Thailand National AMR Surveillance program in Livestock

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Food and Agriculture Organization of the United Nations

World Health Organization

World Organisation for Animal Health
Founded as OIE

Funded by the European Union

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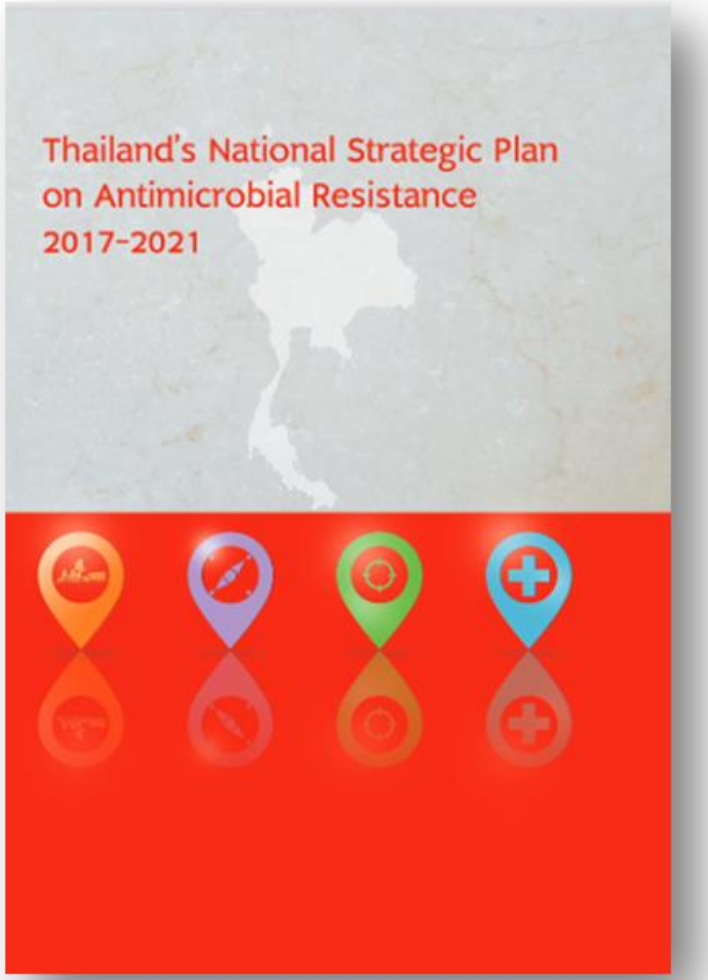
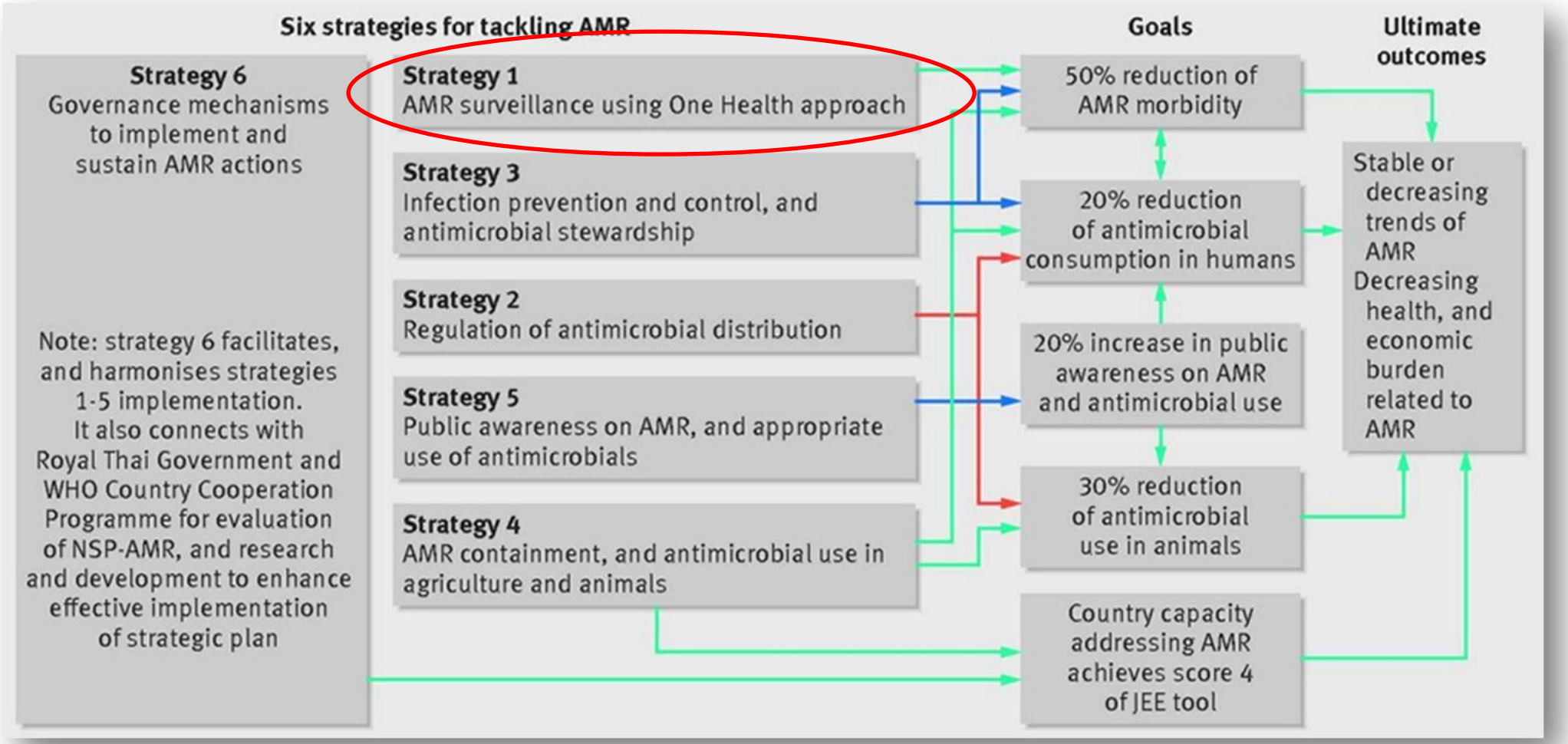
Outline

