# The Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS)

## 2024 Key and Integrated Findings – Brief Summary

Jan. 8, 2026

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Canada

**Integrated One Health Surveillance** is the "collaborative, coordinated, ongoing, systematic collection, analysis, interpretation and communication of AMR and AMU data (from humans, animals, plants and the environment) essential for action, i.e. planning, implementation, and evaluation of interventions to optimize One Health policy, legislation and practice to mitigate AMR."

**The data**

**Surveillance is data for action**

Quadripartite Technical Group on Integrated Surveillance of AMR and AMU (presentation): https://www.amrleaders.org/docs/librariesprovider20/glg/session-7-presentation-3-integrated-surveillance.pdf?sfvrsn=fcf3466e_5&download=true

**Purpose**: review of the latest CIPARS data (high-level) to foster discussion on action (CAHSS AMR/AMU Network priority setting?)

- Sales data
- AMU/AMR
- Emerging stories
- Interactive data and CAHSS
- Key take-aways from the data

Canada

# Integrated antimicrobial sales

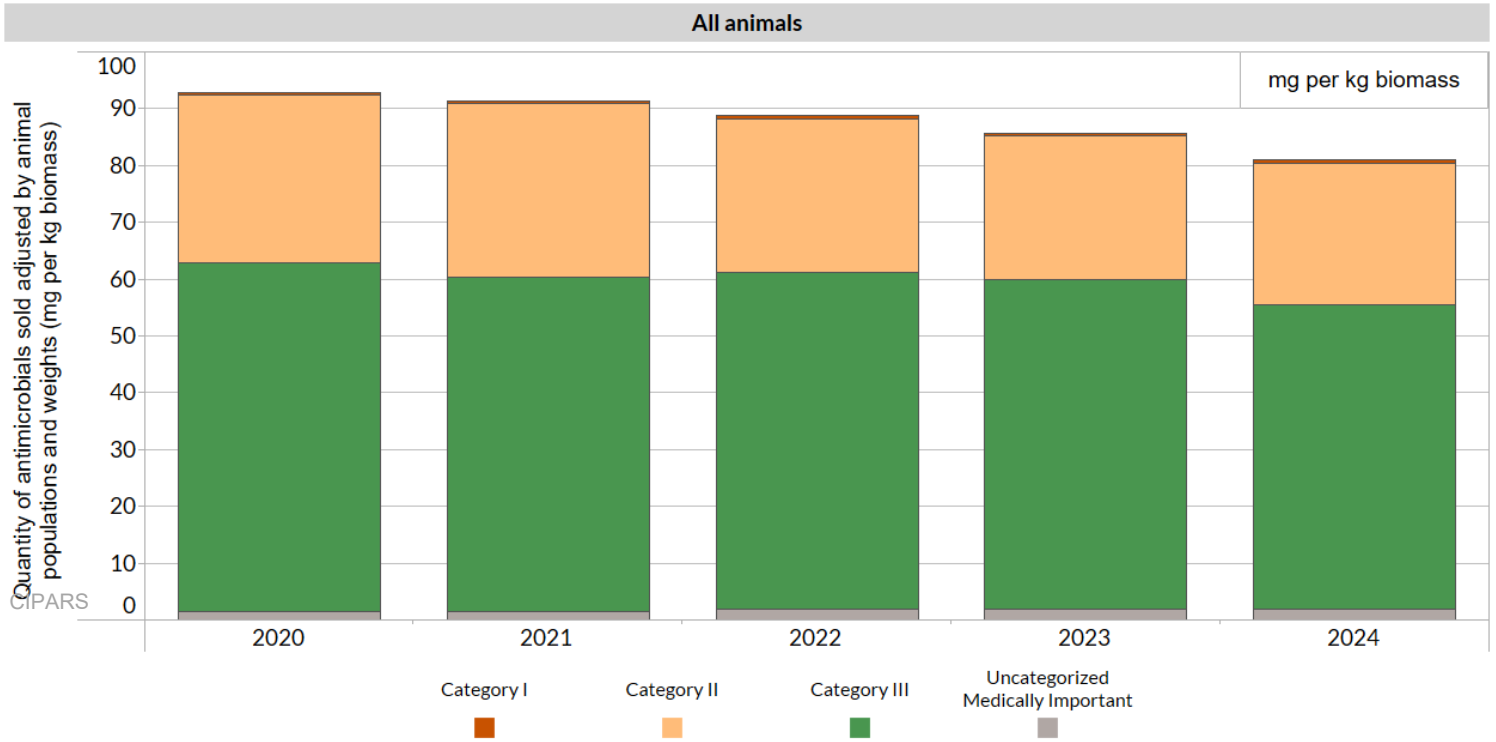
## Veterinary Antimicrobial Sales Reporting (VASR)

Public Health Agency of Canada | Agence de la santé publique du Canada
Santé Canada | Health Canada
Canada

# Antimicrobial sales - animal

**Since 2020, the overall relative quantity of MIA sales for all animals decreased by 13% (measured in mg/kg biomass). However, Category I sales increased substantially by 23% (mg/kg biomass).**

- 5% relative decrease in the total quantity of MIA sold between 2023 and 2024 (mg/kg biomass); **13%** overall between 2020 and 2024
- **Substantial relative decrease of ~26%** in the total quantity of MIA sold between 2015 and 2024[a] (mg/PCU-CA)[b]
- Category I sales adjusted by biomass had **a substantial overall relative increase of 23%** between 2020 and 2024
    - Category I sales are < 1% of total sales (consistent with previous years)




[a]In 2018, data from both the Canadian Animal Health Institute (CAHI) and VASR were available and used to estimate the percentage coverage increase with the VASR data. This percentage was retrospectively applied to the reported CAHI to generate a more comparable sales estimate (assuming the coverage difference was the same each year).
[b]The kg-biomass denominator is not available prior to 2018.

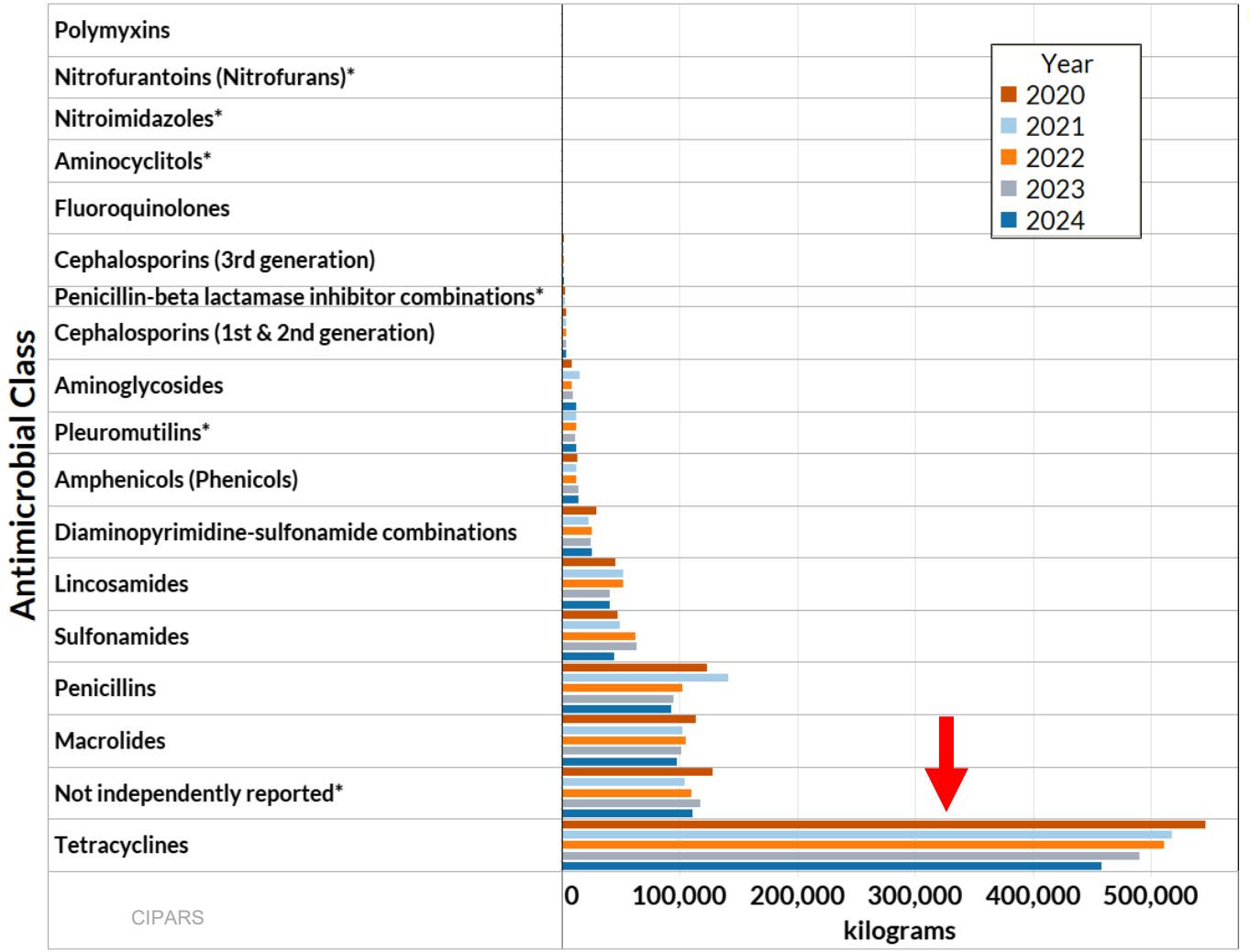
# Antimicrobial sales - animal

## While tetracyclines highly predominate the sales each year, they have decreased by 16% relative to 2020.

All animals
**Indicator:** kilograms

In 2024, around 97% of tetracyclines sold were for use in pigs, beef cattle, and aquaculture

