Anne Margrete Urdahl and Kari Olli Helgesen/Senior researchers/Norwegian Veterinary Institute

Surveillance of AMU and AMR for 25 years in Norway

25-year anniversary for the NORM/NORM-VET report

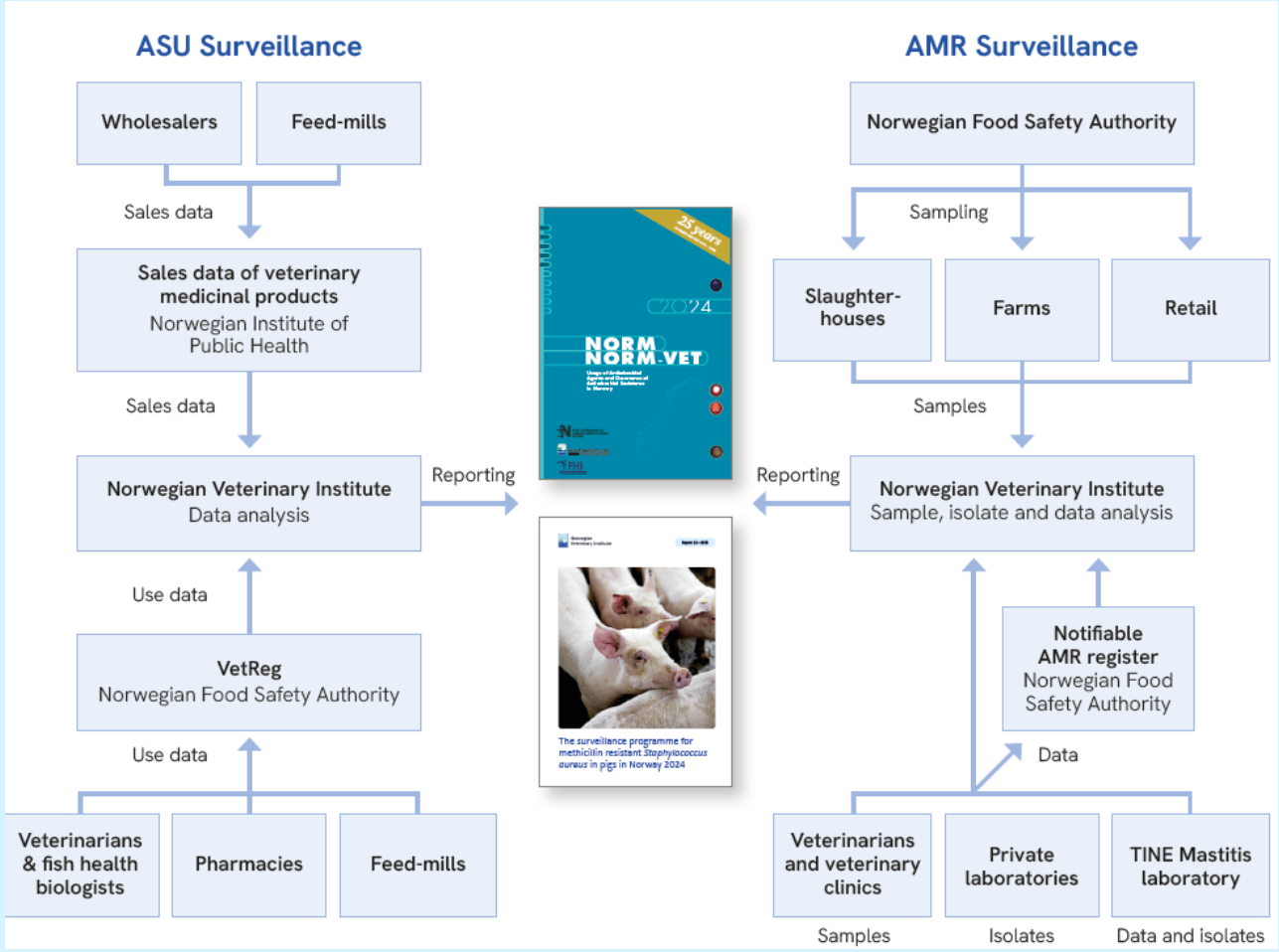
AMU in Norway

AMR in Norway

Why low usage and low prevalence?

Summary

Surveillance structure



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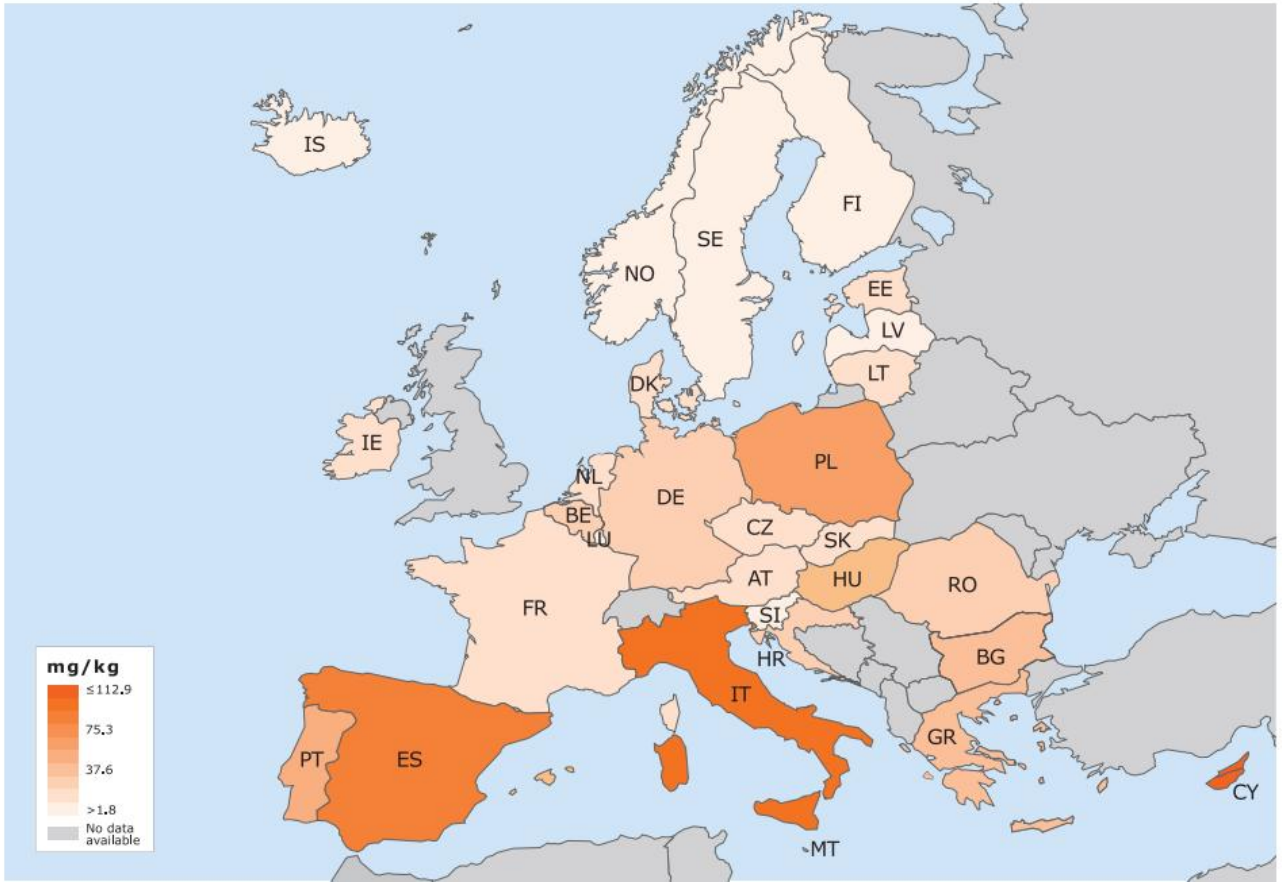
AMU in Norway

