Policy of Antimicrobial use (AMU) in Livestock in Thailand

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Department of Livestock Development (DLD)
Ministry of Agriculture and Cooperatives (MOAC)
Outline

• DLD Organization Chart on AMR/AMU
• Legislation on Drugs
• Antimicrobial Drugs
• Antimicrobial Use (AMU)
• National Strategic Plan on Antimicrobial Resistance 2017-2021 (NSP on AMR 2017-2021 Thailand)
• Control the use of Antimicrobial Drugs
• Multi - stakeholders on AMR/AMU
• Alternative way to reduce AMU
DLD Organization Chart on AMR/AMU

**Local**
- 9 Regions
- 77 Provinces
- 888 District Livestock Offices

**Lab**
- National Institute of Animal Health (NIAH)
- Bureau of Quality Control of Livestock Products (BQCLP)
- Veterinary Research and Development center

**Bureau of Disease Control and Veterinary Services (BDCVS)**

**Bureau of Livestock Standards and Certification (BLSC)**

**Division Animal Feed and Veterinary Products Control (AFVC)**
Legislation on Drugs

Food and Drug Administration (FDA)
Ministry of Public Health (MOPH)

Department of Livestock Development (DLD)
Ministry of Agriculture and Cooperatives (MOAC)
Antimicrobial Drugs

GR1: Tetracyclines
- Chlortetracycline
- Doxycycline
- Oxytetracycline

GR2: Penicillins
- Amoxycillin
- Penicillin

GR3: Cephalosporins
- Ceftiofur

GR4: Sulfonamides, Dihydrofolate reductase inhibitors
- Sulfadiazine
- Sulfadimidine
- Trimethoprim

GR5: Macrolides and ketolides
- Kitasamycin
- Lincomycin
- Tilmicosin
- Tylosin
- Tylvaosin (Avilosin)
Antimicrobial Drugs

**GR6:** Aminoglycosides
- Gentamycin
- Kanamycin
- Neomycin
- Spectinomycin
- Streptomycin

**GR7:** Fluoroquinolones, Quinolones, Quinolone derivatives
- Chlorhydroxyquinoline (halquinol)
- Danofloxacin
- Enrofloxacin
- Marbofloxacin

**GR 8 others**
- Colistin (polymyxins)
- Tiamulin (pleuromutilin)

Thai FDA ; 2013
## Antibiotic Drugs = 2,500 products

<table>
<thead>
<tr>
<th>Import</th>
<th>700 products (30%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Producing in Thailand</td>
<td>1,800 products (70%)</td>
</tr>
</tbody>
</table>

## Top 5 Products of Antibiotic Drug (Value; Million)

<table>
<thead>
<tr>
<th>Product</th>
<th>Value (Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Amoxycillin Oral Powder</td>
<td>500</td>
</tr>
<tr>
<td>2. Tiamulin Oral Powder</td>
<td>400</td>
</tr>
<tr>
<td>3. Tylosin Oral Powder</td>
<td>319</td>
</tr>
<tr>
<td>4. Chlortetracycline (CTC) Oral Powder</td>
<td>294</td>
</tr>
<tr>
<td>5. Doxycycline Oral Powder</td>
<td>177</td>
</tr>
</tbody>
</table>

Thai FDA ; 2013
### Antimicrobial Drugs

#### Market Share in 2016: Broiler

<table>
<thead>
<tr>
<th>Products</th>
<th>Market Share</th>
<th>Market Size (Baht)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxycillin</td>
<td>40%</td>
<td>247,520,000</td>
</tr>
<tr>
<td>Tylosin</td>
<td>20%</td>
<td>123,760,000</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>15%</td>
<td>92,820,000</td>
</tr>
<tr>
<td>Tilmicosin</td>
<td>15%</td>
<td>92,820,000</td>
</tr>
<tr>
<td>Colistin</td>
<td>5%</td>
<td>30,940,000</td>
</tr>
<tr>
<td>Lincomycin+spectinomycin</td>
<td>2%</td>
<td>12,376,000</td>
</tr>
<tr>
<td>Others</td>
<td>3%</td>
<td>18,564,000</td>
</tr>
<tr>
<td><strong>TOTAL MARKET</strong></td>
<td><strong>100%</strong></td>
<td><strong>618,800,000</strong></td>
</tr>
</tbody>
</table>
## Antimicrobial Drugs

