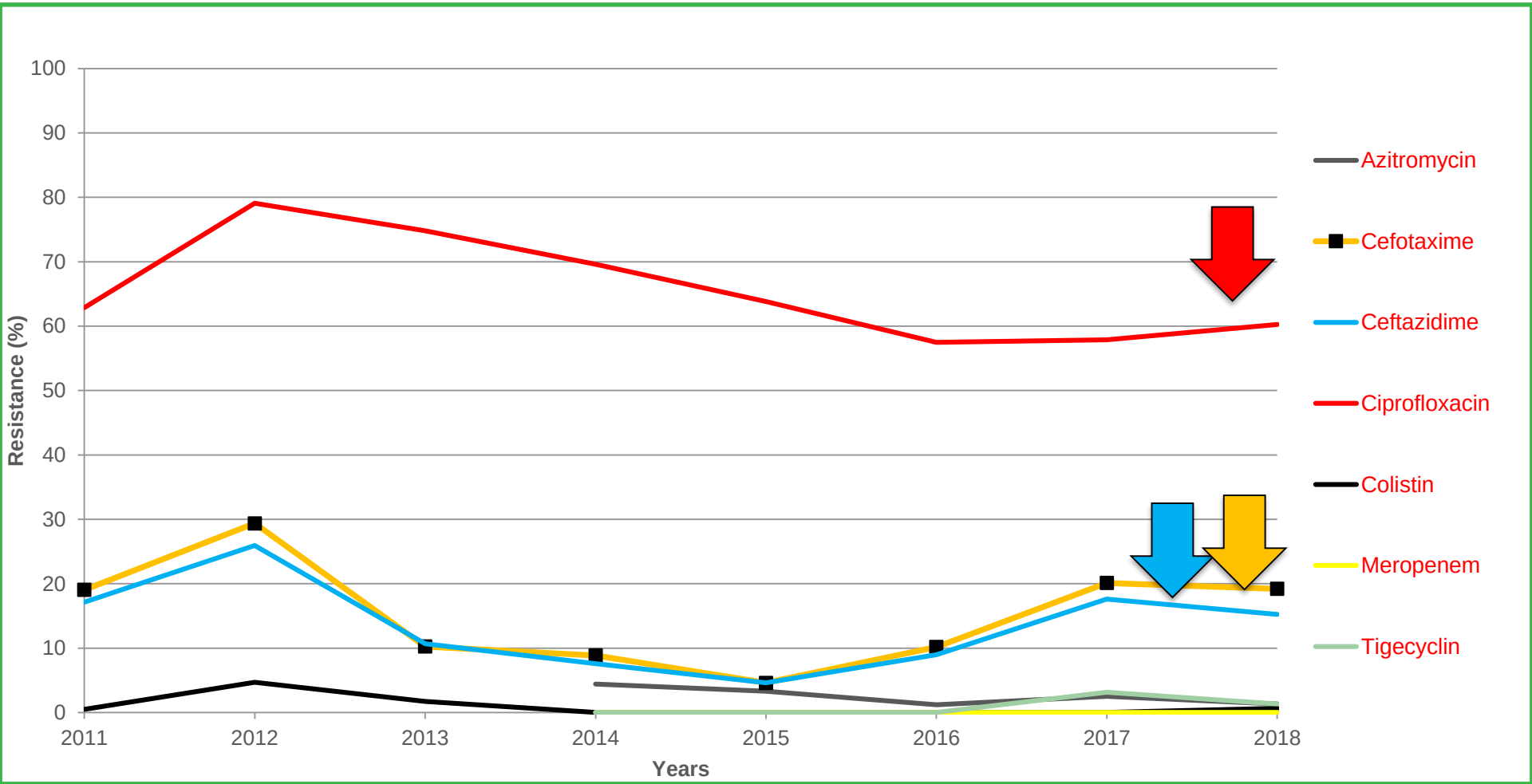
# Resistance prevalence in commensal *E. coli* in chickens: descriptive statistics (2011-2018)