- Pigs: ~ 55%
- Beef cattle: ~ 38%
- Aquaculture: ~ 4%

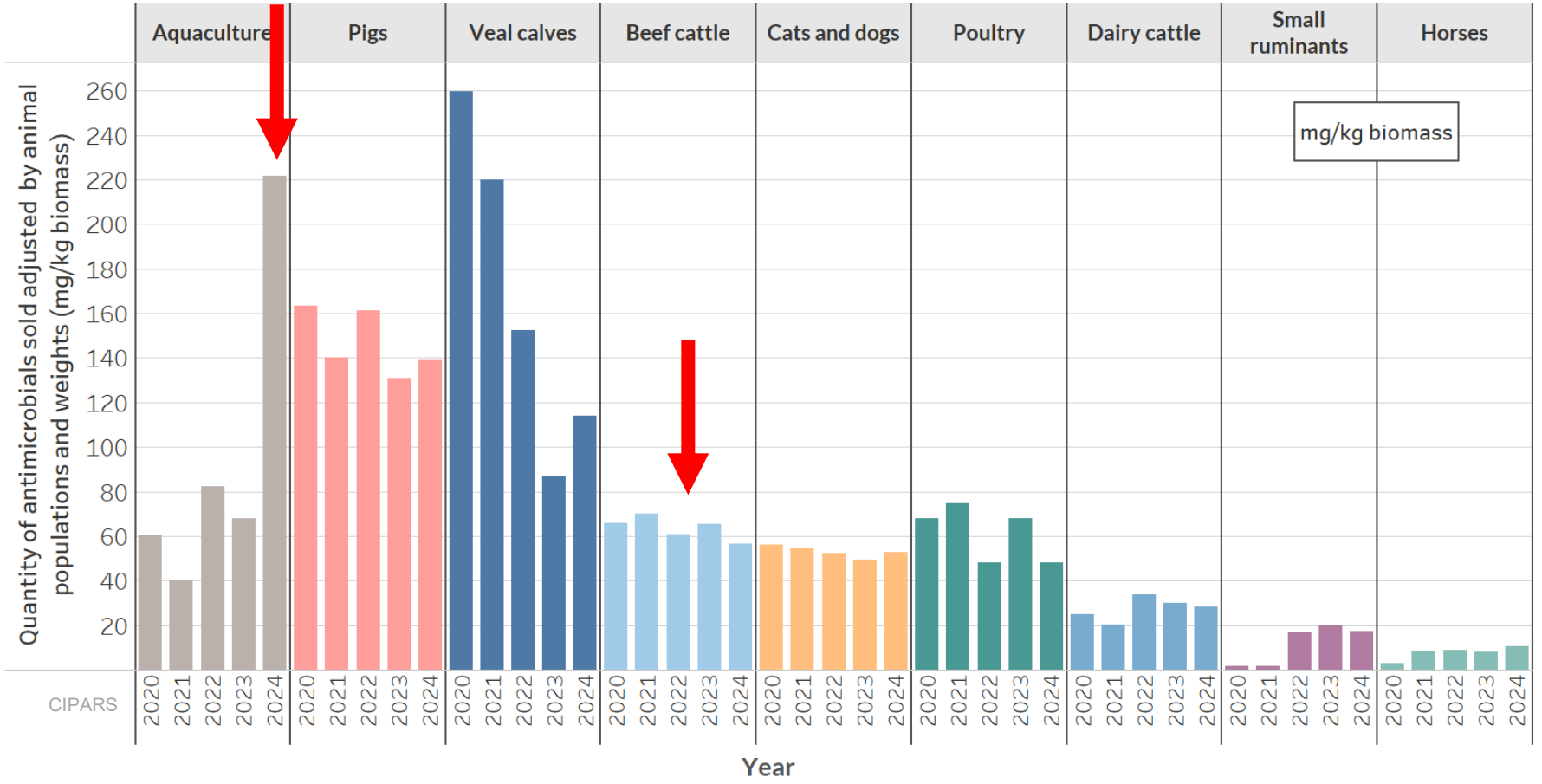



*Antimicrobial classes with fewer than three companies reporting are grouped together as Not Independently Reported (NIR) to prevent identification of individual company's sales volumes. Classes included in NIR vary by year.
Classes included in all years - aminocoumarins, bacitracins, carbapenems, diaminopyrimidines, fusidic acid, glycopeptides, orthosomycins, pseudomonic acids, streptogramins, and therapeutic agents for tuberculosis.
Between 2018-2020 – pleuromutilins and nitroimidazoles included
Between 2022-2024 – penicillin-beta lactamase inhibitor combinations included
In 2024 – aminocyclitols and nitrofurantoins included

# Antimicrobial sales - animal

**For aquaculture, the total MIAs sold substantially increased in 2024, which is unusual, relative to previous years. For beef cattle, the total MIAs sold relatively decreased, though there was a 72% relative increase in Category I antimicrobials sold compared to 2020.**

- Aquaculture now has the highest quantity of MIAs sold adjusted for biomass compared to other animal species – the increase in 2024 relative to 2020 was 226%
- Beef cattle – substantial relative increase (72%) in Category I antimicrobials sold between 2020 and 2024 (*data not shown*)
  - Represents less than 1% of their total sales (absolute difference of ~760 kg)
- Other animal species – no notable trend in Category I quantities sold

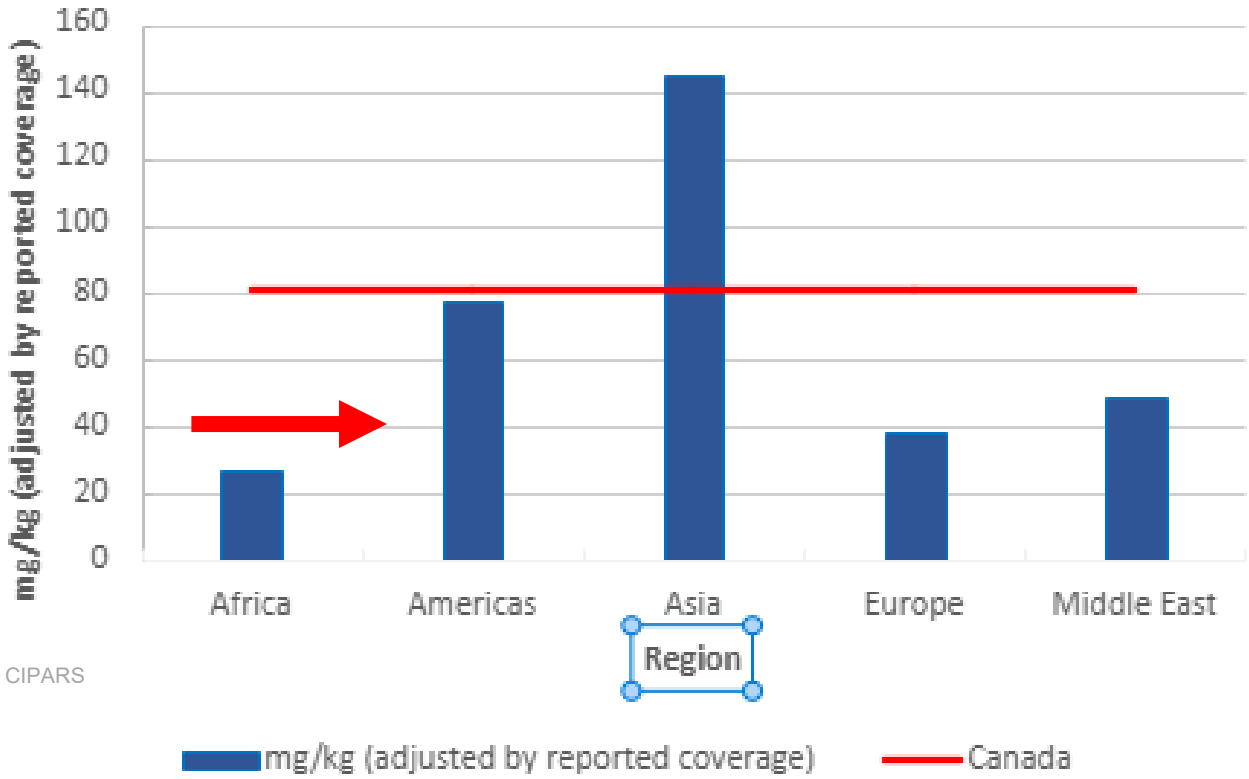


## In 2022, Canada's sales (mg/kg-WOAH) were higher than the average for the Americas (ANIMUSE).

Canada: 80.9 mg/kg-WOAH

Americas[a]: 77.8 mg/kg-WOAH

Proportionally, Canada sells **more** tetracyclines, macrolides, sulfonamides and lincosamides, and **less** fluoroquinolones than the Americas overall.