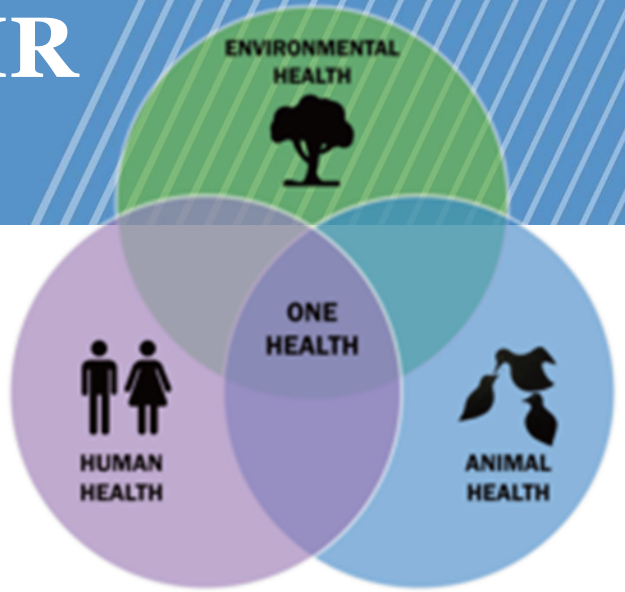
- Overview of Thailand's AMR National Strategic Plan
- Framework of AMR Surveillance system in Thailand
- Overview of DLD AMR surveillance in food-producing animals
- Roles and Responsibilities
- Operational result 2017-2020
- Problems and obstacles



Overview of Thailand's AMR National Strategic Plan



Thailand's National Strategic plan on AMR



1 STRATEGY

AMR Surveillance using One Health Approach

The AMR surveillance system is capable of indicating problems as well as monitoring and reporting the AMR epidemiological situation in both humans and animals in order to provide timely alerts on AMR spread

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Framework of AMR Surveillance system according to sectoral mission in Thailand

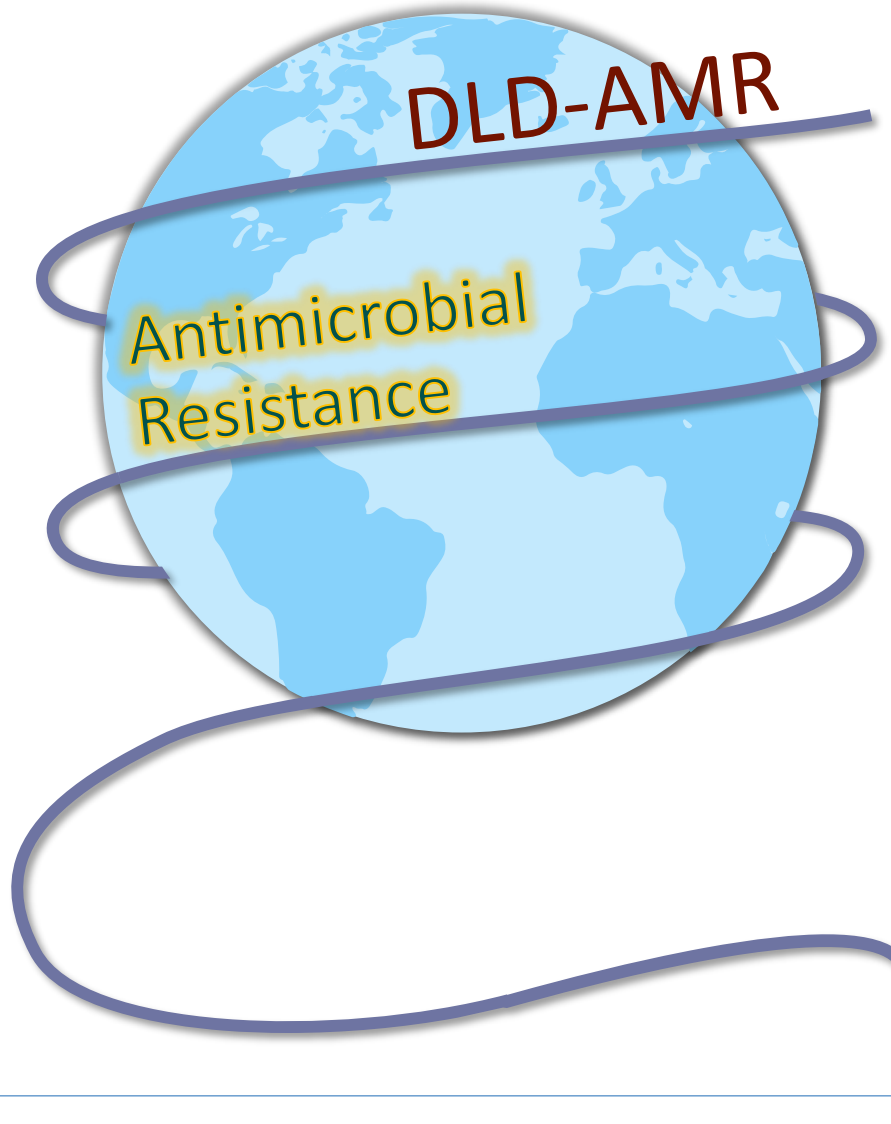
คน (Human)	ปศุสัตว์ (Livestock)	สัตว์น้ำ (Fishery)	อาหาร (Food)	สิ่งแวดล้อม (Environment)
- *Escherichia coli* - *Salmonella* spp. - *Enterococcus faecalis* - *Enterococcus faecium* - *Acinetobacter* spp. - *Klebsiella pneumoniae* - *Pseudomonas aeruginosa* - *Shigella* spp. - *Staphylococcus aureus* - *Streptococcus pneumoniae*	- *Escherichia coli* - *Salmonella* spp. - *Enterococcus faecalis* - *Enterococcus faecium* - *Campylobacter* spp. (*C. coli* และ *C. jejuni*)	- *Escherichia coli* - *Salmonella* spp. - *Enterococcus faecalis* - *Enterococcus faecium* - *Vibrio cholerae* - แบคทีเรียที่แยกจากสัตว์น้ำป่วย เช่น *Aeromonas*, *Streptococcus*, *Vibrio*	- *Escherichia coli* - *Salmonella* spp. - *Enterococcus faecalis* - *Enterococcus faecium* - *Staphylococcus aureus*	- *Escherichia coli* - *Salmonella* spp. - *Enterococcus faecalis* - *Enterococcus faecium*
คน= คนป่วย คนสุขภาพดี Tricycle แนะนำให้เก็บตัวอย่างอุจจาระของหญิงมีครรภ์เฝ้าระวังเชื้อ E. coli	สัตว์สุขภาพดี			