Resistance **>50%** 2011-2018 for Ampicilin and Sulphamethoxazole
Increases in 2018 compared to 2017 for Ampicilin +8,04%, Sulphamethoxazole +14,56%, Trimethoprim: +11,28%
Nalidixic acid: resistance decreased* in 2018 compared 2014 (* statistically significant)
Chloramphenicol is slowly increasing since 2016



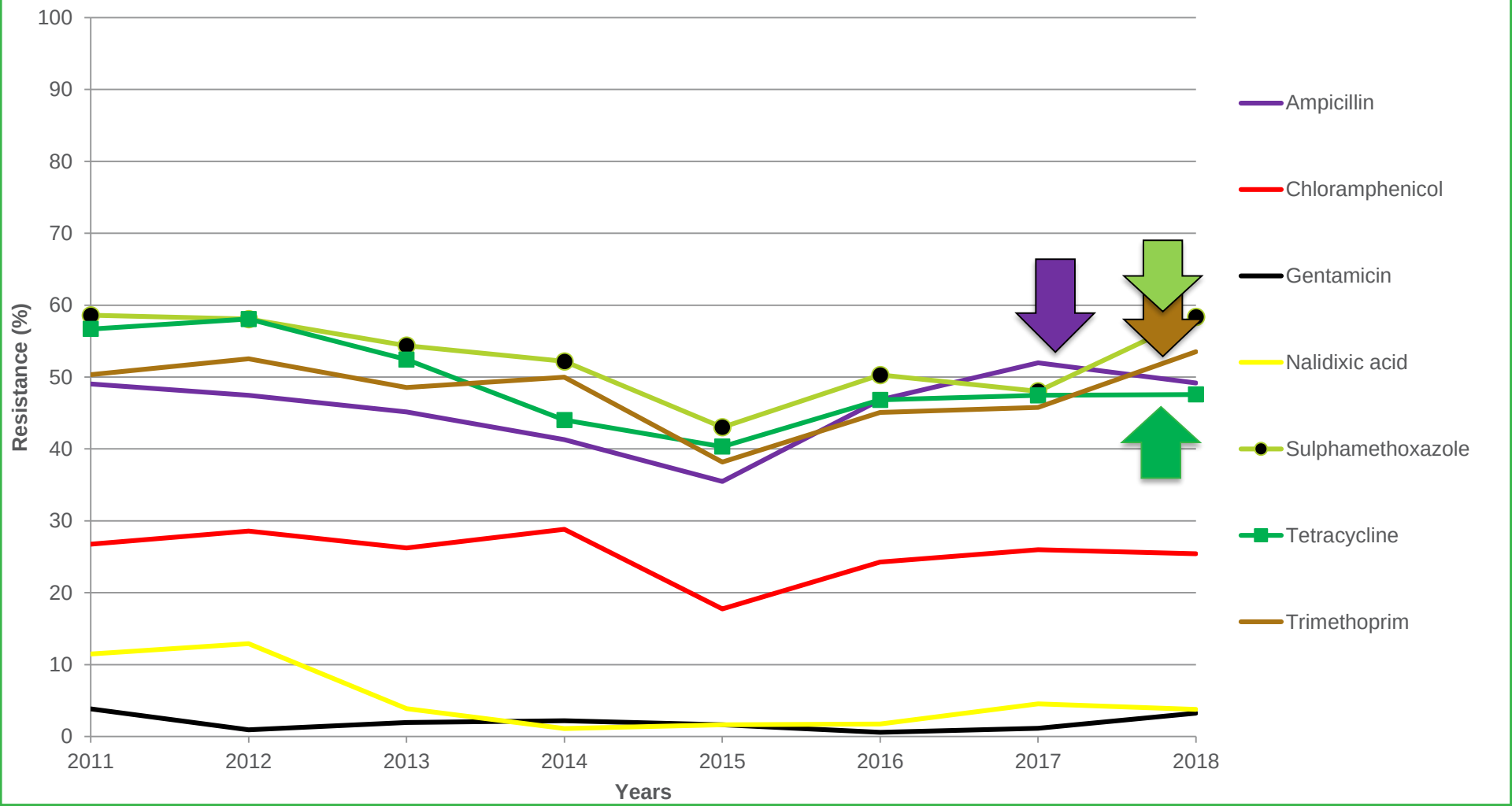
# Resistance prevalence in commensal *E. coli* 2011-2018 in chickens: descriptive statistics in critical antimicrobials (2011-2018)