112
No. Participants

[a]Canada and 16 other countries including the US
**Source:** WOAH-ANIMUSE Interactive Report - https://amu.woah.org/amu-system-portal/home

# Integrated AMU/AMR

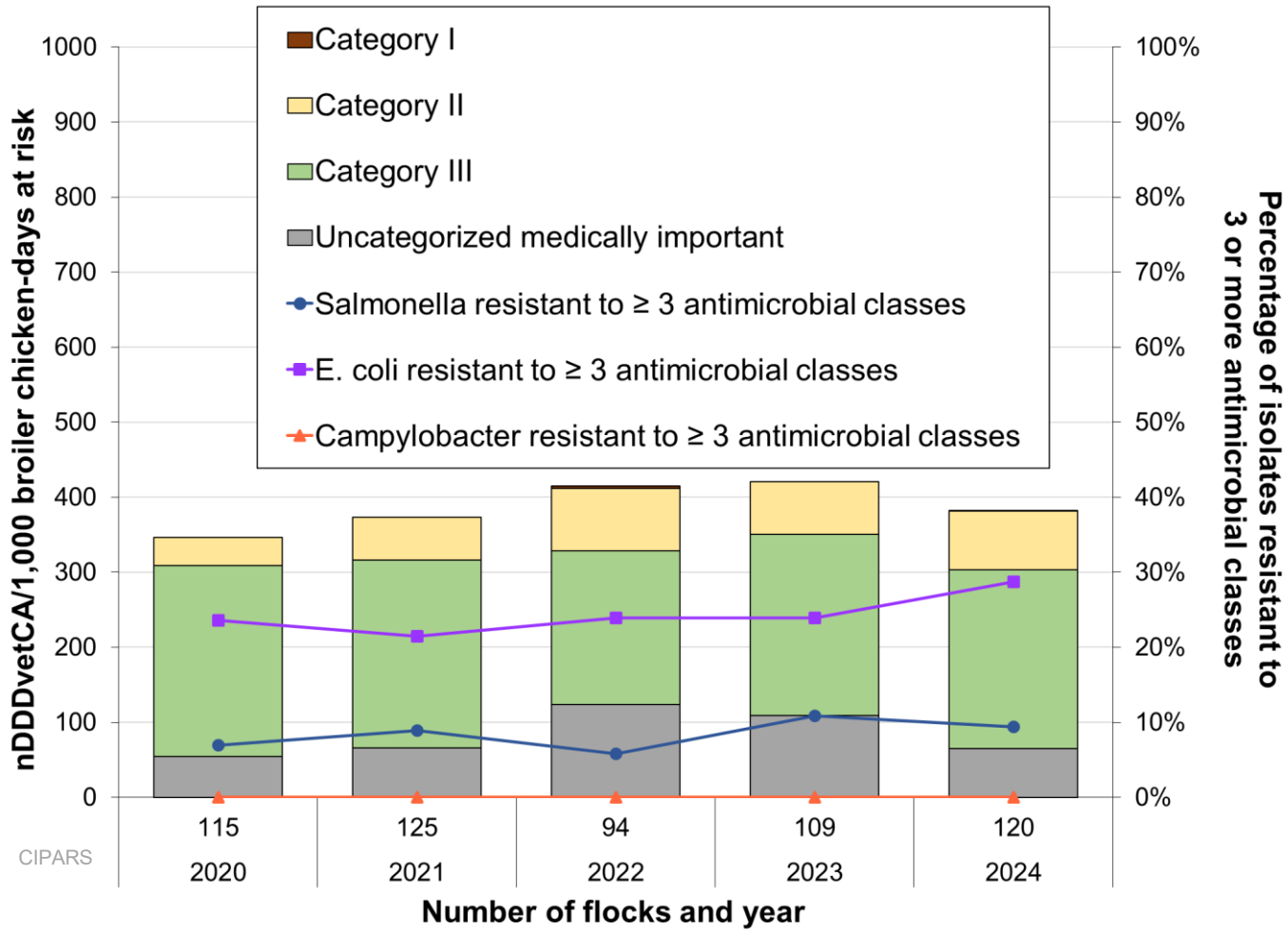
Canada

## On broiler chicken farms, AMU decreased (since 2022) with shifts in the categories of MIA. The frequency of MDR in *E. coli* significantly increased (since 2021).

### Broiler chickens on farm

**Reported AMU: nDDDvetCA/1000 broiler chicken-days at risk**

| | 2020 | 2024 | Percent change[a] |
|---|---|---|---|
| **Total** | 346 | 382 | 10% increase |
| **Category I** | 0 | 0.36 | 100% increase |
| **Category II** | 37 | 79 | 110% increase |
| **Category III** | 255 | 238 | 6% decrease |
| **Uncategorized** | 54 | 65 | 19% increase |



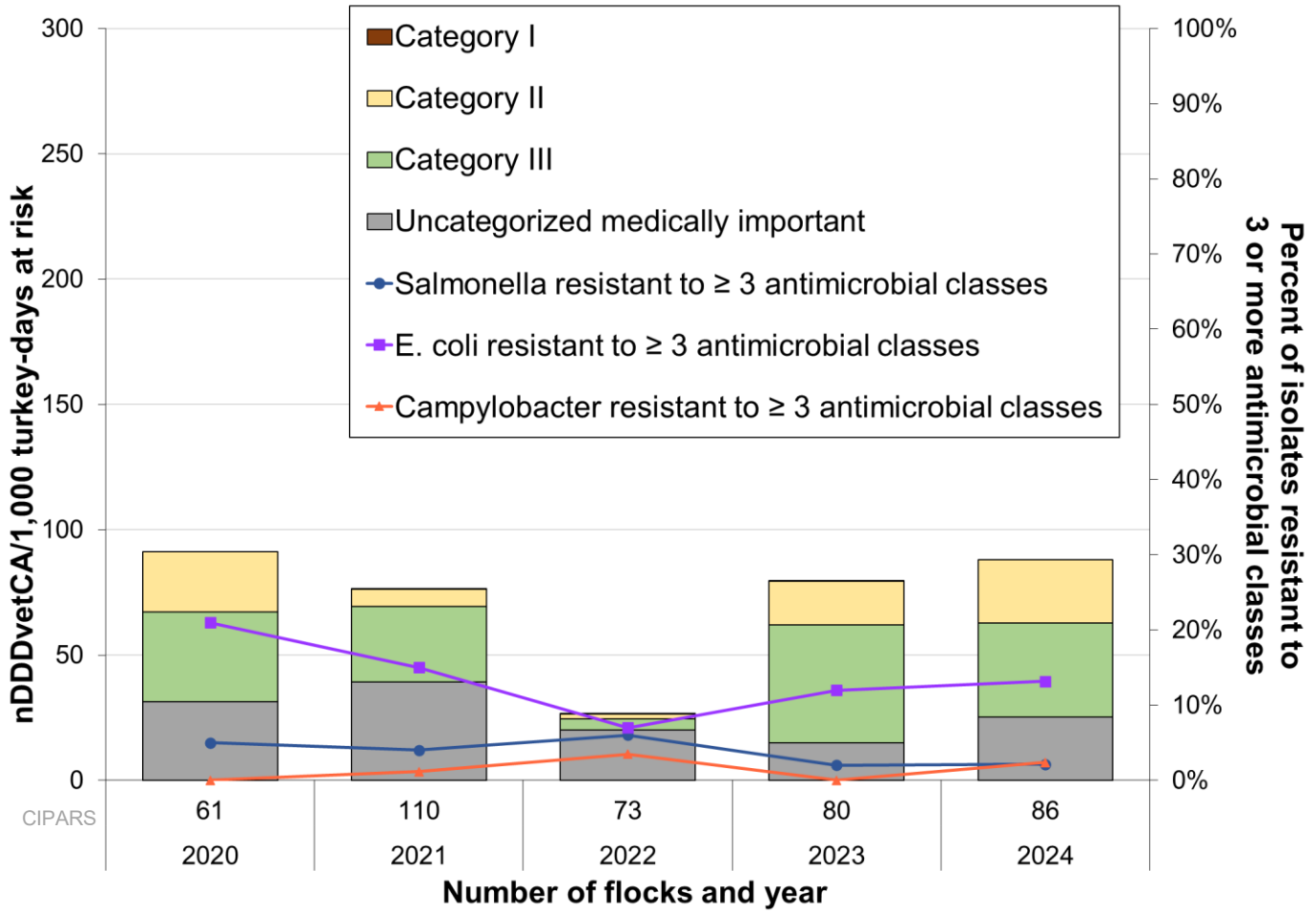

[a]Percent change=((Value 2024-Value 2020)/Value 2020)X100

## For turkeys, reported AMU has been increasing since 2022. In 2024, there was no reported Category I use, whereas Category II and III use increased. MDR in *E. coli* significantly decreased between 2020 and 2024.