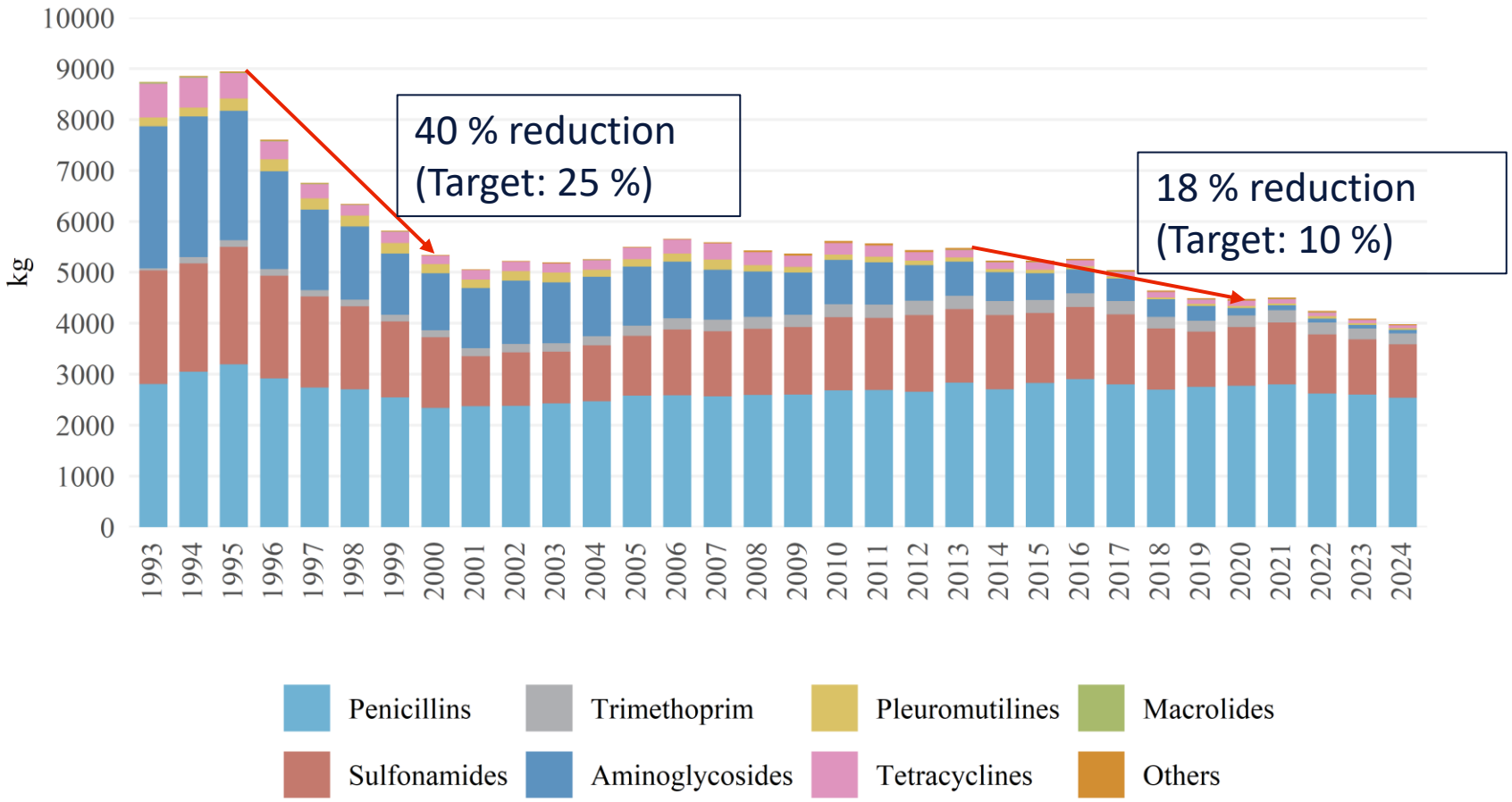
Antibiotic sales for use in food-producing animals in Europa in 2023