Framework for Surveillance Antimicrobial Resistance in Food Animals

	Phase 1 (0–3 years) 2563 - 2565	Phase 2 (4–5 years) 2566 - 2567	Phase 3 (>5 years) 2568 เป็นต้นไป
Sample type(s)	โรงฆ่า: Caecum Meat สถานที่จำหน่าย: Meat	โรงฆ่า: Caecum Meat สถานที่จำหน่าย: Meat ฟาร์ม: Feed	
Bacteria for AST	*Escherichia coli* *Salmonella* spp. *Enterococcus faecalis* *Enterococcus faecium*		
Antibiotics for AST	*E. coli*: ampicillin, ceftazidime, cefotaxime, ciprofloxacin, colistin, meropenem, tetracycline และ trimethoprim/sulfamethoxazole *Salmonella* spp.: ampicillin, ceftazidime, cefotaxime, ciprofloxacin, colistin, meropenem, tetracycline และ trimethoprim/sulfamethoxazole *E. faecalis*: ampicillin, erythromycin, linezolid, teicoplanin, tetracycline และ vancomycin *E. faecium*: ampicillin, erythromycin, linezolid, teicoplanin, tetracycline และ vancomycin		
Genetic markers	- ยืนควบคุมการสร้างเอนไซม์ ESBLs กลุ่ม CTX-M - ยืนควบคุมการดื้อ colistin (*mcr*1-*mcr*10)	- ยืนควบคุมการสร้างเอนไซม์ ESBLs กลุ่ม CTX-M - ยืนควบคุมการสร้างเอนไซม์ Carbapenemase (*bla*KPC, *bla*NDM-1, *bla*VIM, *bla*IMP, *bla*OXA-type) - ยืนควบคุมการดื้อ colistin (*mcr*1-*mcr*10) - ยืนควบคุมการดื้อยาของเชื้อ *E. faecalis* และ *E. faecium* (*van*A, *van*B)	
Provinces	77 จังหวัด		
Sampling sites	โรงฆ่า / สถานที่จำหน่าย	ฟาร์ม / โรงฆ่า / สถานที่จำหน่าย	
Number of sampling sites /province	Caecum จากโรงเชือดไก่, โรงเชือดสุกร ประมาณ 700 - 800 ตัวอย่าง/77 จังหวัด เนื้อไก่, เนื้อสุกร จากโรงเชือด ประมาณ 700 - 800 ตัวอย่าง/77 จังหวัด เนื้อไก่, เนื้อสุกร จากสถานที่จำหน่าย ประมาณ 700 - 800 ตัวอย่าง/77 จังหวัด		
Total number of samples/province/year	ประมาณ 4200 – 4800 ตัวอย่าง/77 จังหวัด/ปี		
Frequency of sampling	1 ครั้ง/เดือน		
AST interpretation method	CLSI, EUCAST		
Number of laboratories	ส่วนกลาง 2 แห่ง / ส่วนภูมิภาค 8 แห่ง		
Training requirement	-		
Responsible stakeholder	กรมปศุสัตว์		

http://narst.dmsc.moph.go.th/manuals/Thailand's%20One%20Health%20Guideline.pdf

Overview of DLD AMR surveillance in food-producing animals



- Implement according to the strategic plan for the management of antimicrobial resistance in Thailand from 2017 to 2021 (expanded to 2022)
- Strategic 1; AMR surveillance system using a 'One Health' approach
- DLD AMR surveillance in food-producing animals; Project to control, prevent and resolution address of antimicrobial resistance in animals:
  - Focus on Fattening pig and Broiler
  - Across 77 provinces
  - Pilot program started in 2016
- Development of an information system to collect data related to antimicrobial resistance in animals
  - Implemented of DLDAMR 2018

Overview of DLD AMR surveillance in food-producing animals

Responsible agency	**Division of Animal Feed and Veterinary Products Control, National Institute of Animal Health, Bureau of Quality Control of Livestock Products, Veterinary Research and Development Center, Provincial Livestock Offices and Regional Livestock Offices**	
Target animal species	Broilers and Fattening pigs	
Specimen type	Caecum	Meat
Sampling location	Slaughters	Slaughters and Retail markets
Target bacteria	*Escherichia coli*, *Salmonella* spp., *Enterococcus faecium / faecalis*, *Campylobacter coli / jejuni*	*Escherichia coli, Salmonella* spp.
Antibiotics Susceptibility Testing	MIC determination : Broth microdilution *E. coli* ESBL Detection	
Reference	WHO, WOAH, FAO, CLSI, EUCAST and ISO 20776-1	

Activity plan of DLD AMR surveillance in food-producing animals

Activity	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
AFVC establishes a sample number target and communicate to PLOs and DLD laboratories	←	—	→									
Lab Establish a sample delivery schedule and communicate to PLOs and RLO		←	→									
Collect sample				←	—	—	—	→				
Isolation and Ident., E. coli ESBL testing and AST(MIC)				←	—	—	—	—	—	—	→	
Follow up activity						←	—	—	—	—	→	
Collect data and summarize operational results											←	→

Roles and Responsibilities

Sample collection

- Provincial livestock officer
- Cecum (Slaughterhouse) and Meat (Slaughterhouse and Retail market)

Bacterial isolation ESBL test

- NIAH, BQCLP and VRDCs
- Cecum: *E. coli*, *Salmonella* spp., *Enterococcus* and *Campylobacter*
- Meat: *E. coli* and *Salmonella* spp.

Antimicrobial Susceptibility Test (MIC)

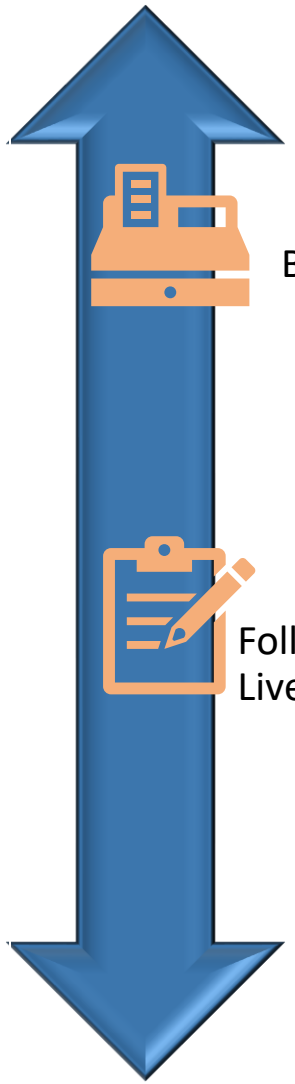
- NIAH: *E. coli*, *Salmonella* spp., *Enterococcus* and *Campylobacter* (cecum)
- BQCLP: *E. coli* and *Salmonella* spp. (meat)
- VRDCs: *Campylobacter*