### Turkeys on farm

**Reported AMU: nDDDvetCA/1000 turkey-days at risk**

| | 2020 | 2024 | Percent change[a] |
|---|---|---|---|
| **Total** | 91 | 88 | 4% decrease |
| **Category I** | 0 | 0 | No change |
| **Category II** | 24 | 25 | 4% increase |
| **Category III** | 36 | 37 | 5% increase |
| **Uncategorized** | 31 | 25 | 19% decrease |



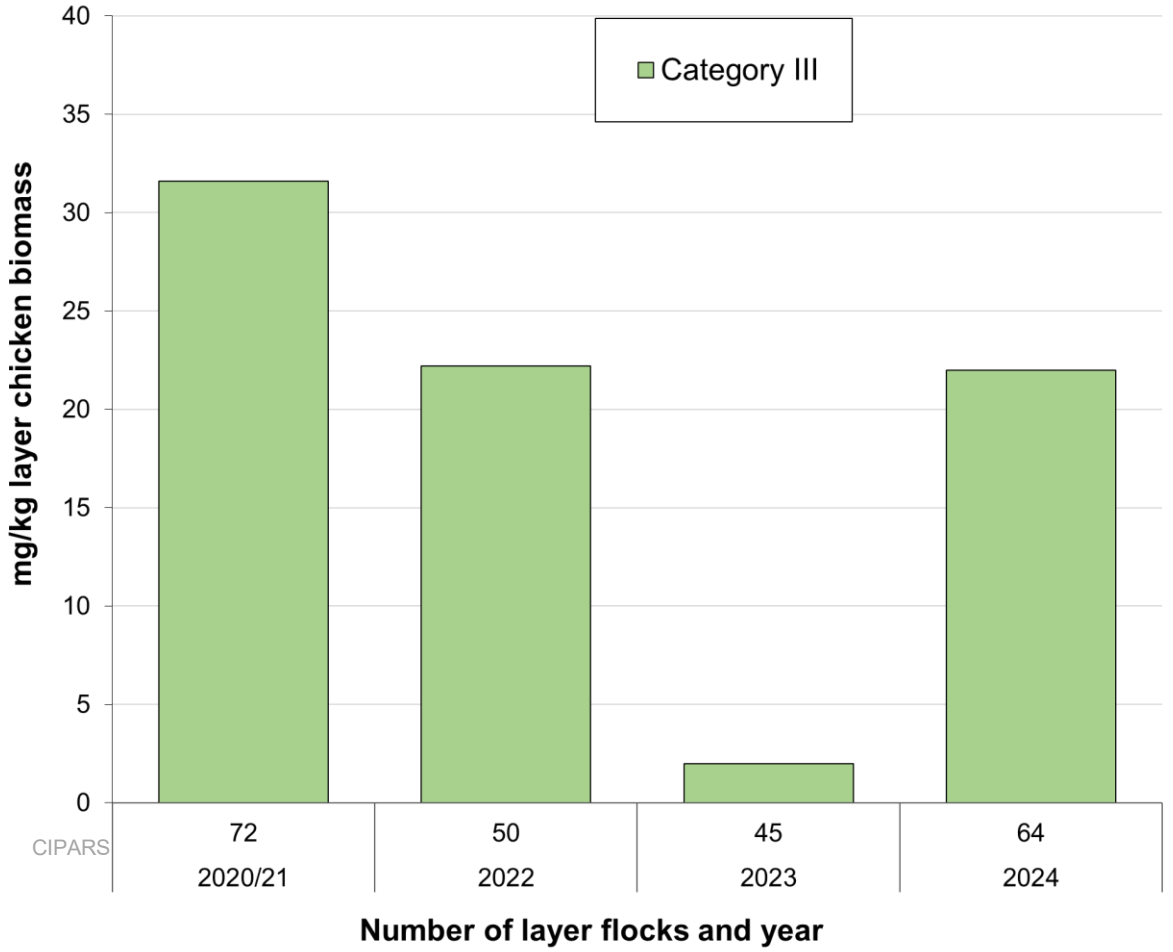

[a]Percent change=((Value 2024-Value 2020)/Value 2020)X100

## For MIAs, only Category III antimicrobials were reported for layer chicken flocks. Multidrug resistance was only detected in *E. coli* (≤3% over time).

### Layer chickens on farm

**Reported AMU: mg/kg layer chicken biomass**

| | 2020/21 | 2024 | Percent change[a] |
|---|---|---|---|
| **Total** | 32 | 22 | 30% decrease |
| **Category I, II and uncategorized** | Not reported | Not reported | |
| **Category III** | 32 | 22 | 30% decrease |




For layer chickens, 2020 and 2021 were pilot years; hence are combined.

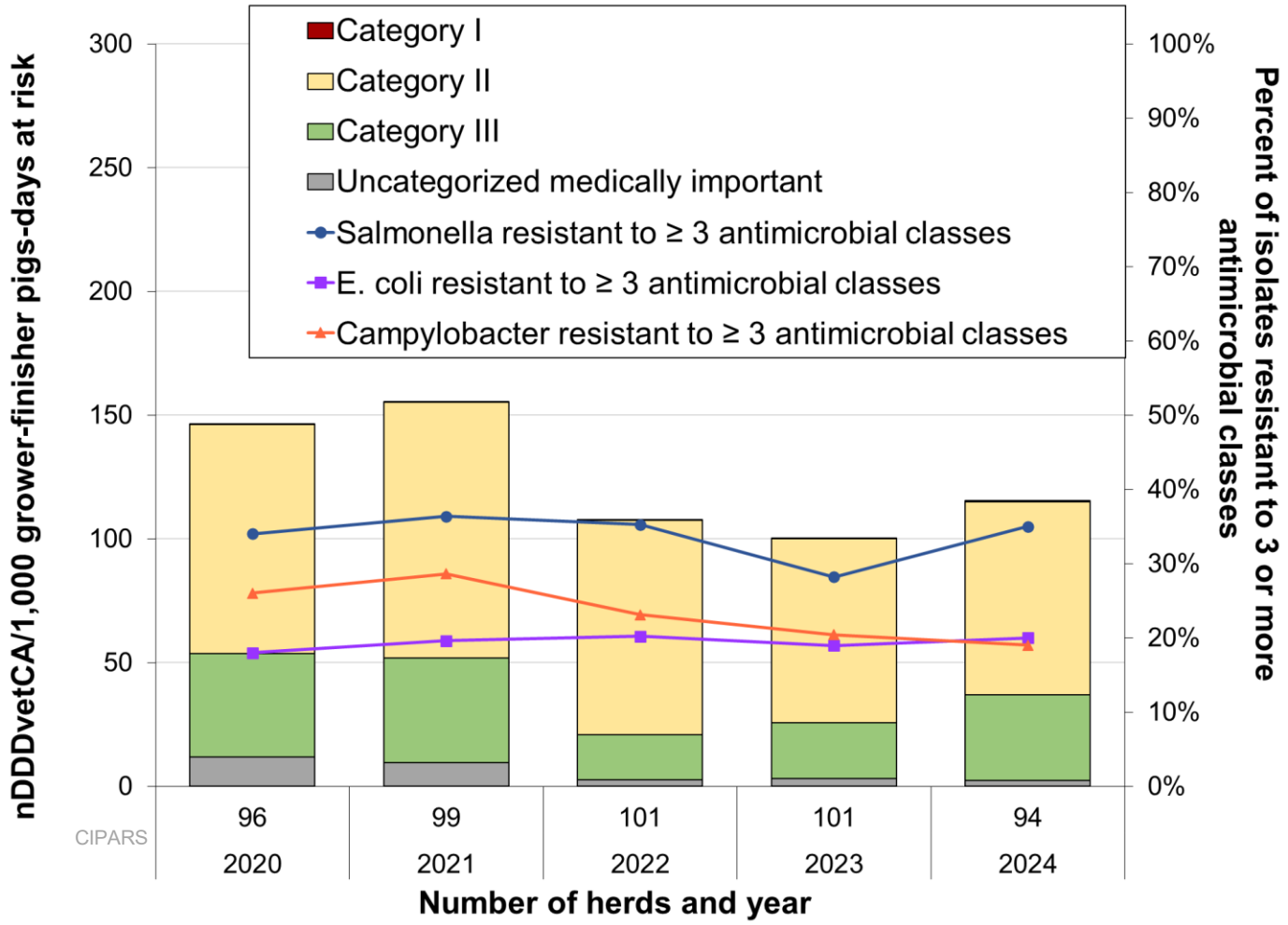
[a]Percent change=((Value 2024-Value 2020/21)/Value 2020/21)X100

## For grower-finisher pigs, there was a substantial relative increase in Category I use between 2020 and 2024 (though Cat I represent < 1% total reported AMU). MDR frequencies were moderate to high.

### Grower-finisher pigs on farm

**Reported AMU: nDDDvetCA/1000 grower-finisher pig-days at risk**

| | 2020 | 2024 | Percent change[a] |
|---|---|---|---|
| **Total** | 146 | 115 | 21% decrease |
| **Category I** | 0.09 | 0.41 | 380% increase |
| **Category II** | 93 | 78 | 16% decrease |
| **Category III** | 42 | 35 | 17% decrease |
| **Uncategorized** | 12 | 2 | 81% decrease |