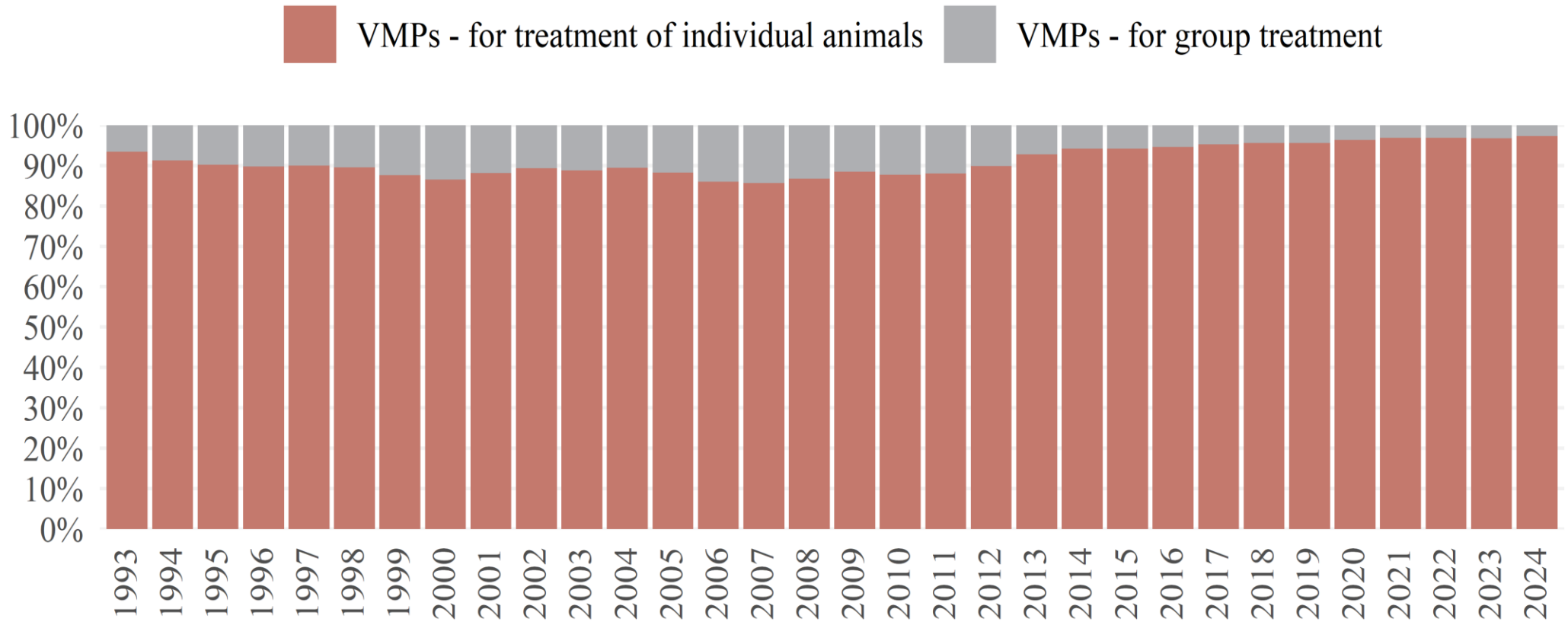
ESUAvet report 2023

- 1.8 mg/kg animal biomass
- When farmed fish is remove from the data:
  - 4.0 mg/kg animal biomass
- For reference:
  - EU-average: 38.2 mg/kg animal biomass