Data analysis

- AFVC, NIAH and BQCLP (Secretariat DLD AMR)
- Data: Prevalence, Percentage AMR and Trend of AMR

Report and Implementation

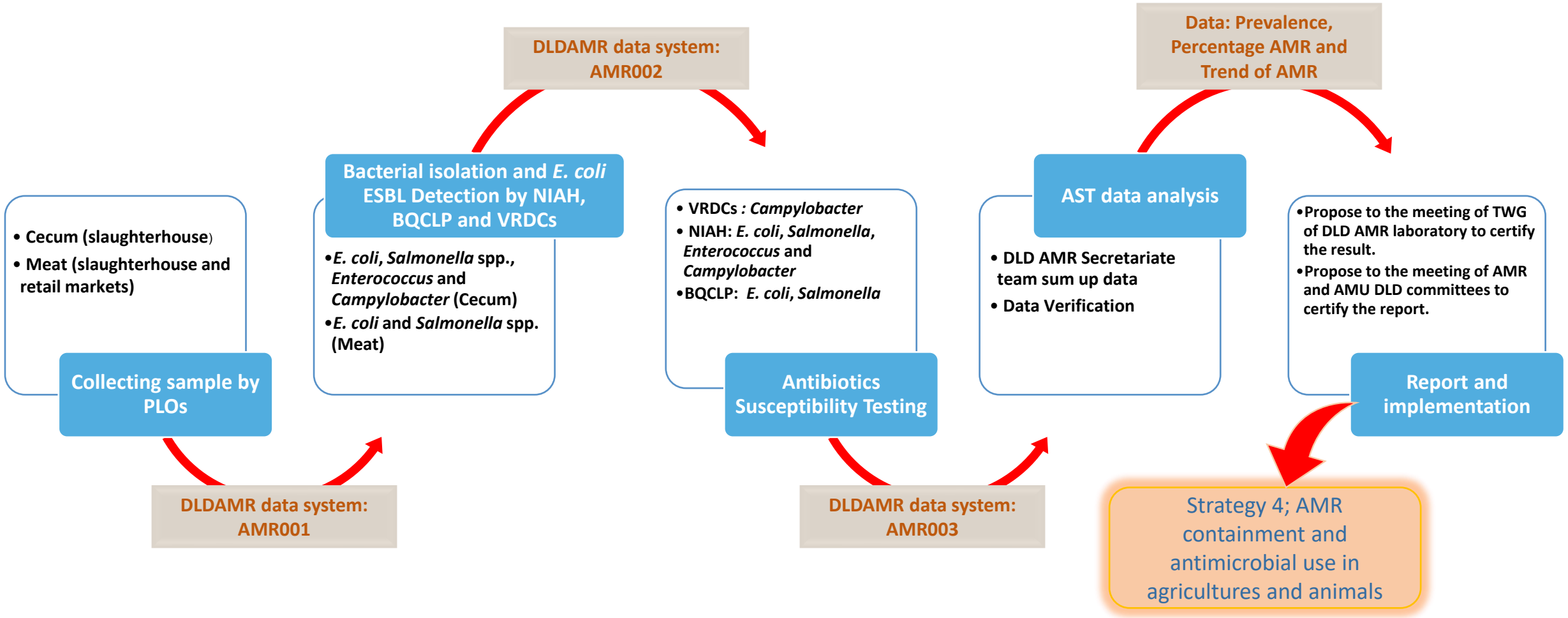
- NIAH (Secretariat of TWG of DLD AMR Laboratory) : Propose to the meeting of TWG of AMR laboratory
- AFVC (Secretariat DLD AMR team) : Propose to the meeting of AMR and AMU DLD committees to certify the report