### Market Share in 2016: Layer

<table>
<thead>
<tr>
<th>Products</th>
<th>Market Share</th>
<th>Market Size (Baht)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>40%</td>
<td>81,384,349</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>15%</td>
<td>30,519,131</td>
</tr>
<tr>
<td>Tylosin</td>
<td>25%</td>
<td>50,865,218</td>
</tr>
<tr>
<td>Colistin</td>
<td>5%</td>
<td>10,173,044</td>
</tr>
<tr>
<td>Fluoroquinolone</td>
<td>5%</td>
<td>10,173,044</td>
</tr>
<tr>
<td>Linco+Spectin</td>
<td>5%</td>
<td>10,173,044</td>
</tr>
<tr>
<td>Others</td>
<td>5%</td>
<td>10,173,044</td>
</tr>
<tr>
<td><strong>TOTAL MARKET</strong></td>
<td><strong>100%</strong></td>
<td><strong>203,460,871</strong></td>
</tr>
</tbody>
</table>

*Animal Health Products Association-AHPA; 2016*
## Market Share in 2016: Breeder

<table>
<thead>
<tr>
<th>Products</th>
<th>Mkt. Share %</th>
<th>Market Size (Baht)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxycillin</td>
<td>40%</td>
<td>30,917,018</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>20%</td>
<td>15,458,509</td>
</tr>
<tr>
<td>Tylosin</td>
<td>15%</td>
<td>11,593,882</td>
</tr>
<tr>
<td>Colistin</td>
<td>10%</td>
<td>7,729,255</td>
</tr>
<tr>
<td>Linco+Spectinomycin</td>
<td>10%</td>
<td>7,729,255</td>
</tr>
<tr>
<td>Others</td>
<td>5%</td>
<td>3,864,627</td>
</tr>
<tr>
<td><strong>TOTAL MARKET</strong></td>
<td><strong>100%</strong></td>
<td><strong>77,292,545</strong></td>
</tr>
</tbody>
</table>

Animal Health Products Association-AHPA; 2016
## Antimicrobial Drugs

### Market Share in 2016: Fattening Pig

<table>
<thead>
<tr>
<th>Products (Feed additive antimicrobial)</th>
<th>Market Share (%)</th>
<th>Total Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiamulin</td>
<td>35%</td>
<td>778,331,531</td>
</tr>
<tr>
<td>Amoxycillin</td>
<td>20%</td>
<td>444,760,875</td>
</tr>
<tr>
<td>CTC</td>
<td>15%</td>
<td>333,570,656</td>
</tr>
<tr>
<td>Tilmicosin</td>
<td>10%</td>
<td>222,380,438</td>
</tr>
<tr>
<td>Colistin</td>
<td>6%</td>
<td>133,428,263</td>
</tr>
<tr>
<td>Tylosin</td>
<td>6%</td>
<td>133,428,263</td>
</tr>
<tr>
<td>Halquinol</td>
<td>4%</td>
<td>88,952,175</td>
</tr>
<tr>
<td>Lincomycin</td>
<td>2%</td>
<td>44,476,088</td>
</tr>
<tr>
<td>Others</td>
<td>2%</td>
<td>44,476,088</td>
</tr>
<tr>
<td><strong>TOTAL MARKET</strong></td>
<td><strong>100%</strong></td>
<td><strong>2,223,804,375</strong></td>
</tr>
</tbody>
</table>
## Antimicrobial Drugs