Food-producing terrestrial animals, including horses

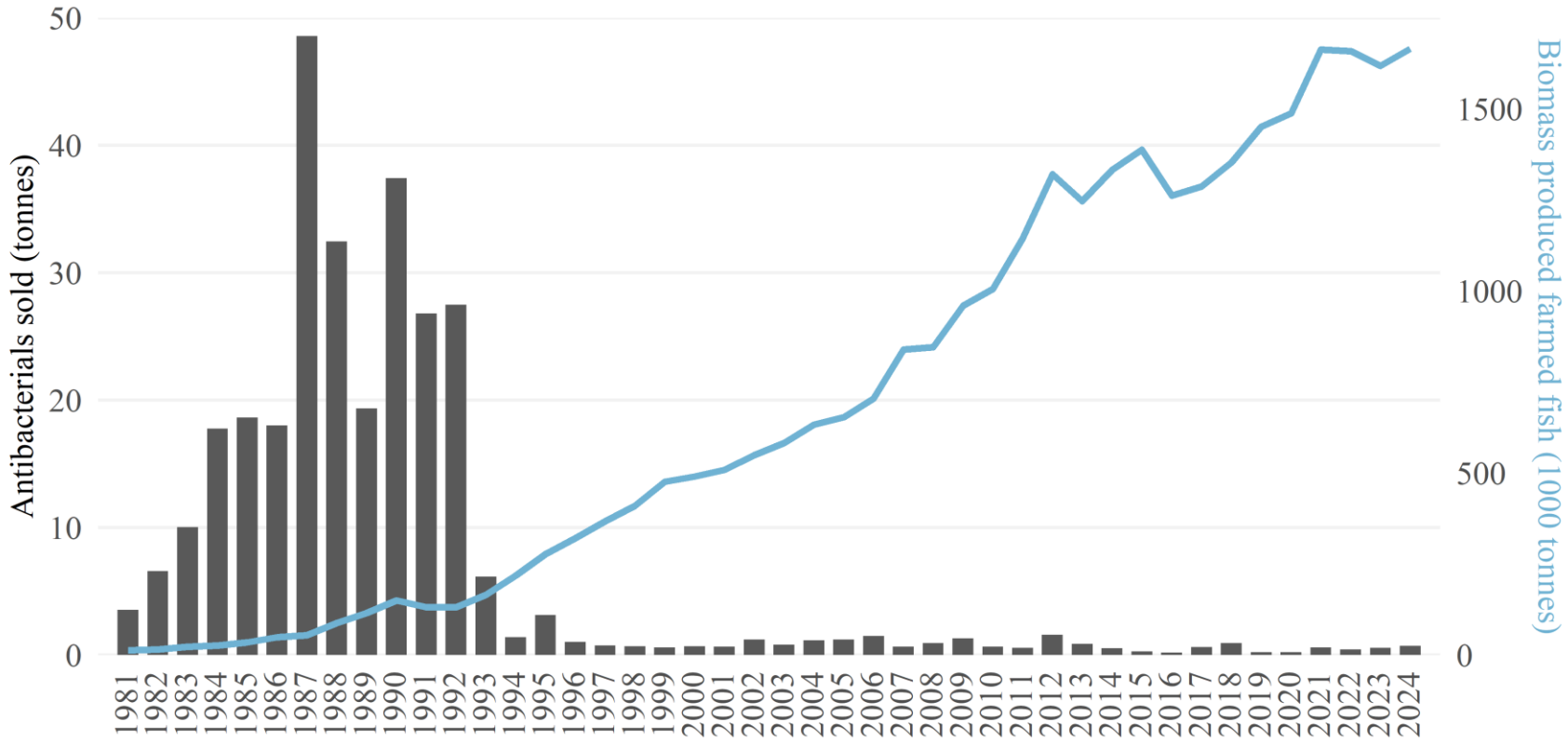


NORM/NORM-VET 2024



NORM/NORM-VET 2024

Farmed fish



NORM/NORM-VET, 2025

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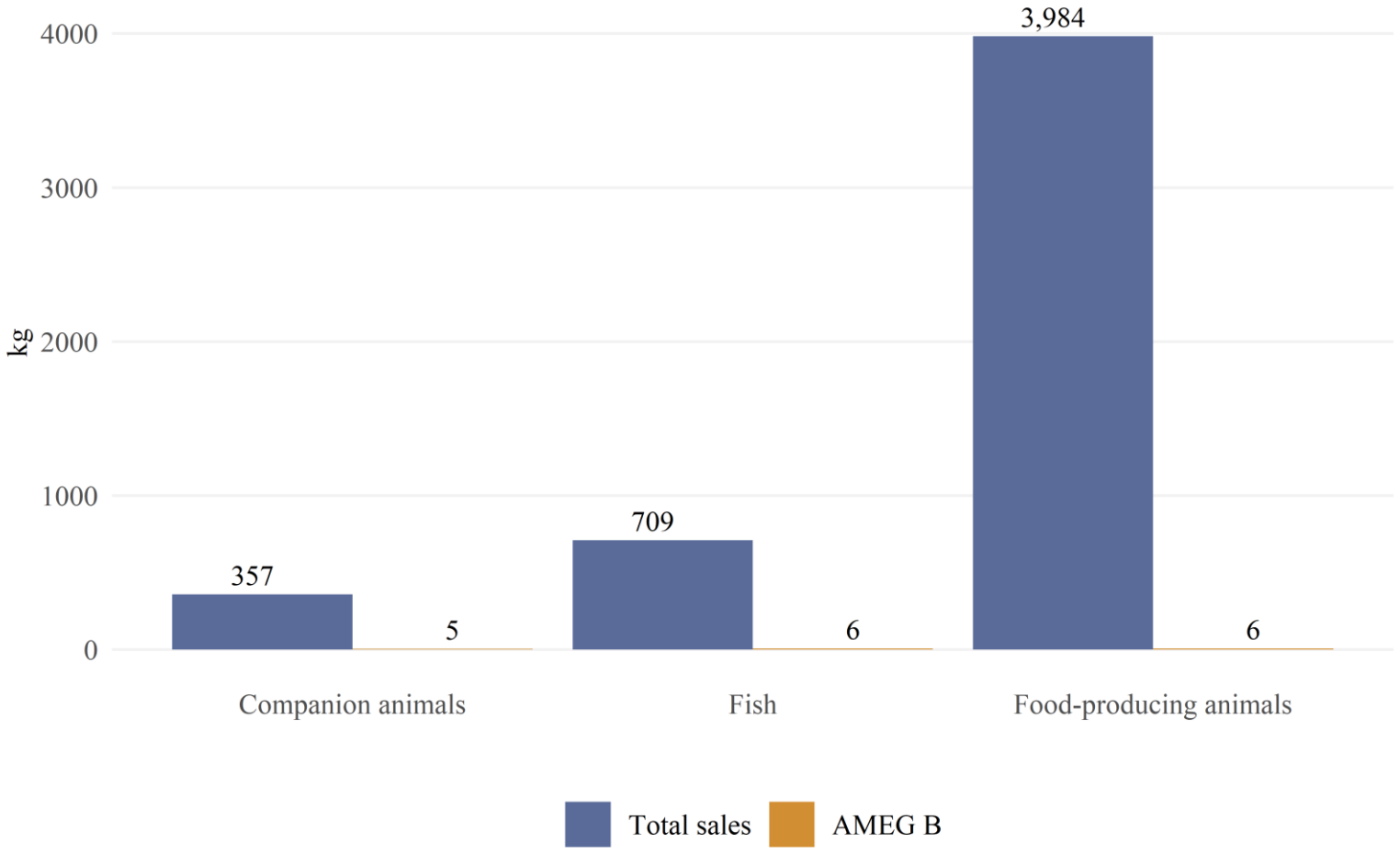
AMEG B sales in 2024



AMEG B:
3rd- and 4th-generation cephalosporins, polymyxins and quinolones

Advise: Restrict the use

NORM/NORM-VET 2024

AMR in Norway

AMR surveillance

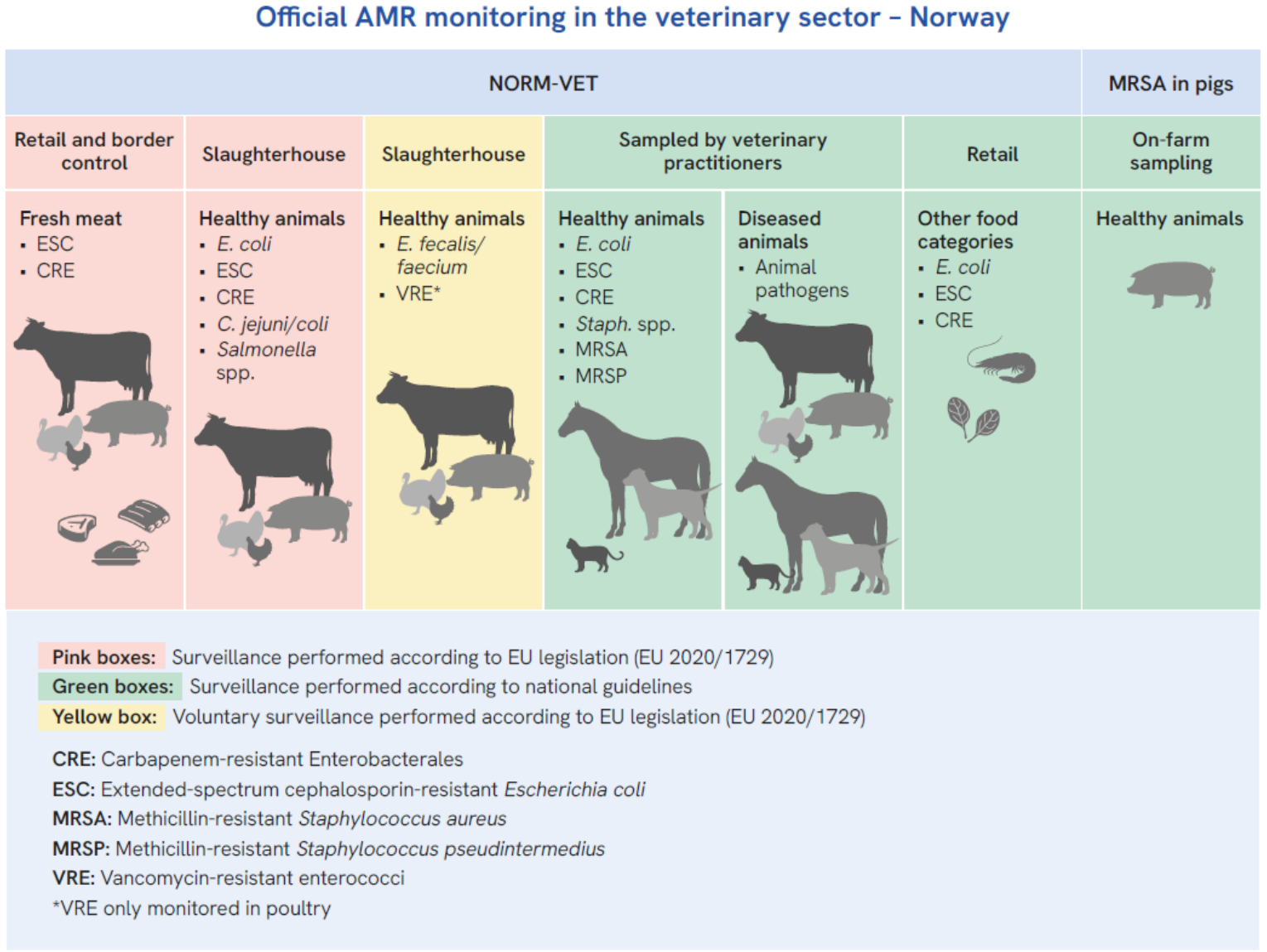
Two official programmes:

- NORM-VET – monitoring occurrence of AMR and AMR mechanisms and follows trends over time
- MRSA in pigs - identifying MRSA positive herds for further contact-tracing and implementation of measures to eradicate livestock-associated MRSA

Surveillance performed according to:

- EU legislation
- National AMR Strategy and Action Plans

Some AMR bacteria are notifiable to the NFSA as defined in the Animal Health Regulations



Overview of official antimicrobial resistance (AMR) monitoring currently performed in the veterinary sector in Norway. The Norwegian monitoring programme on antimicrobial resistance in bacteria from food, feed and animals (NORM-VET) started in 2000, while the monitoring programme on methicillin-resistant Staphylococcus aureus (MRSA) in pigs was implemented in 2014. In addition, veterinarians and domestic laboratories are obliged according to the Animal Health Regulations to report detection of notifiable AMR forms to the Norwegian Food Safety.

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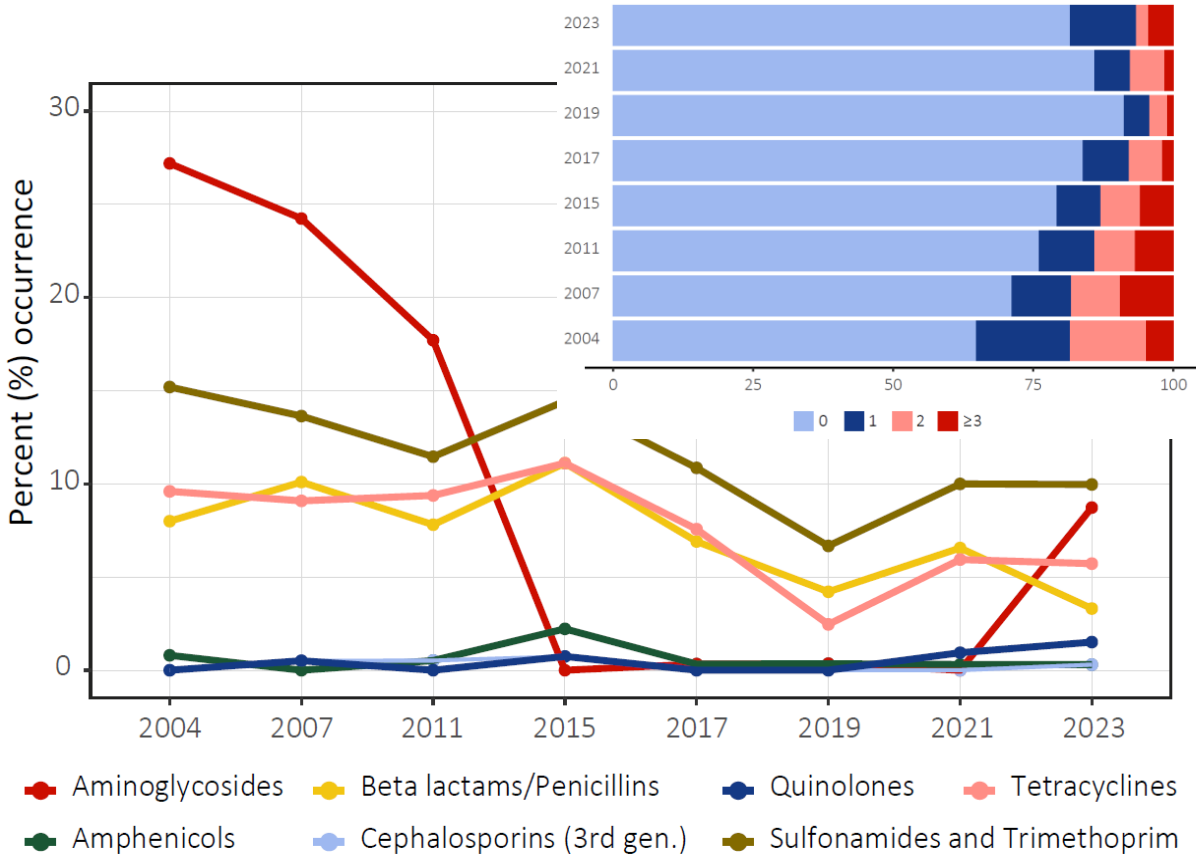
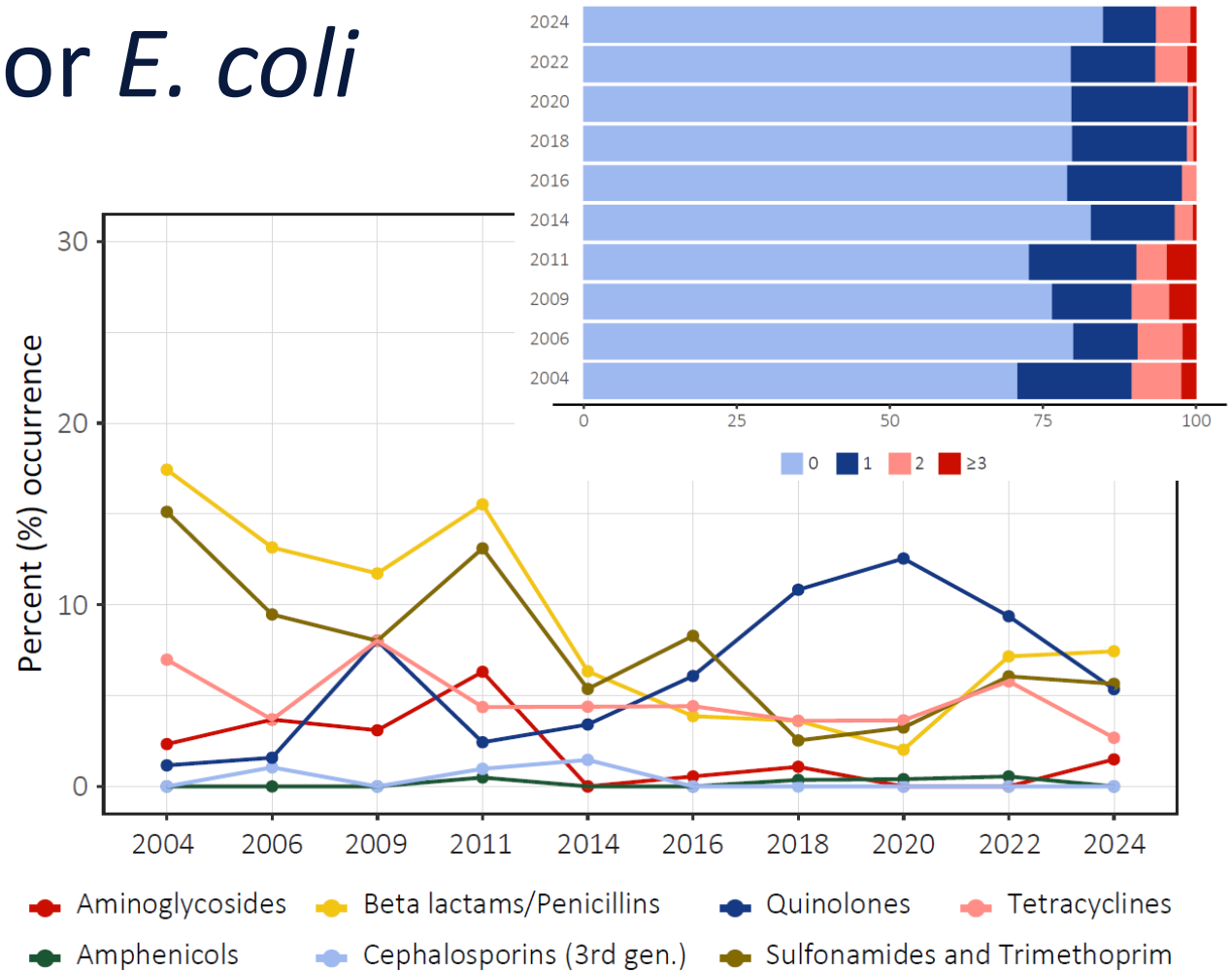
AMR occurrence in indicator *E. coli*