Budget management by AFVC

Follow up activity by Regional Livestock Office and AFVC

DLD AMR surveillance in food-producing animals Program

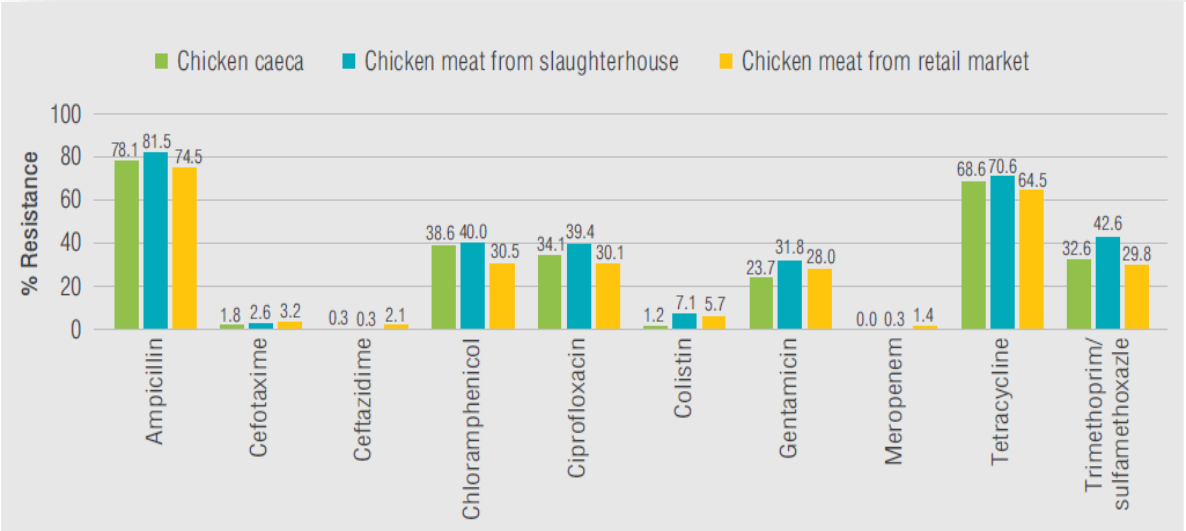


Surveillance information system: DLDAMR

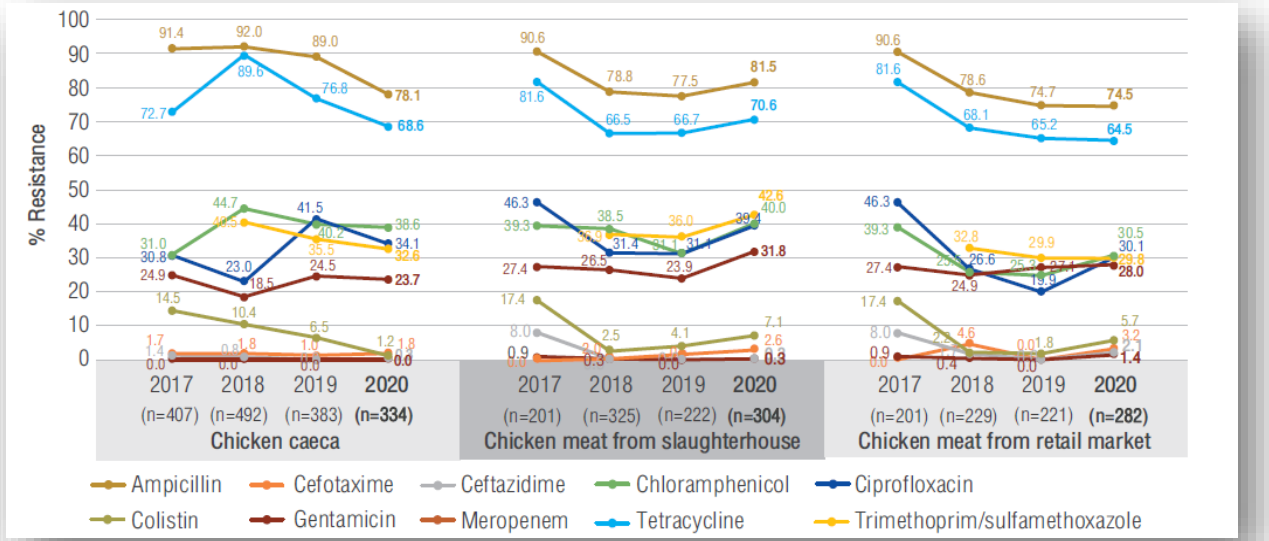
The Animal Antimicrobial Resistance Monitoring Information (AARMIS)

- Provincial Livestock Officer : AMR001
- Laboratory officer : AMR002 and AMR003
- Regional Livestock Officer
- AFVC officer

Operational result in 2017-2020: *Escherichia coli* in Chicken



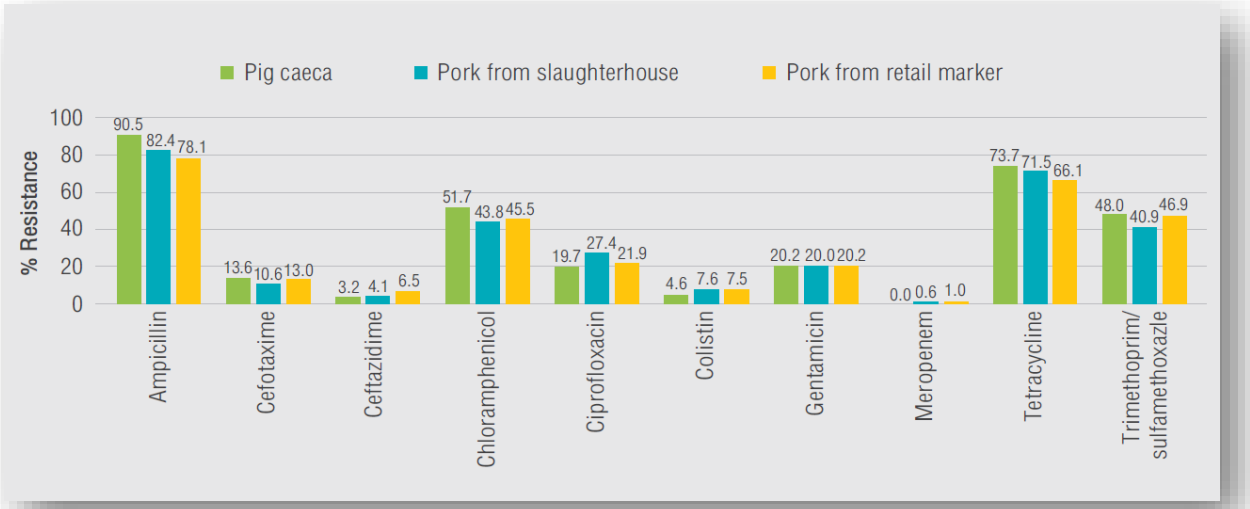
Percent resistance of *E. coli* isolates in chicken caeca, and chicken meat from slaughterhouses and retail markets in 2020



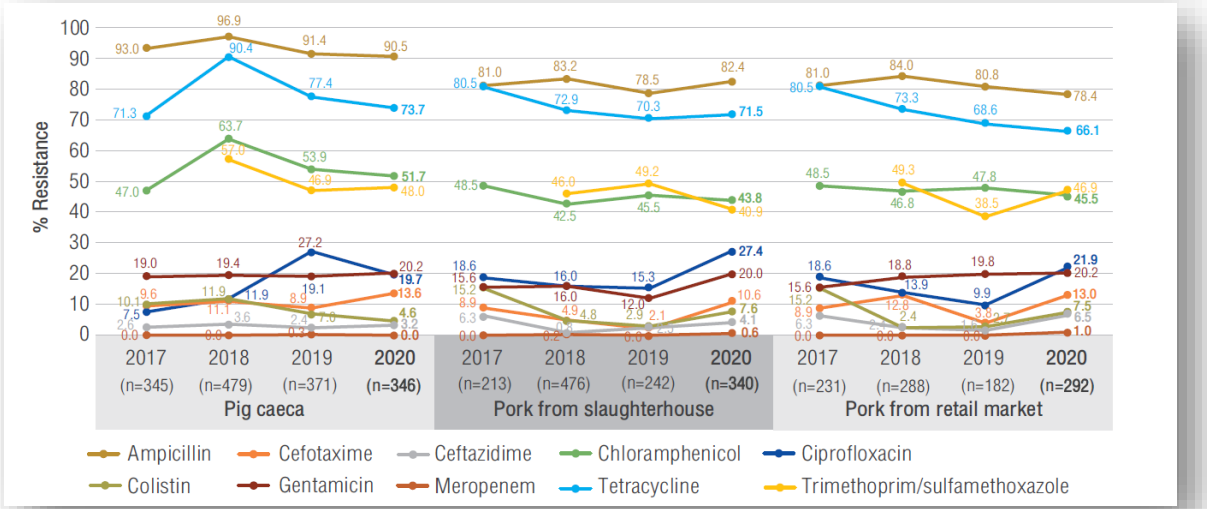
Percent resistance of *E. coli* in chicken caeca, and chicken meat from slaughterhouses and retail markets, Thailand in 2017 to 2020

Citation: Thailand's One Health Report on Antimicrobial Consumption and Antimicrobial Resistance in 2020.