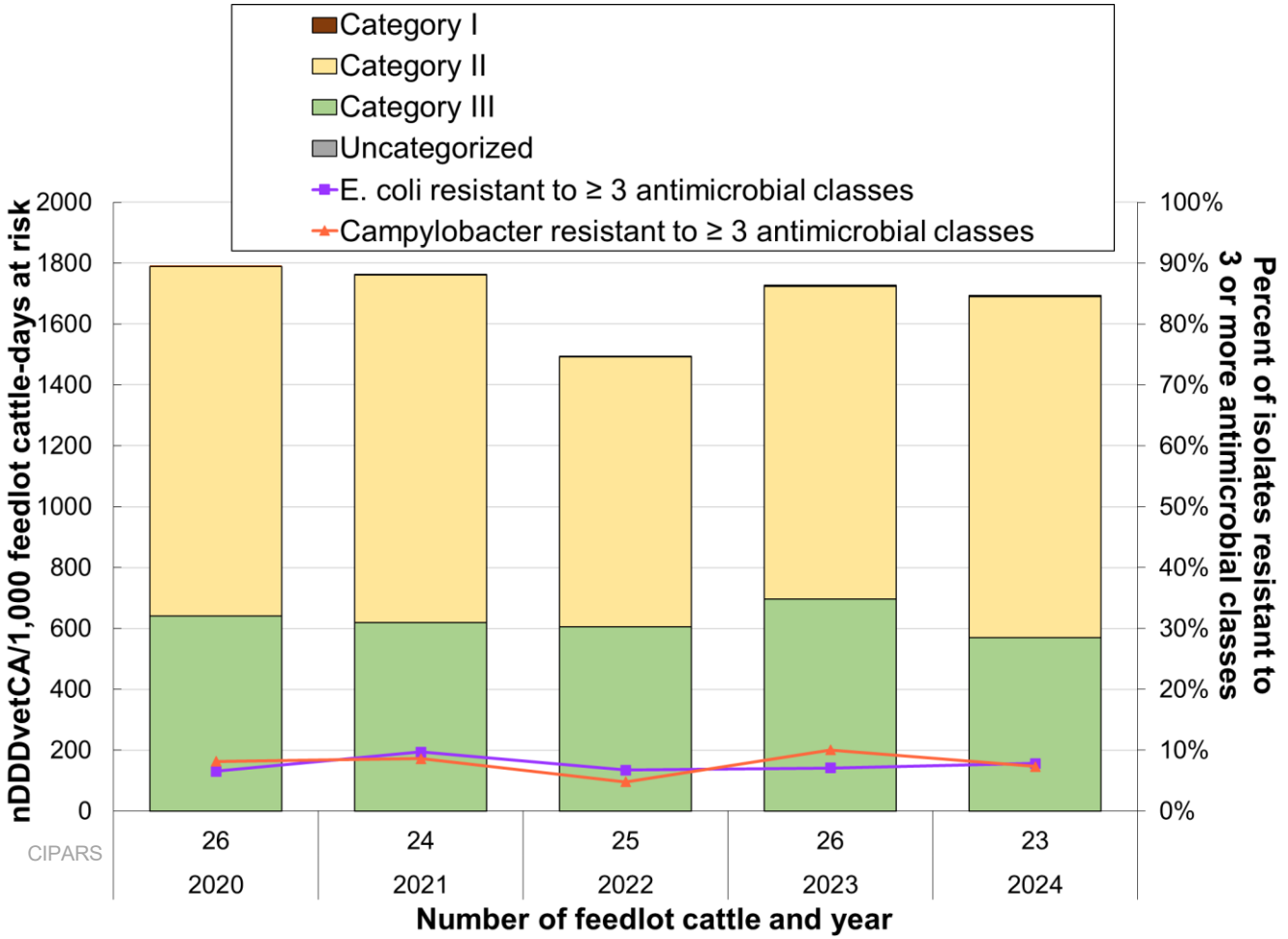

[a]Percent change=((Value 2024-Value 2020)/Value 2020)X100

## Overall, reported AMU on feedlots decreased by 6% relative to 2020. Reported Category I use (less than 1% of total use) also decreased. The frequency of MDR was low for *E. coli* and *Campylobacter*.

### Feedlot cattle on farm

**Reported AMU:**
**nDDDvetCA/1000 feedlot cattle-days at risk**

| | 2020 | 2024 | Percent change[a] |
|---|---|---|---|
| **Total** | 1792 | 1693 | 6% decrease |
| **Category I** | 3.1 | 2.9 | 8% decrease |
| **Category II** | 1148 | 1120 | 2% decrease |
| **Category III** | 641 | 570 | 11% decrease |
| **Uncategorized** | 0 | 0 | Not reported |




[a]Percent change=((Value 2024-Value 2020)/Value 2020)X100

# AMR indicator: ciprofloxacin resistance

## For dairy cattle, the frequency of ciprofloxacin resistance in *Campylobacter* significantly increased between 2020 and 2024.

### Dairy cattle on farm[a]

*E. coli*

- Ciprofloxacin resistance was low

*Salmonella*

- 14 isolates

*Campylobacter*

- Significant increase in resistance to ciprofloxacin from moderate in 2020 to high in 2024

**Ciprofloxacin resistance**

| Bacteria | Component | 2020 (%) | 2024 (%) | Percent difference[b] | Five-year trend (vertical 0% to 26%) |
|---|---|---|---|---|---|
| ***Escherichia coli*** | Farm | 1 | 1 | 0% |  |
| ***Salmonella*** | Farm | 0 | 14 | 13% |  |
| ***Campylobacter*** | Farm | 12 | 23 | 11% |  |

[b]Percent difference=Percent 2024-Percent 2020

| Legend | 20 or fewer isolates recovered | Rare 0-0.1% | Very low 0.1% to 1% | Low >1% to 10% | Moderate >10% to 20% | High >20% to 50% | Very high >50% to 70% | Extremely high >70% |
|---|---|---|---|---|---|---|---|---|

CIPARS

[a]Inclusive of calf, heifer, lactating cows, and manure pit samples

# AMR indicator: ceftriaxone resistance

## For dairy cattle, the frequency of ceftriaxone resistance in *E. coli* isolates was low.

### Dairy cattle on farm[a]

*E. coli*

- Resistance was low

*Salmonella*

- 14 isolates

**Ceftriaxone resistance**

| Bacteria | Component | 2020 (%) | 2024 (%) | Percent difference[b] | Five-year trend (vertical 0% to 10%) |
|---|---|---|---|---|---|
| ***Escherichia coli*** | Farm | 2 | 2 | 0% | |
| ***Salmonella*** | Farm | 0 | 0 | 0% | |

[b]Percent difference=Percent 2024-Percent 2020

| Legend | 20 or fewer isolates recovered | Rare 0-0.1% | Very low 0.1% to 1% | Low >1% to 10% | Moderate >10% to 20% | High >20% to 50% | Very high >50% to 70% | Extremely high >70% |
|---|---|---|---|---|---|---|---|---|

CIPARS

[a]Inclusive of calf, heifer, lactating cows, and manure pit samples

# AMR indicator: multidrug resistance (MDR)

**For dairy cattle, MDR in *E. coli* isolates was low, whereas in *Campylobacter*, it was only observed in 2022 (<1% of isolates).**

## Dairy cattle on farm[a]

*E. coli*

- MDR was low in 2024

*Salmonella*

- Isolate counts were low (<20) in 2024

*Campylobacter*

- MDR was only observed in 2022 (1% of isolates in 2022)

**Multidrug resistance (MDR)**

| Bacteria | Component | 2020 (%) | 2024 (%) | Percent difference[b] | Five-year trend (vertical 0% to 25%) |
|---|---|---|---|---|---|
| ***Escherichia coli*** | Farm | 13 | 10 | 3% |  |
| ***Salmonella*** | Farm | 0 | 7 | 7% |  |
| ***Campylobacter*** | Farm | 0 | 0 | 0% |  |

[b]Percent difference=Percent 2024-Percent 2020

| Legend | 20 or fewer isolates recovered | Rare 0-0.1% | Very low 0.1% to 1% | Low >1% to 10% | Moderate >10% to 20% | High >20% to 50% | Very high >50% to 70% | Extremely high >70% |
|---|---|---|---|---|---|---|---|---|

CIPARS

[a]Inclusive of calf, heifer, lactating cow, and manure pit samples

# The quantity of antimicrobials purchased by human hospitals and dispensed by community pharmacies increased overall by 23% to pre-pandemic levels. At the same time, MDR remained low.

## Human

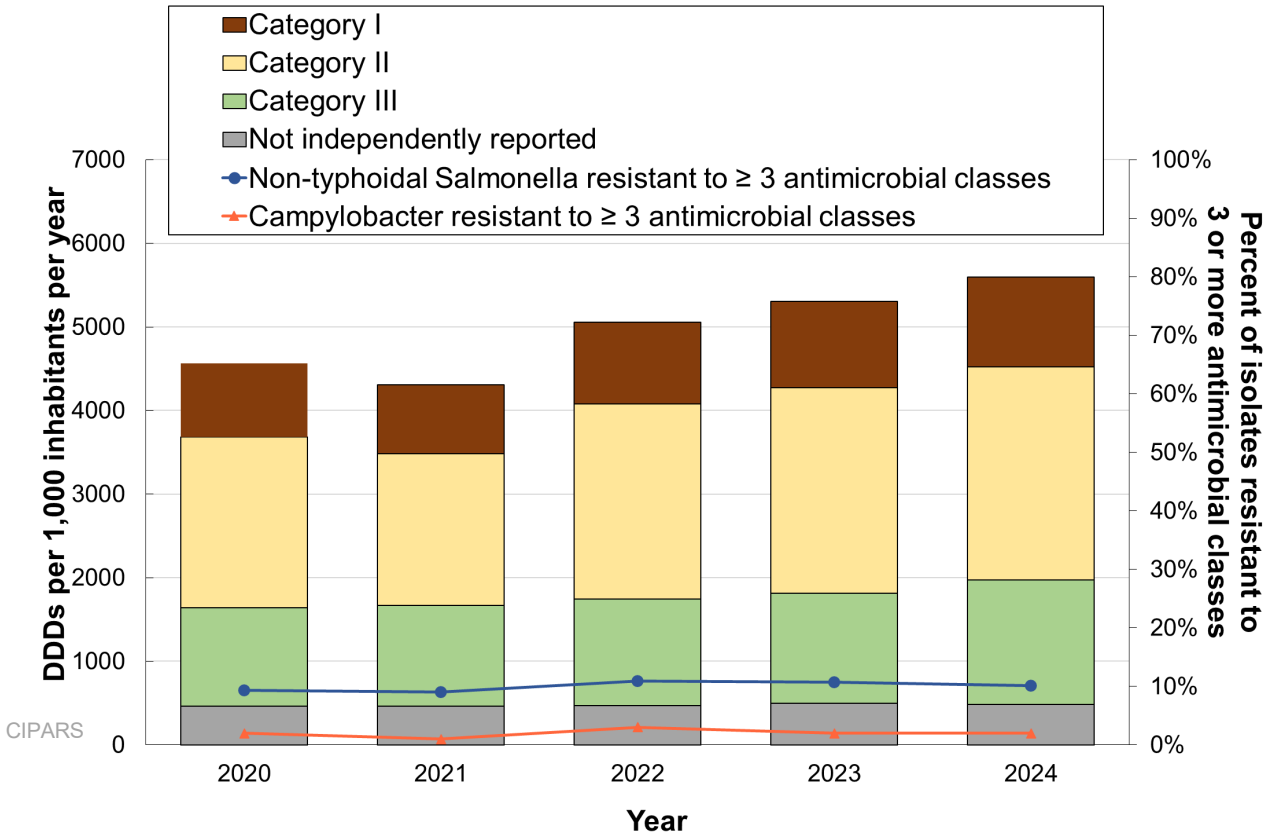
**Reported AMU: DDDs/1000 inhabitant per year**

| | 2020 | 2024 | Percent change[a,c] |
|---|---|---|---|
| **Total** | 4564 | 5593 | 23% increase |
| **Category I** | 883 | 1074 | 22% increase |
| **Category II** | 2043 | 2546 | 25% increase |
| **Category III** | 1173 | 1488 | 27% increase |
| **Not independently reported (NIR)[b]** | 465 | 485 | 4% increase |