Resistance **>50%** 2011-2018 Ciprofloxacin but decrease is significant
Cefotaxime and Ceftazidime: prevalence increased in 2016 and 2017 but slightly decreased in 2018
Colistin: resistance <0,7% since 2014



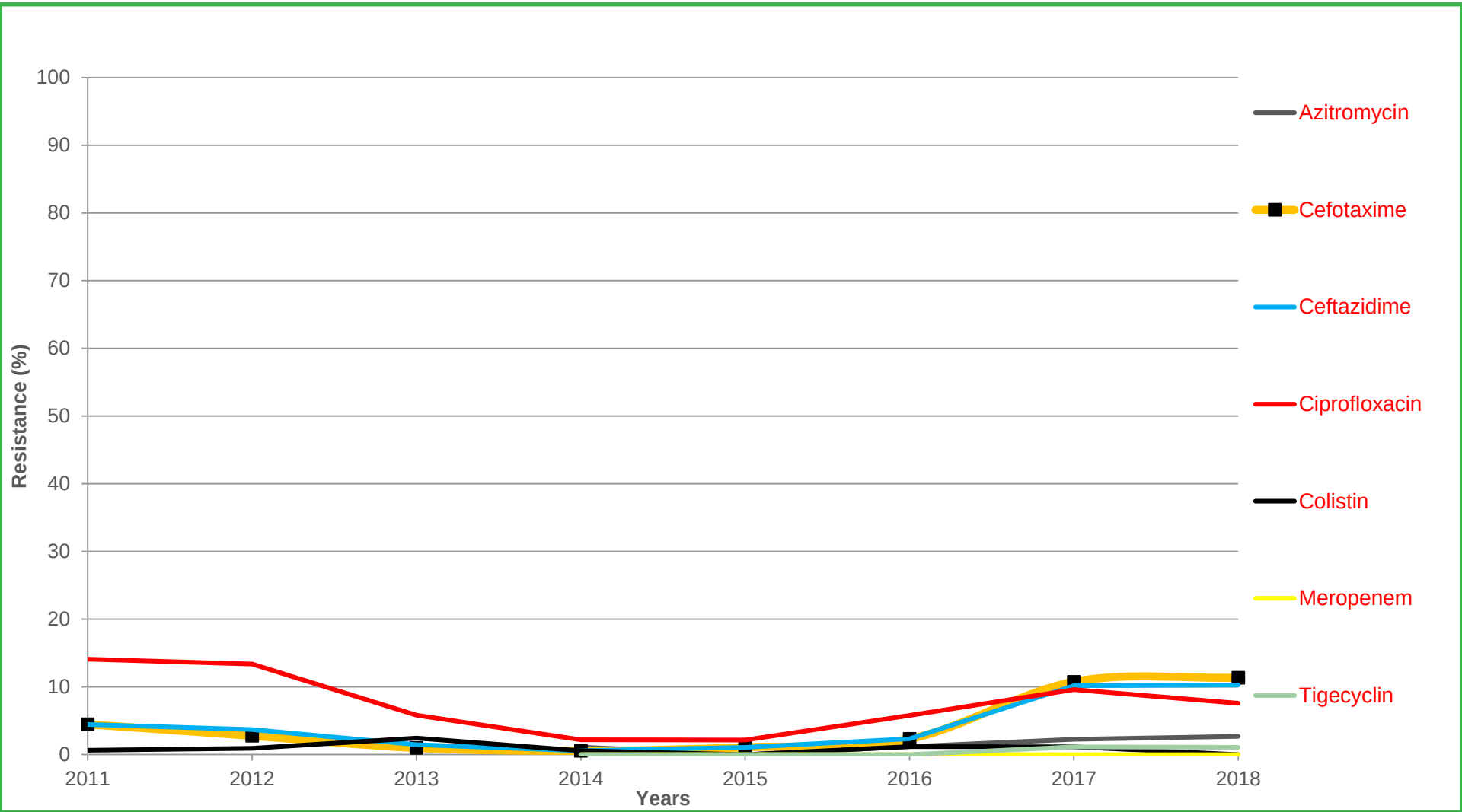
# Resistance prevalence in commensal *E. coli* in pigs: descriptive statistics (2011-2018)