Operational result in 2017-2020: *Escherichia coli* in Pig



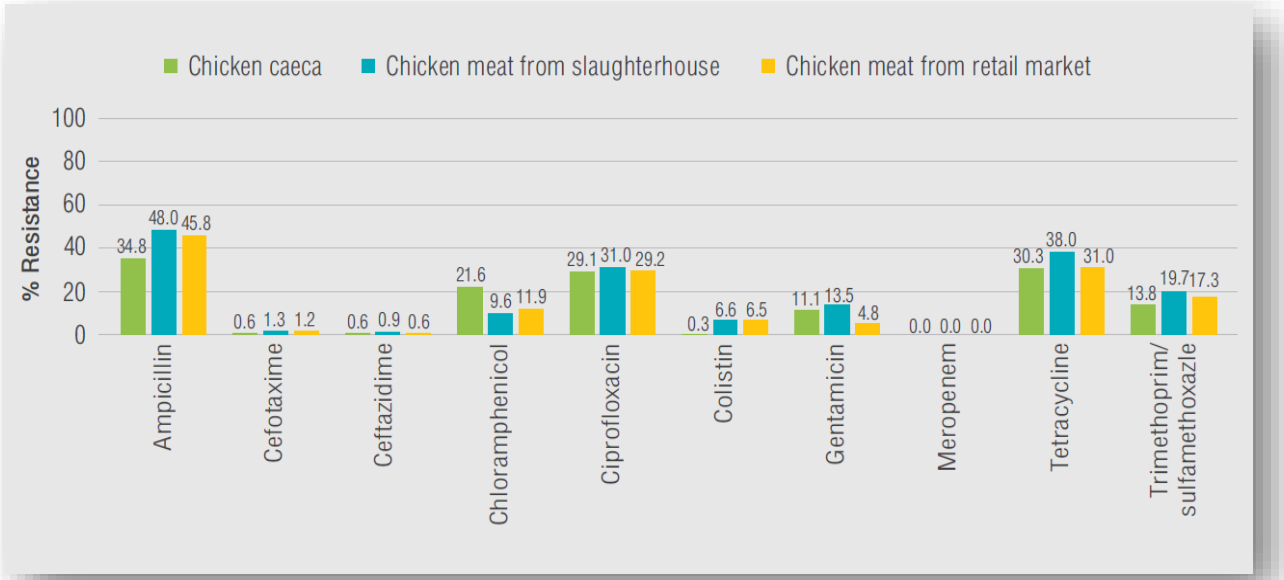
Percent resistance of *E. coli* isolates in pig caeca, and pork from slaughterhouses and retail markets in 2020



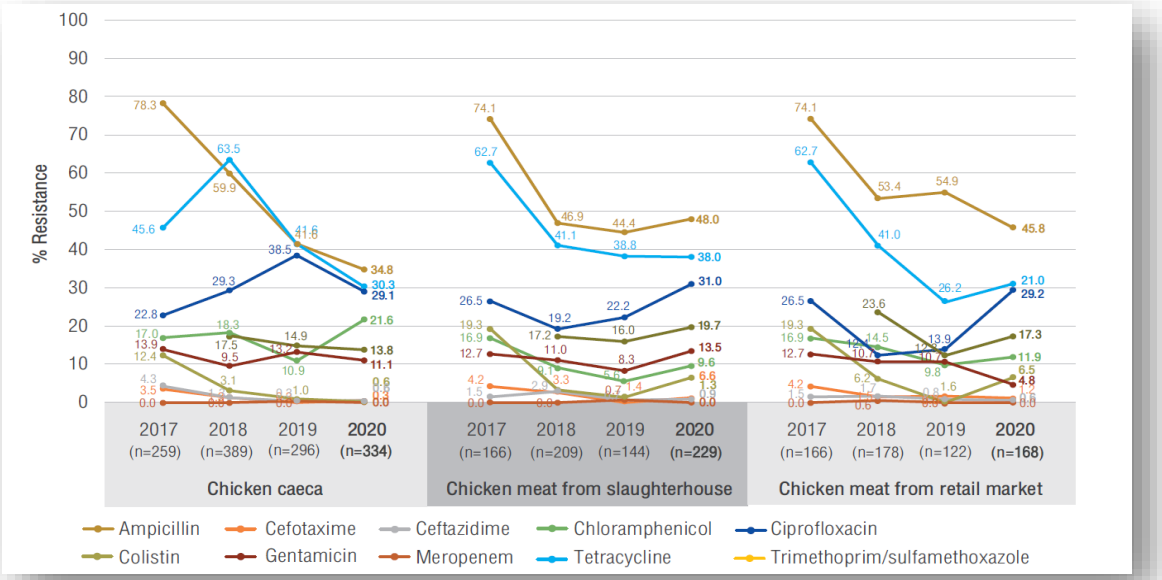
Percent resistance of *E. coli* in pig caeca, and pork from slaughterhouses and retail markets, Thailand in 2017 to 2020

Citation: Thailand's One Health Report on Antimicrobial Consumption and Antimicrobial Resistance in 2020.