**Number of isolates**

| | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|
| **Non-typhoidal *Salmonella*** | 4839 | 3277 | 4483 | 5845 | 6164 |
| ***Campylobacter*** | 379 | 435 | 322 | 272 | 331 |

[a]Percent change=((Value 2024-Value 2020)/Value 2020)X100




AMU data source: SHAMU (IQVIA)

[b]NIR includes: aztreonam, bacitracin, ceftobiprole-medocaril, ceftolozane-tazobactam, chloramphenicol, daptomycin, fosfomycin, fusidic acid, linezolid, metronidazole, nitrofurantoin and vancomycin

[c]Quantity of antimicrobials are returning to pre-pandemic levels

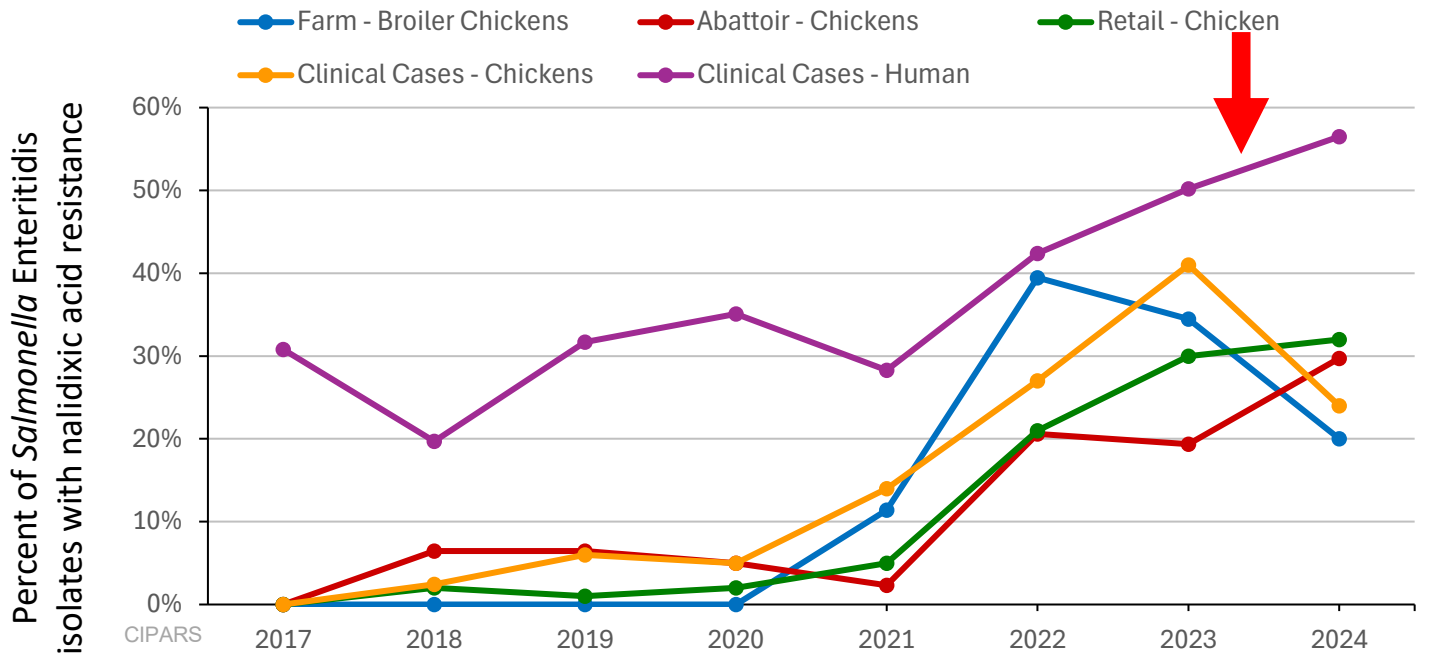
# Follow-ups to emerging stories

Canada

# Nalidixic acid resistance in *Salmonella* Enteritidis (SE) in chickens at abattoir, retail chicken and humans continued to increase.

## Broiler chickens, chickens, chicken and humans

- Nalidixic acid-resistance in SE from chickens at abattoir and retail chicken continued to increase
- Nalidixic acid-resistance in SE from broiler chickens on farm and clinical cases in chickens decreased since 2023
- Nalidixic acid resistance in SE from humans substantially increased




| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| n | Farm – Broiler Chickens | 69 | 70 | 46 | 37 | 35 | 38 | 29 | 20 |
| | Abattoir - Chickens | 28 | 31 | 31 | 20 | 43 | 34 | 31 | 37 |
| | Retail - Chicken | 83 | 67 | 72 | 51 | 55 | 57 | 70 | 37 |
| | Clinical Cases - Chickens | 112 | 111 | 133 | 92 | 88 | 44 | 80 | 50 |
| | Clinical Cases - Human | 1060 | 2818 | 2359 | 1486 | 1188 | 1857 | 2352 | 2682 |

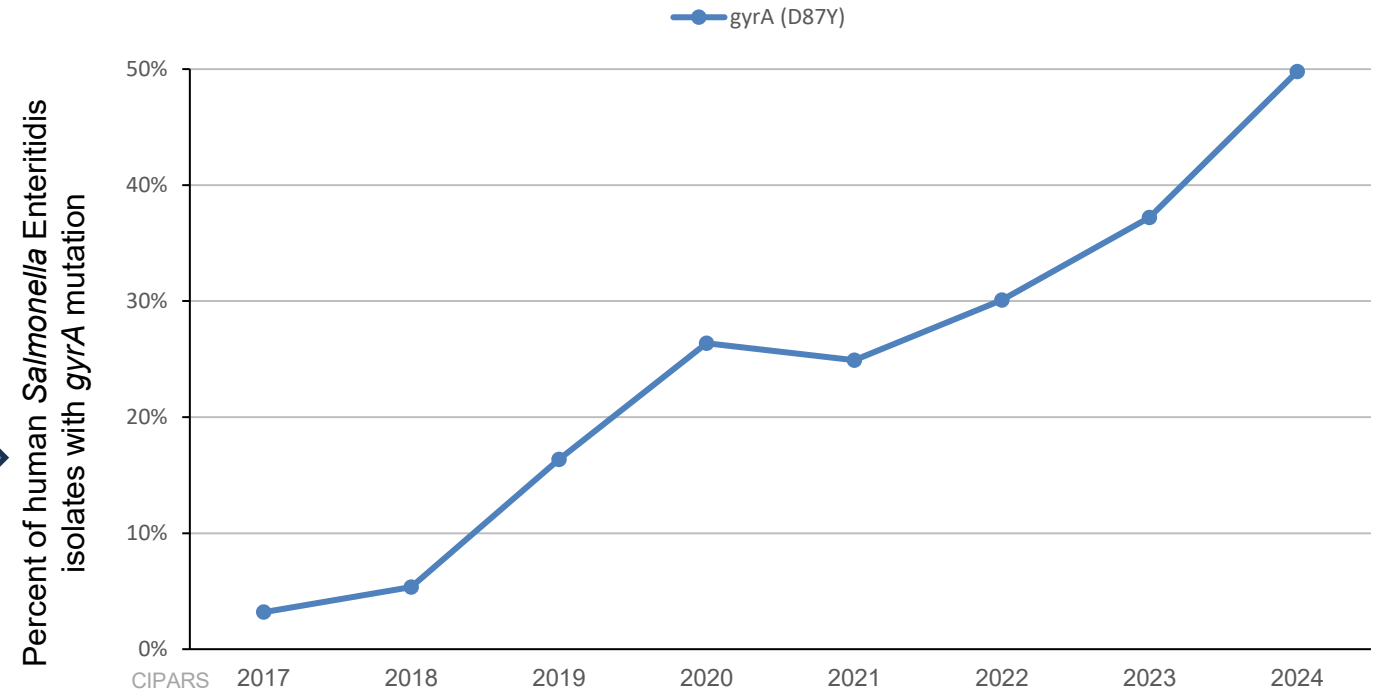
Year, Surveillance Component, and Isolate Number (n)

# Nalidixic acid resistance in *Salmonella* Enteritidis and *gyr*(A) D87Y mutation

## There was a rapid emergence of a mutation in *gyrA* (D87Y) in *Salmonella* Enteritidis (SE) from chickens, retail chicken and humans.