Occurrence of resistance to various antimicrobial classes in *E. coli* from pigs, 2004-2023.



Occurrence of resistance to various antimicrobial classes in *E. coli* from broilers, 2004-2024

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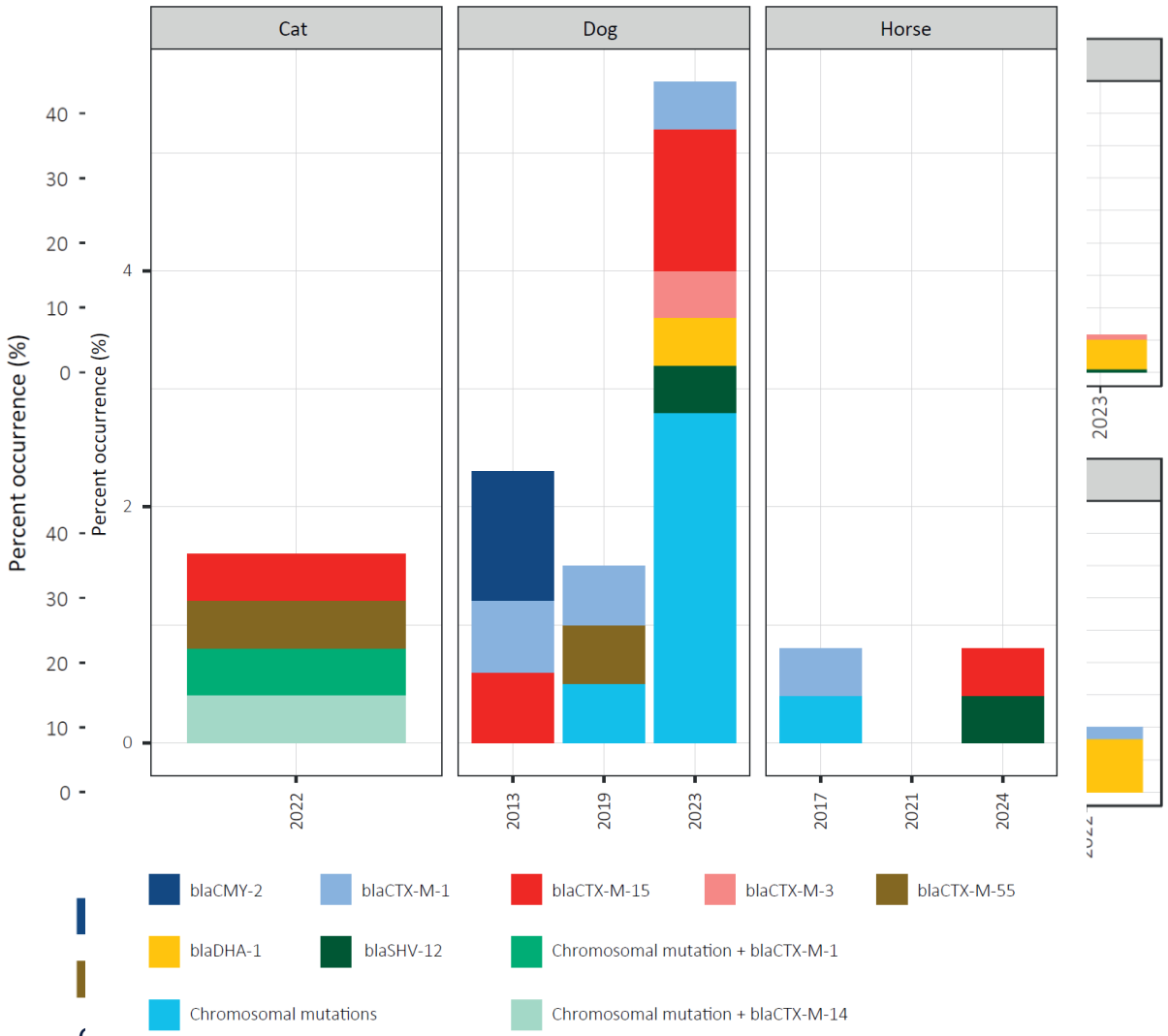
ESC-resistant *E. coli*

Selective screening of ESC-resistant *E. coli* since 2011 in broilers, 2015 in cattle and pig, and 2016 in turkey.

High occurrence of transferable ESC-resistant *E. coli* in broilers in 2011. Measures taken by the industry yielded results with a subsequent drop in occurrence from 2014-2018.

Occurrence of transferable ESC-resistant *E. coli* is now very low in all these animal species, chromosomal point mutations have been the cause of resistance for the majority of the isolates.

This is also the case for companion animals and horses.



Occurrence of ESC-resistant *E.coli* in healthy dogs, cats and horses in 2013-2024.
Colors of bars refer to the genetic background of resistance. *bla* genes are transferable, while chromosomal mutations in ampC are non-transferable.

Occurrence of ESC-resistant *E.coli* in pigs, cattle, turkeys & broilers in 2011-2024.
Colors of bars refer to the genetic background encoding resistance. *bla* genes are transferable, while chromosomal mutations in ampC are non-transferable.

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ESC = Extended-Spectrum Cephalosporin

Carbapenem-resistant Enterobacterales (CRE)

Selective screening of CRE in NORM-VET since 2015 (i.e. only for *E. coli* the first years).