Operational result in 2017-2020: *Salmonella* spp. in Chicken



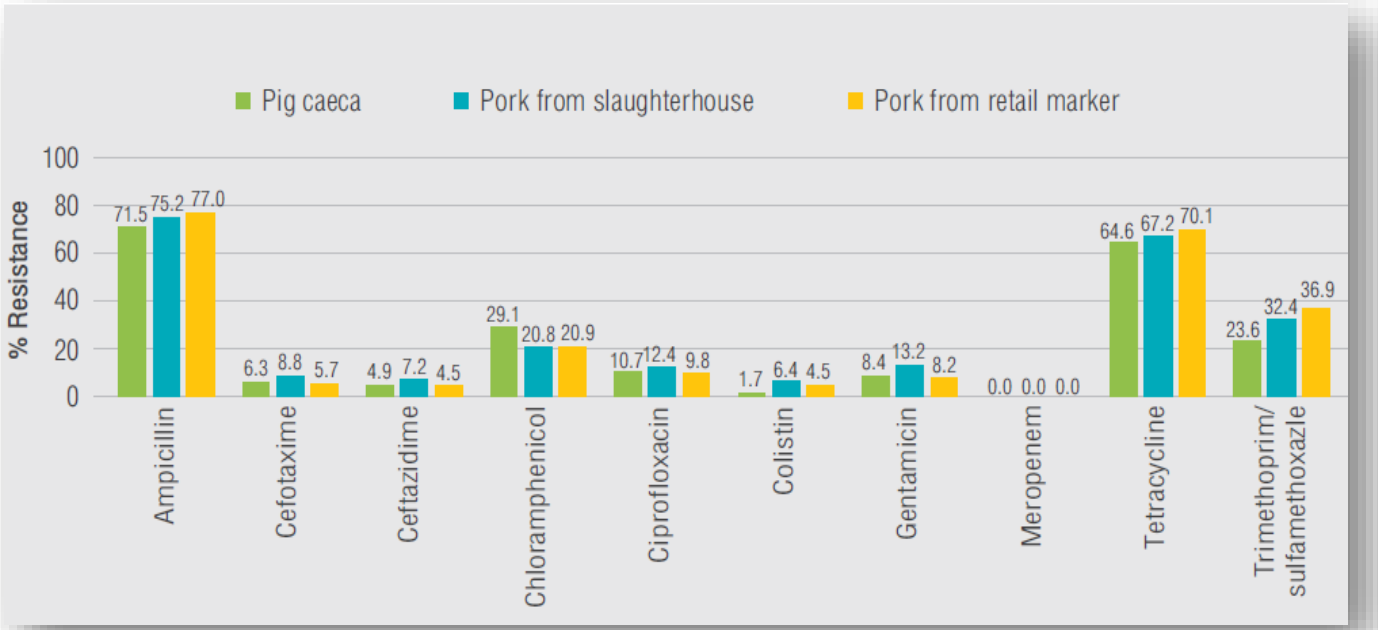
Percent resistance of *Salmonella* isolates in chicken caeca, and chicken meat from slaughterhouses and retail markets in 2020



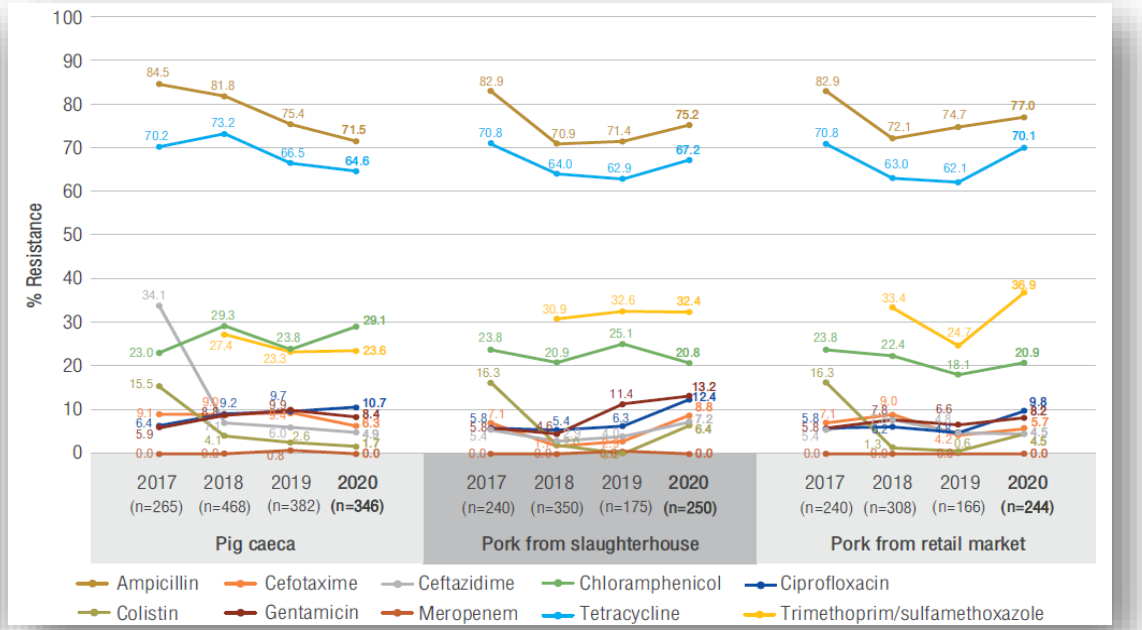
Percent resistance of *Salmonella* spp. in chicken caeca, and chicken meat from slaughterhouses and retail markets, Thailand in 2017 to 2020

Citation: Thailand's One Health Report on Antimicrobial Consumption and Antimicrobial Resistance in 2020.

Operational result in 2017-2020: *Salmonella* spp. in Pig



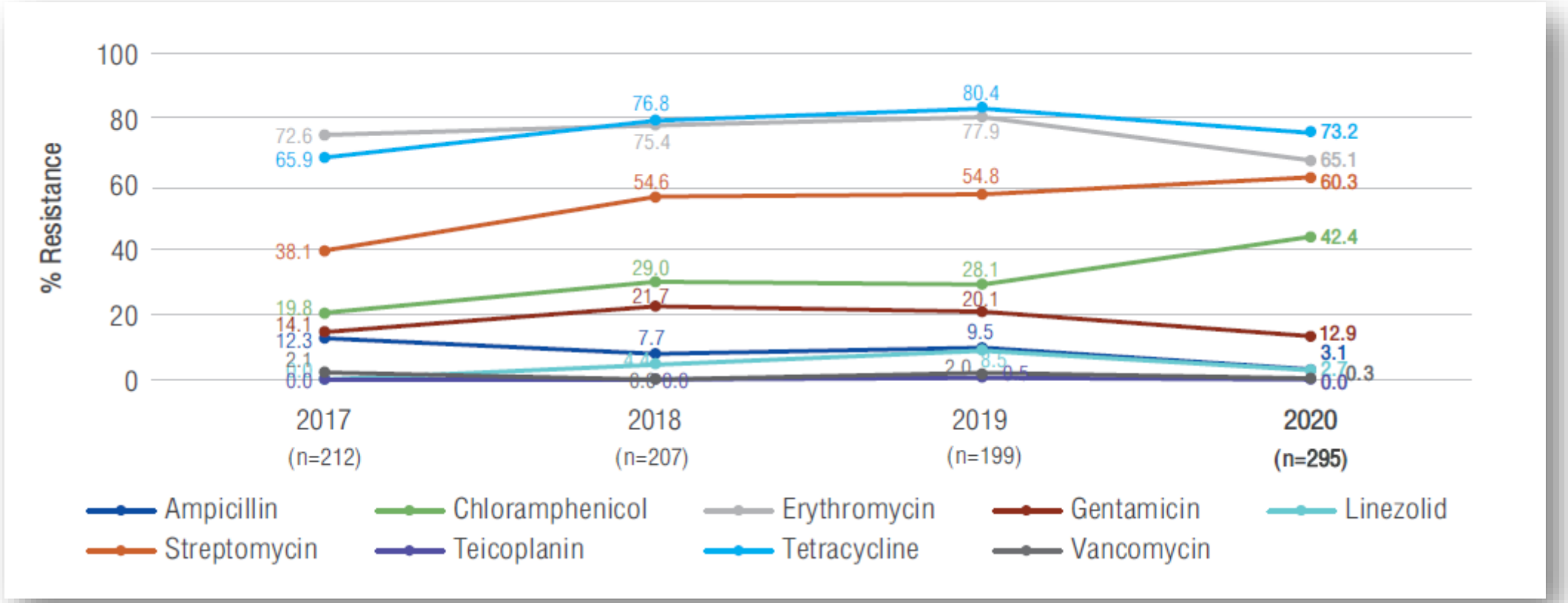
Percent resistance of *Salmonella* isolates in pig caeca, and pork from slaughterhouses and retail markets in 2020