Broiler chickens, chickens, chicken and human

- Since 2018, all nalidixic acid-resistant SE isolates from broiler chickens (farm, abattoir and clinical cases) and retail, were sequence type 11 and had a mutation in *gyrA* (D87Y)
- In humans, SE isolates with a mutation in *gyrA* (D87Y) substantially increased (figure) and 99.4% of SE isolates with *gyrA* (D87Y) mutation were sequence type 11
- In humans, *Salmonella* Infantis isolates with a mutation in *gyrA* (D87Y) substantially increased – 11% in 2017 to 42% in 2024 (of all *S*. Infantis)




| n | Clinical Cases - Human | 1060 | 2818 | 2359 | 1486 | 1188 | 1857 | 2352 | 2682 |
|---|---|---|---|---|---|---|---|---|---|

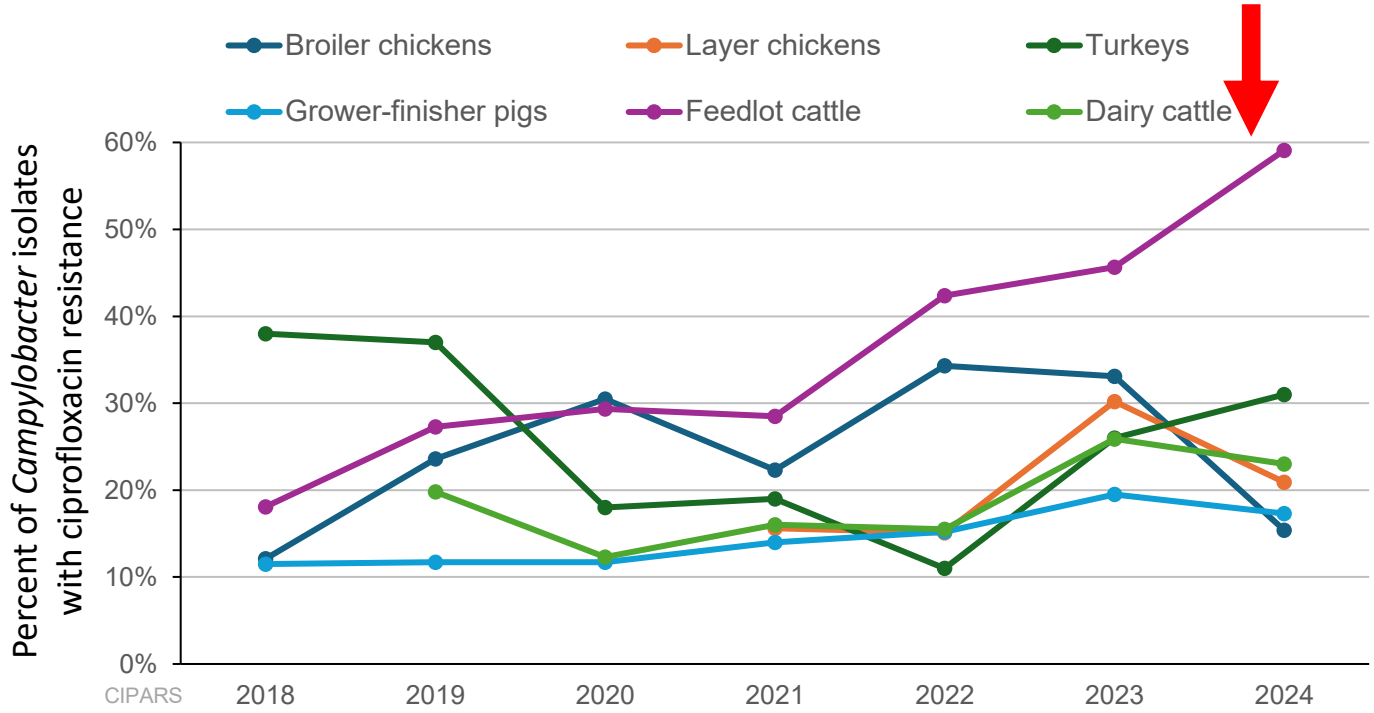
Year, Surveillance Component, and Isolate Number (n)

# Ciprofloxacin resistance in *Campylobacter* substantially increased in feedlot cattle, cattle at abattoir and retail beef.

All surveillance components

Ciprofloxacin resistance in *Campylobacter* isolates from:

- Feedlot cattle, cattle at abattoir and retail beef continued to **substantially increase**
- Farm (layer chickens, grower-finisher pigs, turkeys and dairy cattle), abattoir (chickens and pigs) and retail chicken - resistance increased since 2020, but variable trends
- Broiler chickens on farm and retail turkey **decreased** since 2020 and 2023 with variability between
- Humans was variable and high, ranging from 25% to 44% between 2018 and 2024 (*data not shown*)




| n | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Farm – Broiler Chickens | 122 | 142 | 78 | 123 | 123 | 140 | 81 |
| | Farm – Layer Chickens | | | | 183 | 115 | 107 | 170 |
| | Farm - Turkeys | 191 | 214 | 90 | 240 | 115 | 109 | 147 |
| | Farm – Grower-finisher Pigs | 483 | 447 | 349 | 367 | 365 | 425 | 376 |
| | Farm – Feedlot Cattle | 94 | 162 | 92 | 247 | 184 | 149 | 93 |
| | Farm – Dairy Cattle | | 360 | 285 | 284 | 298 | 283 | 231 |

Year, Surveillance Component, and Number of Isolates (n)

## ESBL-producing non-typhoidal *Salmonella* isolates recovered from humans and animals/food continued to increase, with a sharp increase in animals/food in 2024.

Overall frequency prior to 2017 was < 0.5% for humans and animals/food

- 2024 – humans - 1.9%; animals/food - 2.9%

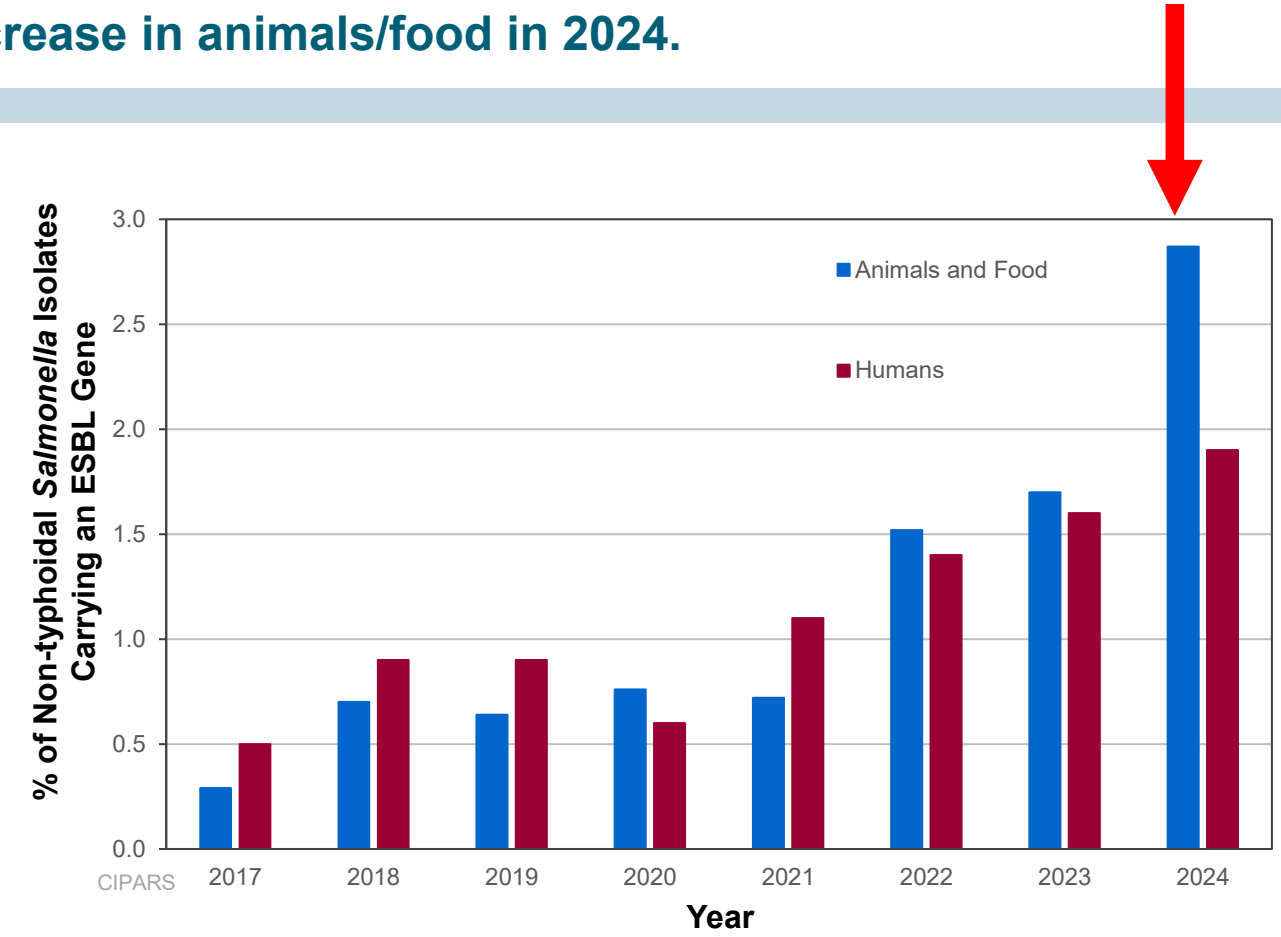
Humans

Since 2017,

- Frequency of ***bla*$_{\text{CTX-M-65}}$** increased (0.3% → 1.1% of all isolates; vast majority are *S*. Infantis)
- Frequency of ***bla*$_{\text{CTX-M-55}}$** increased (0.1% → 0.5% of all isolates; predominantly *Salmonella* I 4,[5],12:i:-)