First detection of CRE in autumn 2023, in a caecal sample from a dairy herd.

- *E. coli* carrying the bla_{NDM-5} gene.

Follow up sampling were conducted – CRE not detected after three months.

Unknown source for introduction to the farm, but human carriers were suspected.

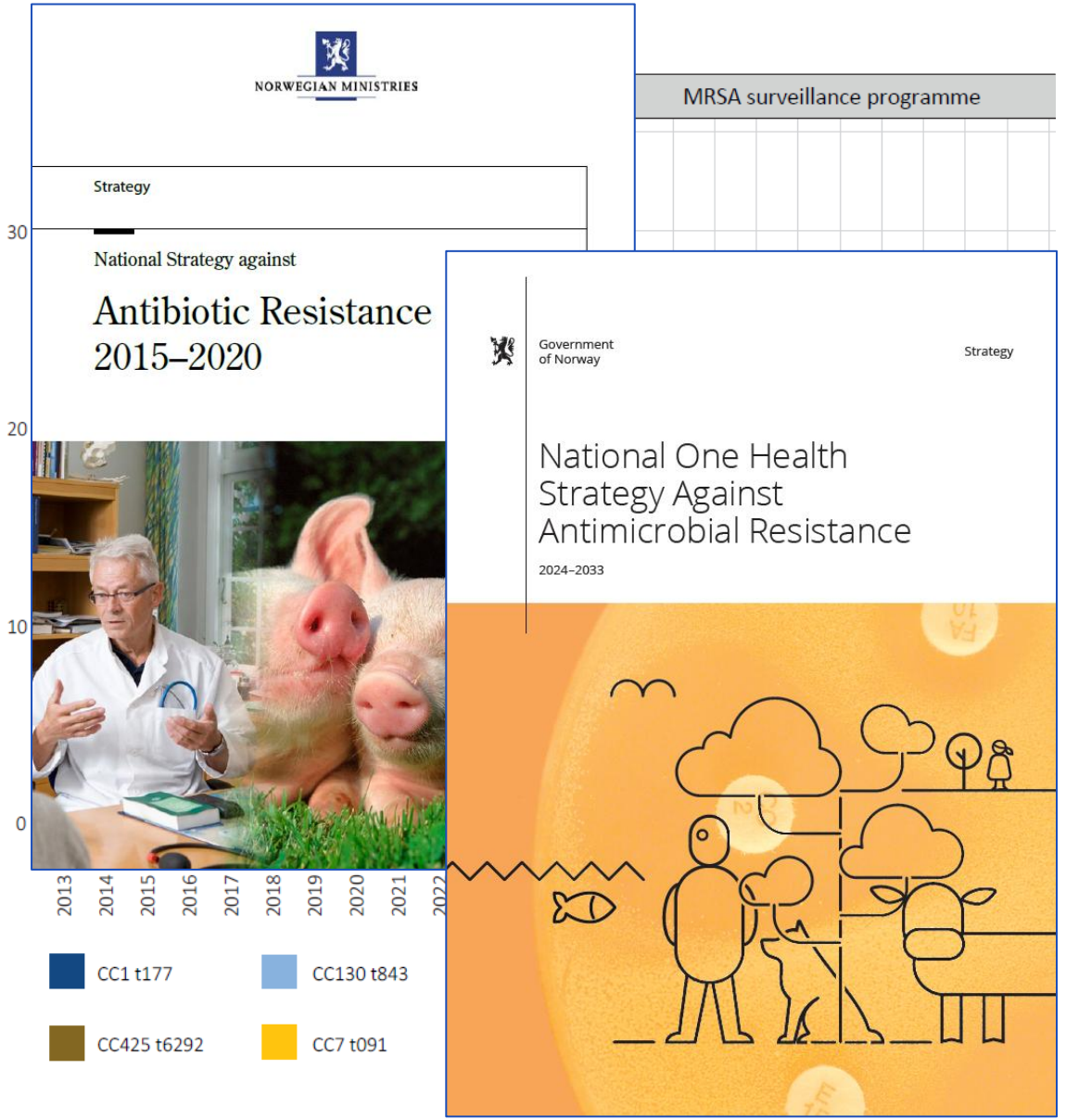
Photo: Coulorbox

LA-MRSA in pigs

National AMR Strategy (2015-2020) set the goal: «**LA-MRSA is not to be established in the Norwegian pig popation**» and this goal is continued in National One Health Strategy Against AMR (2024-2033).

National surveillance programme started in 2014.

Positive holdings are followed up with contact tracing, restrictions on live animal trade and eradication measures.



LA-MRSA = Livestock-Associated Methicillin Resistant *Staphylococcus aureus*

Why low usage and low prevalence?

Geography

Small farms – long distances

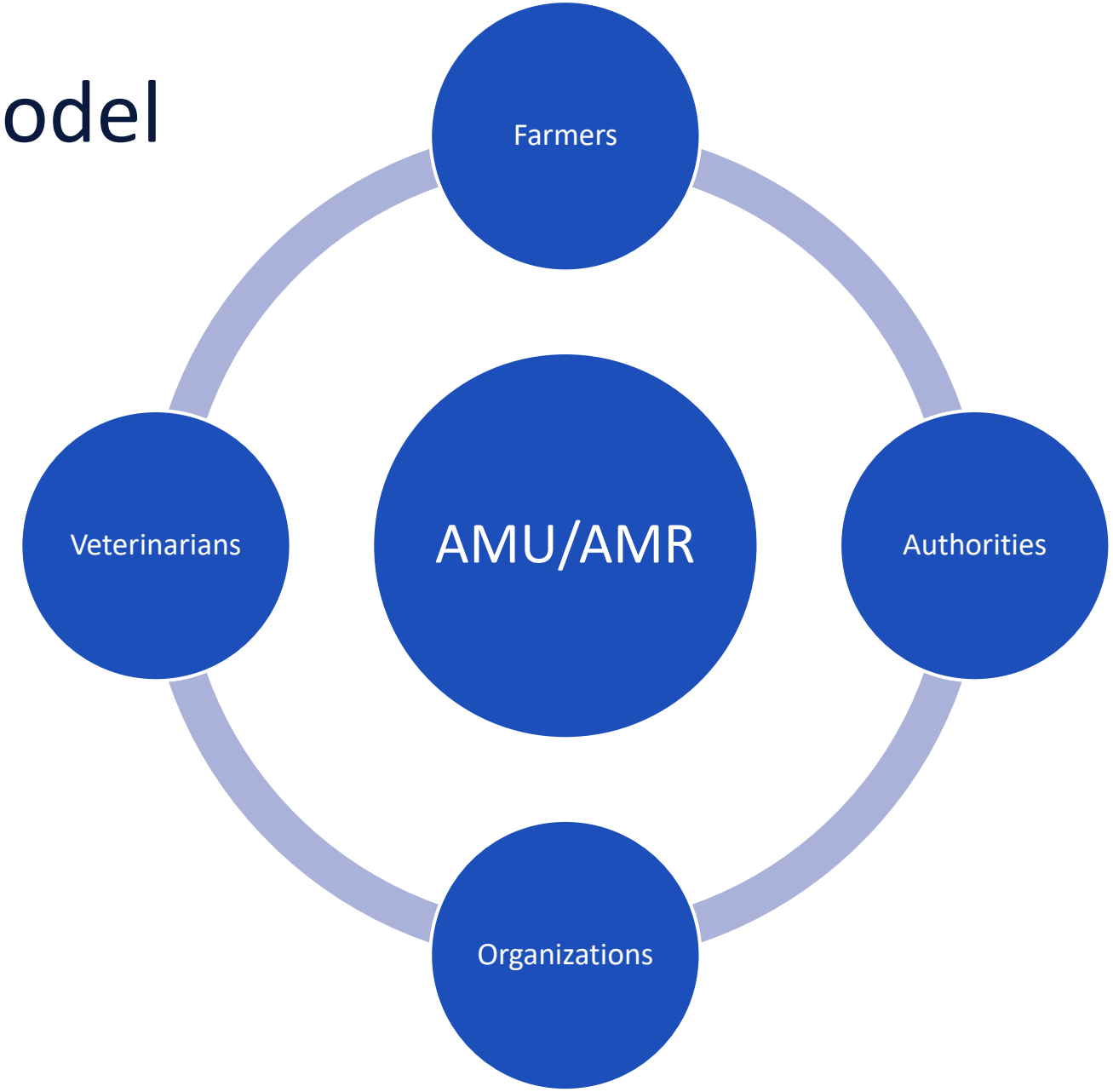
Neighbouring countries with similar health status and AMR-prevalence