Percent resistance of *Salmonella* spp. in pig caeca, and pork from slaughterhouses and retail markets, Thailand in 2017 to 2020

Citation: Thailand's One Health Report on Antimicrobial Consumption and Antimicrobial Resistance in 2020.

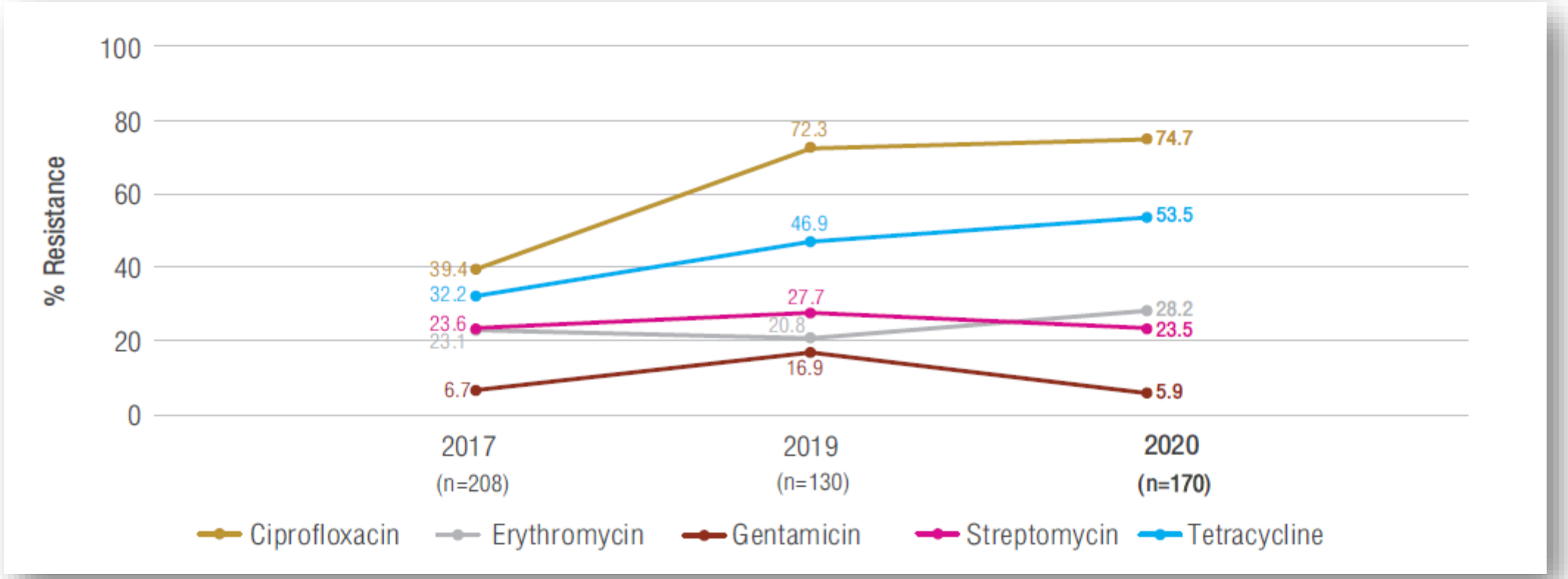
Operational result in 2017-2020: *Enterococcus* spp. in Pig



Percent resistance of *Enterococcus* spp. in pig caeca, Thailand in 2017 to 2020

Citation: Thailand's One Health Report on Antimicrobial Consumption and Antimicrobial Resistance in 2020.

Operational result in 2017-2020: *Campylobacter* spp. in Chicken



Percent resistance of *Campylobacter* spp. in chicken, Thailand in 2017, 2019 and 2020

Note: Data 2018 was not available.

Citation: Thailand's One Health Report on Antimicrobial Consumption and Antimicrobial Resistance in 2020.

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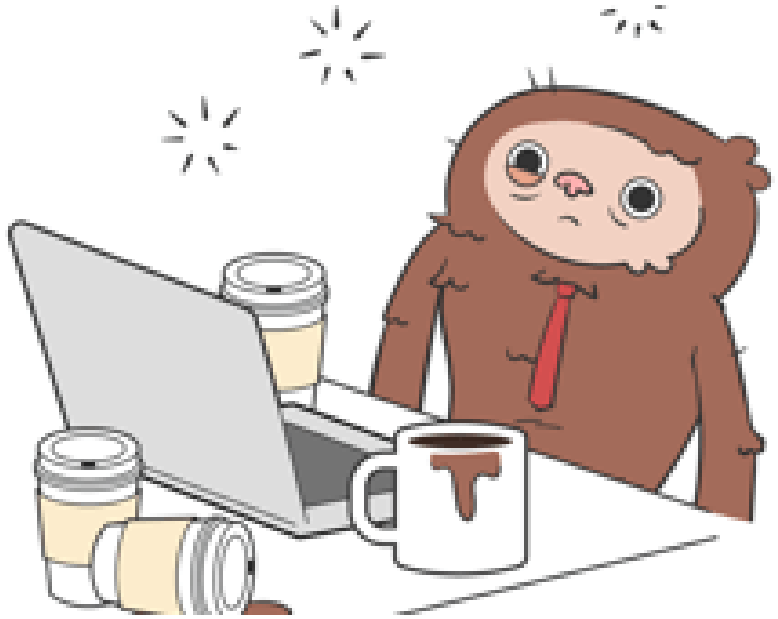
Problems and obstacles

- ❑ Surveillance information system: DLDAMR
- ❑ Data transfer
- ❑ Bacterial delivery
- ❑ Laboratory technique
    - Isolation
    - Preservation
    - AST



Drawings: FAO/Khin Nyein Chan Oo

Working together to fight antimicrobial resistance