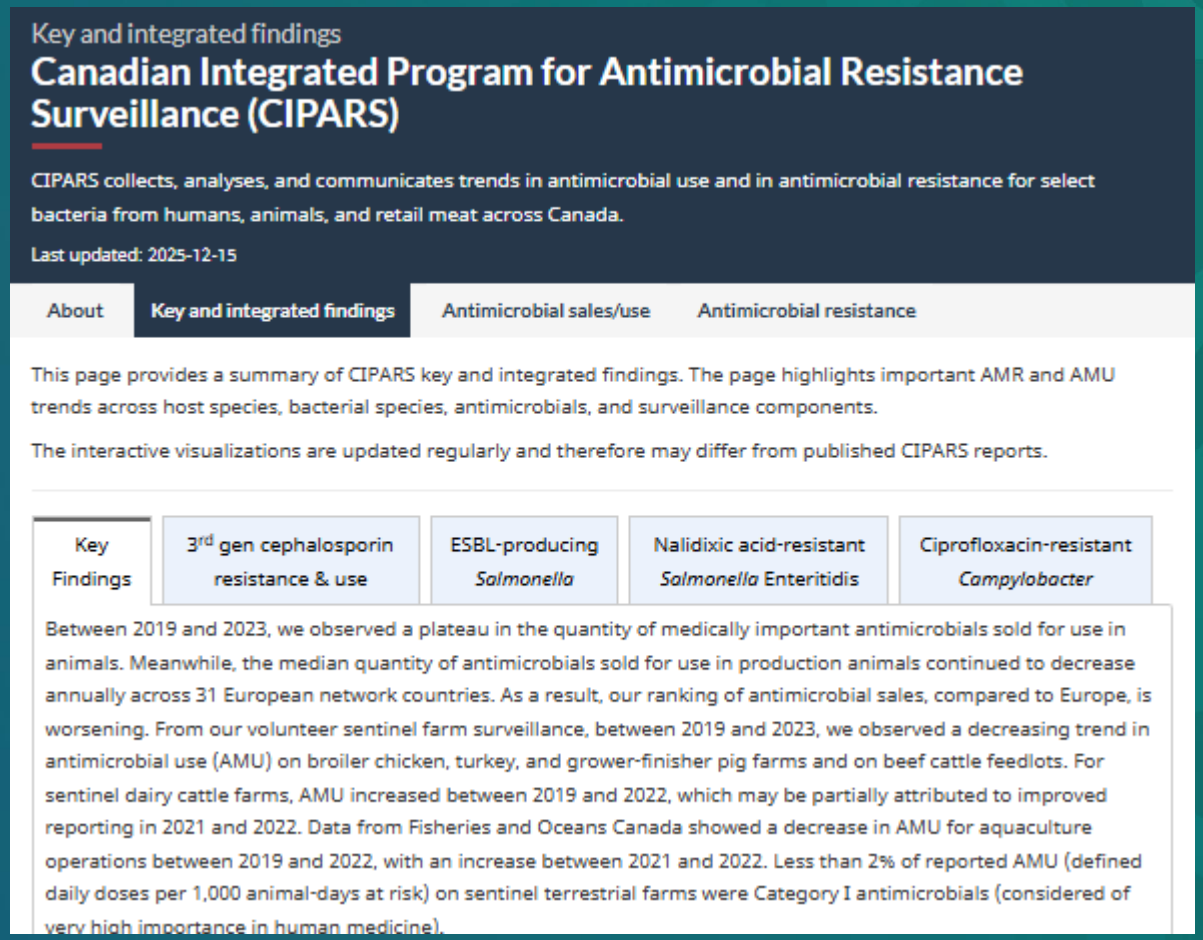
Animal/food sources

- Frequency of ***bla*$_{\text{CTX-M-65}}$** substantially increased since 2021 (0.1% → 2.45% of all isolates; vast majority *S*. Infantis)
- Frequency of ***bla*$_{\text{CTX-M-55}}$** was variable since 2017 (range 0.1% to 0.5% of all isolates; predominantly *Salmonella* I 4,[5],12:i:-)



**CIPARS Interactive data visualizations: *One Stop Shop:*** https://health-infobase.canada.ca/cipars/

**CAHSS:** https://www.cahss.ca/cahss-networks/amuamr




Canada

# Take-away messages

**Today was high-level info, the <u>complexity is in the details</u>.**

- **Overall, MIA sales decreasing** since 2020…but **Category I sales increasing**
- **Reported AMU on sentinel farms (2020 to 2024)**: decreased for all species except broilers and aquaculture (all aquaculture operations)
    - *Though remember the variable fluctuations during this time across species and Categories!...details matter.*
- **Increasing nalidixic acid-resistant *S.* Enteritidis** from broiler chickens, chicken meat and humans
- **Substantially increasing ciprofloxacin resistance** in *Campylobacter* from feedlot cattle, healthy cattle at abattoir and retail ground beef
- **ESBL-producing non-typhoidal *Salmonella*** from humans, and animals/food continued to increase

**Surveillance is data for action**

# Acknowledgements


**Human (AMR):**

- NML Division of Enteric Diseases and PulseNet Canada
- Provincial Public Health Laboratories
- FoodNet Canada Sentinel Sites (*Campylobacter*)
- National Enteric Surveillance Program (NESP)

**Farm (AMR and AMU):**

- Veterinarians, producers and component groups, and academic and federal partners who participate in the farm program
- Saskatchewan Agriculture
- Feedlot Cattle Surveillance - partial funding current & past: Canadian Agricultural Partnership in Alberta and Ontario, Alberta Cattle Feeders Association, Bayer Animal Health, Beef Farmers of Ontario, Beef Cattle Research Council, Alberta Beef Producers, McDonald's, Saskatchewan Cattle Feeders and Vetoquinol
- Dairy Cattle Surveillance – partial funding: Dairy Farmers of Canada Dairy Research Cluster as part of the Canadian Agricultural Partnership
- Fisheries and Oceans Canada (DFO)

**Abattoir:**

- Canadian Food Inspection Agency, abattoir operators, samplers and personnel

**Retail and Water:**

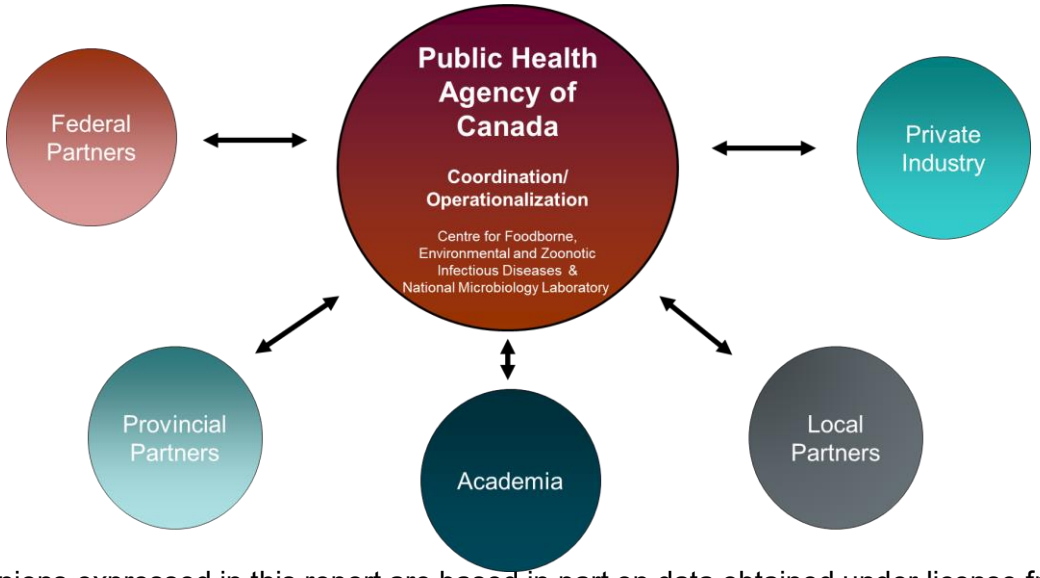
- Health Units and institutions that participate in FoodNet Canada
- Alberta Irrigation Districts Association
- Alberta Agriculture and Irrigation
- Participating water treatment plants

**Clinical Animal Isolates:**

- Provincial Animal Health Laboratories

**Antimicrobial sales for animals:**

- VASR: Health Canada's Veterinary Drugs Directorate and PHAC




**Antimicrobial Use - humans:**

- SHAMU (PHAC AMR Task Force) and IQVIA. The statements, findings, conclusions, views, and opinions expressed in this report are based in part on data obtained under license from IQVIA Solutions Canada Inc. concerning the following information service(s): Compuscript, from January, 2020 to December, 2024. All Rights Reserved. The statements, findings, conclusions, views, and opinions expressed herein are not necessarily those of IQVIA Inc. or any of its affiliated or subsidiary entities.

**Antimicrobials Sold as Pesticides for use in Crops:**

- Health Canada's Pest Management and Regulatory Agency

**Feed Ingredients and Mixed Feeds:**

- Canadian Food Inspection Agency