Ampicilin, Sulphamethoxazole,Tetracyclin and Trimethoprim: prevalence >35% from 2011 to 2018
2018: Sulphamethoxazole: +10,36%*; Trimethoprim: + 7,75% (* statistically significant)



# Resistance prevalence in commensal *E. coli* in pigs: descriptive statistics in critical antimicrobials (2011-2018)

Stable in 2018 compared to 2017



# MULTI-RESISTANCE

Resistance to at least 3 different antimicrobials and belonging to different antimicrobial families

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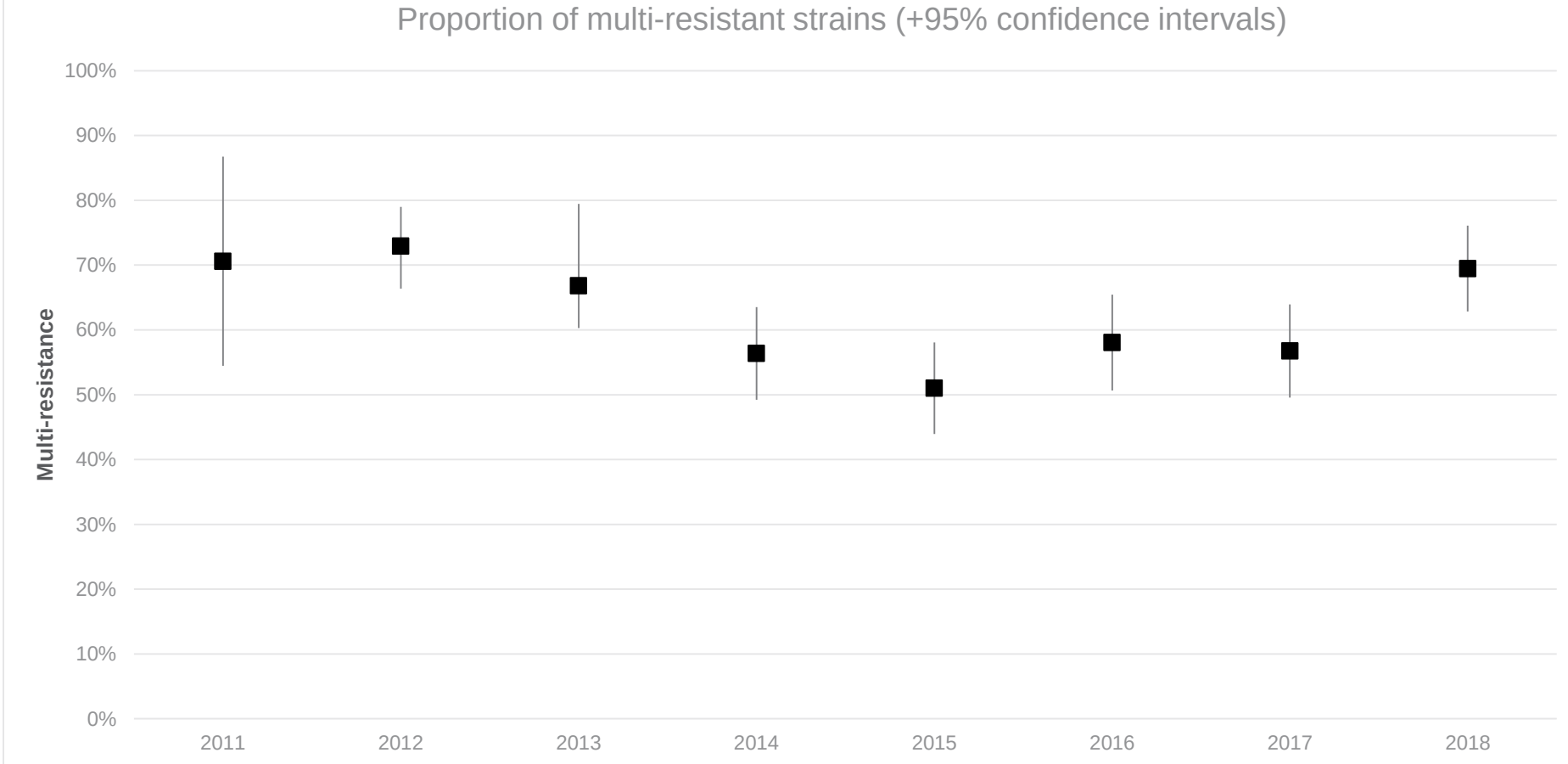
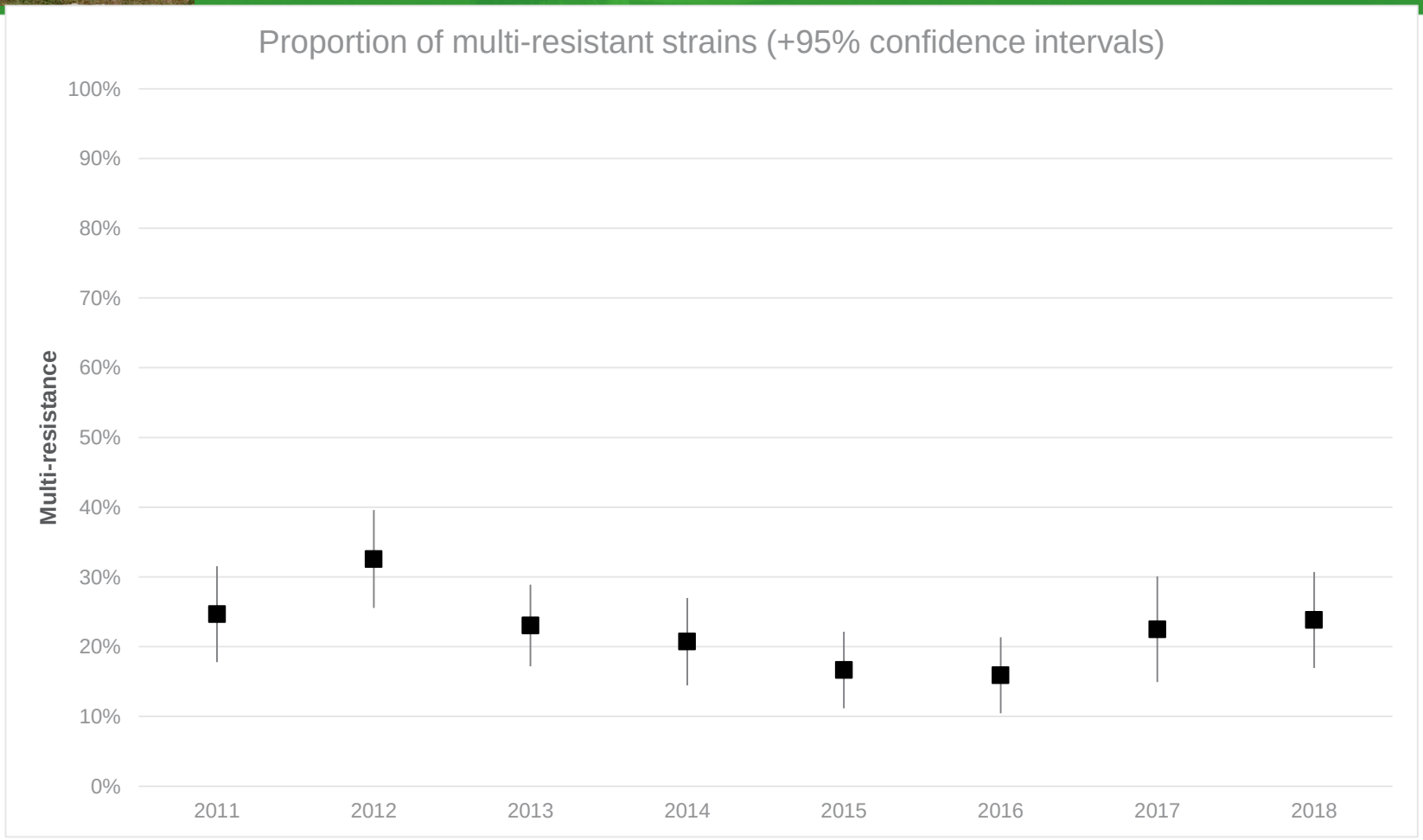
# Multi-resistance in commensal *E. coli* in veal calves (2011-2018)