Topography

Cold climate

Photo: Coulorbox

The cooperation model



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Health status of Norwegian lifestook

Free from (e.g.)

- Bovine Viral Diarrhea (BVD)
- Infectious Bovine Rhinotracheitis (IBR)
- Porcine Reproductive and Respiratory Syndrome (PRRS)

Low prevalence of (e.g.)

- Piscirickettsiosis (*Piscirickettsia salmonis*)

Breeding for healthier animals

- National organization for cattle breeding: Geno
- National organization for cattle breeding: Norsvin

Photo: Coulorbox

Biosecurity

Restrictions on import of animals

Restrictions on movement of animals

Programs for healthier animals

- E.g. «Healthier goats»

Culling as part of disease control

- E.g. MRSA
- Chronically infected animals

Vaccination of all farmed fish

Foto: Rudolf Svensen

AMR strategies

- Industry initiative 1996-2000
  - Came after the relation between avoparcin used as a growth promoter and emergence of vancomycin-resistant enterococci (VRE) was detected and the avoparcin use was stopped
  - Target: 25 % reduction in antibiotic use for food-producing terrestrial animals
  - Result: 40 % reduction
- National strategy 2015-2020
  - Authorities set the reduction target
  - Industry made an action plan
  - Target: 10 % reduction in antibiotic use for food-producing terrestrial animals
  - Result: 18 % reduction
  - End the use of narasin as feed-additive in broiler production
  - LA-MRSA not to be established in the pig population
  - ESC-resistant *E. coli* in poultry should be reduced to a minimum

Regulation

- Import and transport restrictions
- Surveillance programs for diseases and AMR/AMU
- Antibiotics are available on prescription only
- Veterinarians are not allowed to dispense medicines to animal owners

Treatment practice

Treatment of individual animals dominate

Terapeutic use

Little use of metaphylaxis

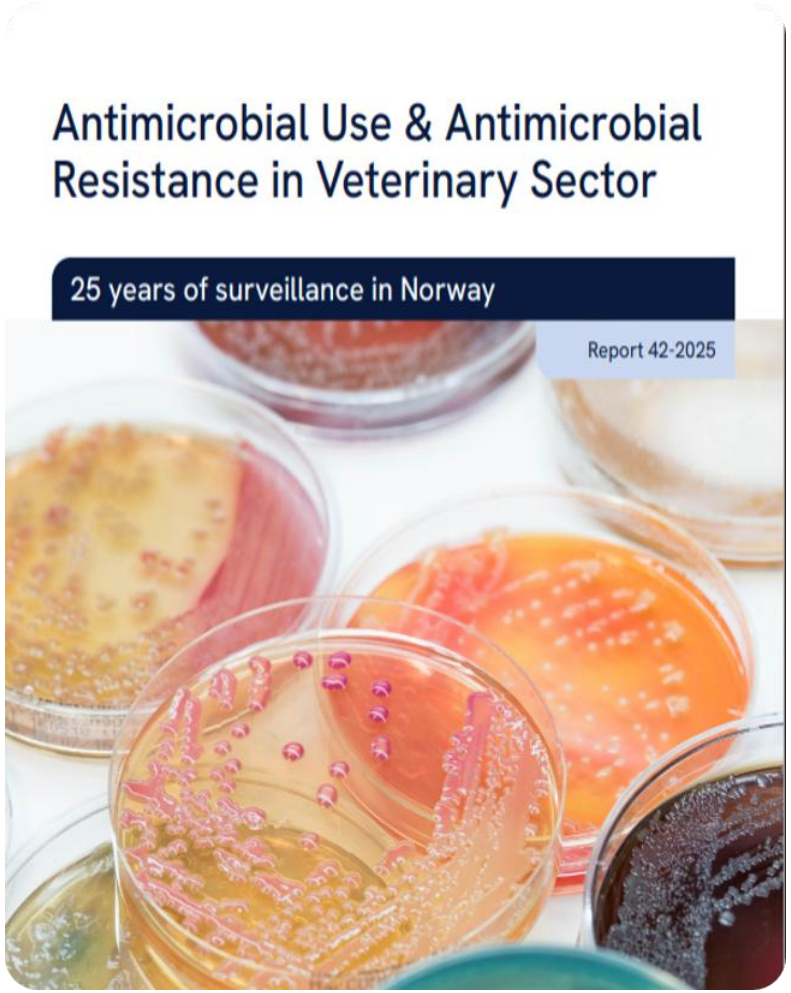
Treatment of terrestrial food-producing animals dominated by the use of beta-lactamase sensitive penicillins (59 % in 2024)

Low use of AMEG B (3rd- and 4th-generation cephalosporins, polymyxins and quinolones)

Photo: Coulorbox

Summary

- Norway is well-positioned geographically
- All stakeholders work to keep or improve the status
- All stakeholders work together
- Healthy animals do not need antibiotic treatments!



Scientifically ambitious, forward-looking and collaborative – for One Health

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