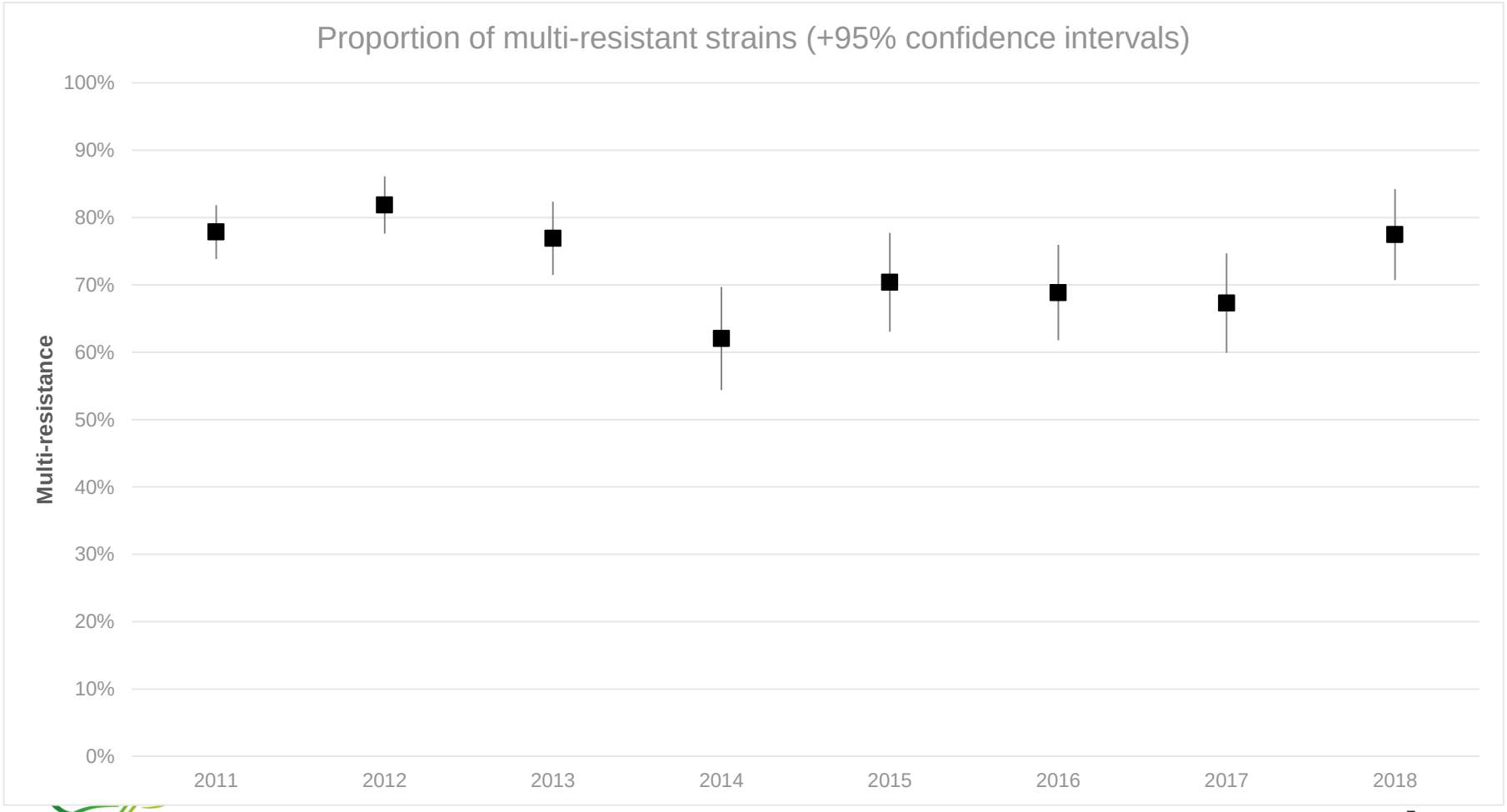

Proportion of multi-resistance strains is >50% from 2011 to 2018
Multi-resistance increased* by 12,7% in 2018 compared to 2017 (*statistically significant)

# Multi-resistance in commensal *E. coli* in beef cattle (2011-2018)



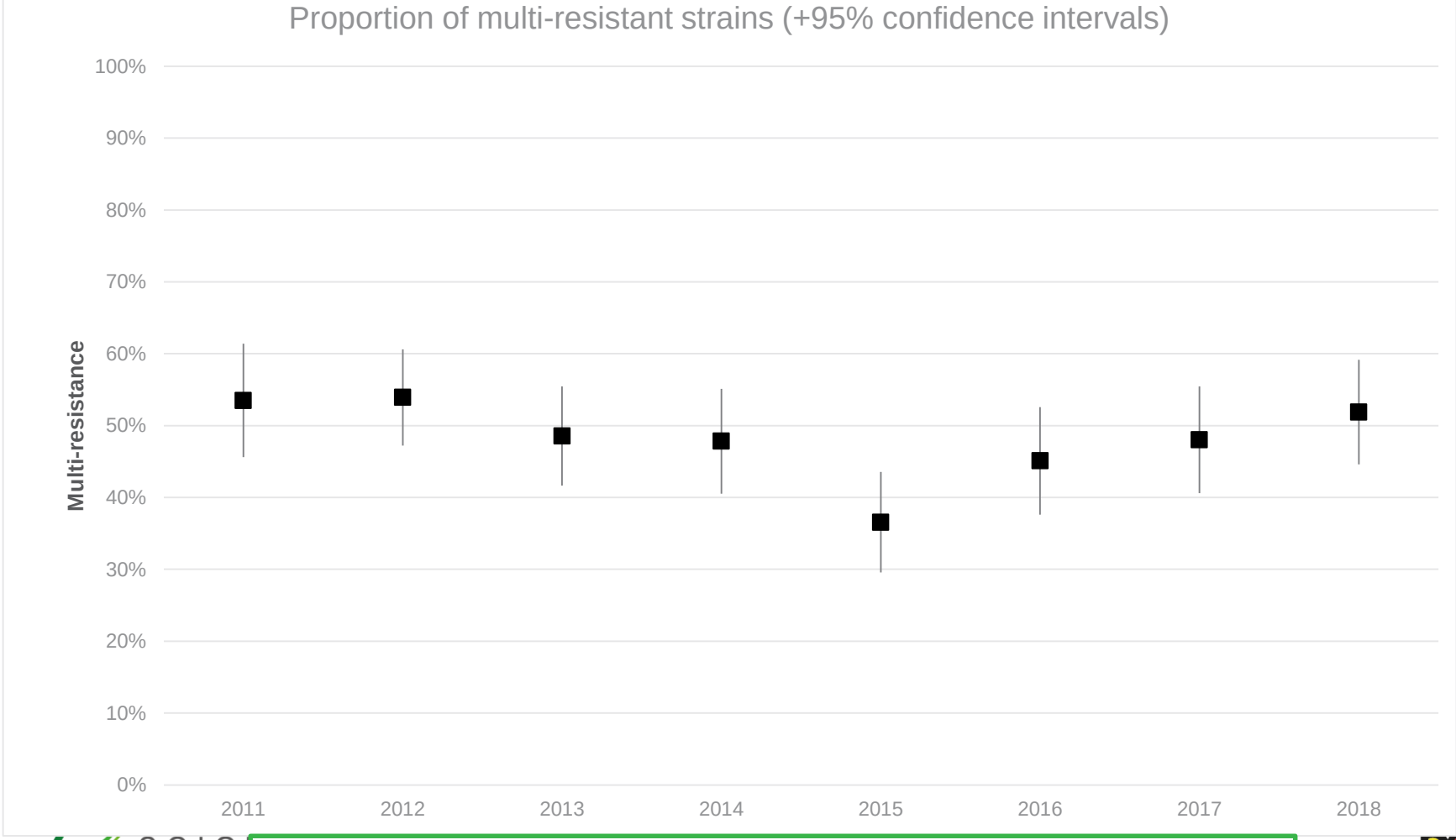

Multi-resistance increased by 1,3% in 2018 compared to 2017

# Multi-resistance in commensal *E. coli* in chicken (2011-2018)




Proportion of multi-resistance strains is >60% from 2011 to 2018
Multi-resistance increased* by 10,18% in 2018 compared to 2017 (*statistically significant)

# Multi-resistance in commensal *E. coli* in pigs (2011-2018)




Multi-resistance increased by 3,87% in 2018 compared to 2017

# Discussion

**Phenotypic data**: genotypic analysis could improve the characterization of the resistance

**Small sample size** (170/species) but EU recommandation

**No resistance** to carbapenems  for the five years on a row (not authorized for use in animals)

Resistance to **critical antimicrobials** (except Ciprofloxacin in veal calves)

**is <= 10%** in veal calves, beef cattle and pigs. In chickens, stabilization in 2018 compared to 2017

Resistance to **Sulphamethoxazole**  increased **in all species** in 2018 compared to 2017, often with Ampicilin and Tetracycline (probable co resistance)

Proportion of **multi-resistant** strains statistically **increased** in veal calves and chickens in 2018 compared to 2017

# Acknowledgements

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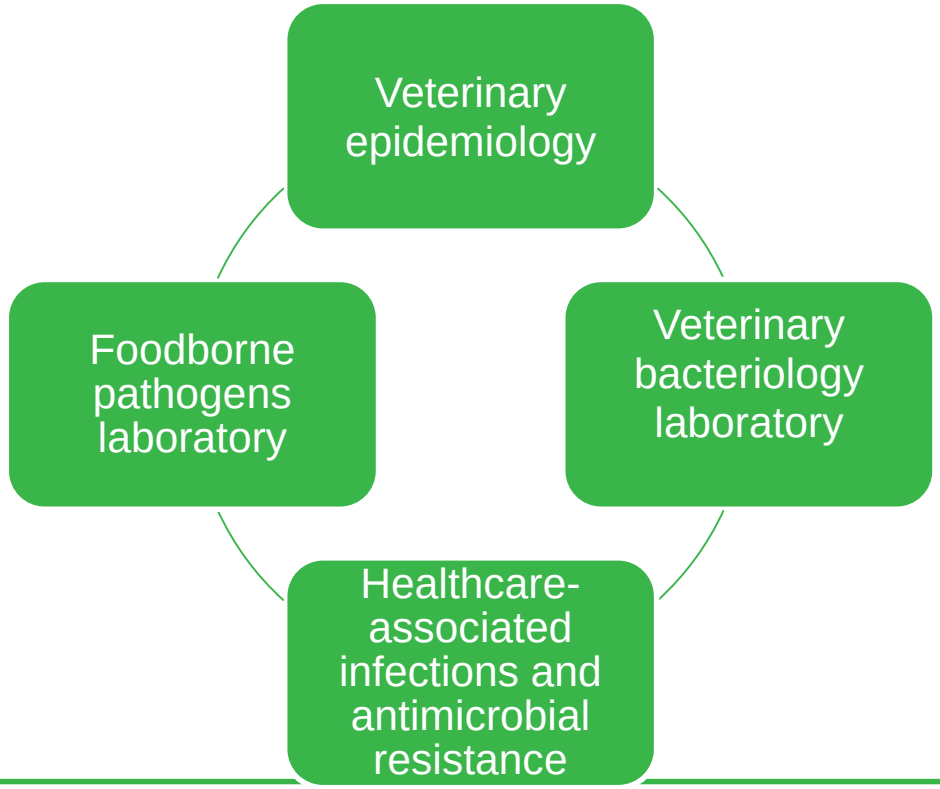
UHasselt



# MERCI POUR VOTRE ATTENTION

**Cargnel Mickaël**
Mickael.Cargnel@sciensano.be

sciensano .be