### Market Share in 2016: Fattening Pig

<table>
<thead>
<tr>
<th>Products (injections)</th>
<th>Market Share (%)</th>
<th>Market Size (Baht)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxycillin</td>
<td>30%</td>
<td>167,400,000</td>
</tr>
<tr>
<td>Cephalosporin</td>
<td>17%</td>
<td>94,860,000</td>
</tr>
<tr>
<td>Aminoglycosides</td>
<td>10%</td>
<td>55,800,000</td>
</tr>
<tr>
<td>Tiamulin</td>
<td>15%</td>
<td>83,700,000</td>
</tr>
<tr>
<td>Pen-Strep</td>
<td>20%</td>
<td>111,600,000</td>
</tr>
<tr>
<td>Tylosin</td>
<td>3%</td>
<td>16,740,000</td>
</tr>
<tr>
<td>Oxytetracycline</td>
<td>2%</td>
<td>11,160,000</td>
</tr>
<tr>
<td>Others</td>
<td>3%</td>
<td>16,740,000</td>
</tr>
<tr>
<td><strong>TOTAL MARKET</strong></td>
<td><strong>100%</strong></td>
<td><strong>558,000,000</strong></td>
</tr>
</tbody>
</table>
Antimicrobial Use (AMU)

Calculation on AMU (mg/PCU)

DLD & Animal Health Products Association (AHPA)
The consumption of veterinary antimicrobials = Active Ingredient (AI) ; (mg, kg of active ingredient) 

\[
\text{Population correction unit (PCU) ; ( kg of animal weight)}
\]

AI = Active ingredient

PCU = Population Correction Unit

1 PCU = 1 kg

PCU = Numbers of livestock animals  X  Estimated (Average) weights at treatment
Antimicrobial Use (AMU)

Average weights and carcass-to-live-weight conversion factors

Table 3. Average weight (AW), in kilos, used in calculating the population correction unit (PCU)

<table>
<thead>
<tr>
<th>Animal category</th>
<th>AW at treatment (kilos)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cattle</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slaughter cows</td>
<td>425</td>
<td>Montforts (1999)¹</td>
</tr>
<tr>
<td>Slaughter heifers</td>
<td>200</td>
<td>EMA²</td>
</tr>
<tr>
<td>Slaughter bullocks and bulls</td>
<td>425</td>
<td>Montforts (1999)¹</td>
</tr>
<tr>
<td>Slaughter calves and young cattle</td>
<td>140</td>
<td>Montforts (1999)¹ ; EMA²</td>
</tr>
<tr>
<td>Imported/exported cattle for slaughter</td>
<td>425</td>
<td>Montforts (1999)¹</td>
</tr>
<tr>
<td>Imported/exported cattle for fattening</td>
<td>140</td>
<td>Montforts (1999)¹</td>
</tr>
<tr>
<td>Livestock dairy cows</td>
<td>425</td>
<td>Montforts (1999)¹ ; EMA²</td>
</tr>
<tr>
<td><strong>Pigs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slaughter pigs</td>
<td>65</td>
<td>Montforts (1999)¹ ; EMA²</td>
</tr>
<tr>
<td>Imported/exported pigs for slaughter</td>
<td>65</td>
<td>Montforts (1999)¹ ; EMA²</td>
</tr>
<tr>
<td>Imported/exported pigs for fattening</td>
<td>25</td>
<td>M. Goll (Eurostat, personal comm.)</td>
</tr>
<tr>
<td>Livestock sows</td>
<td>240</td>
<td>Montforts (1999)¹ ; EMA²</td>
</tr>
<tr>
<td><strong>Poultry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slaughter broilers</td>
<td>1</td>
<td>Montforts (1999)¹ ; EMA²</td>
</tr>
<tr>
<td>Slaughter turkeys</td>
<td>6.5</td>
<td>Montforts (1999)¹ ; EMA²</td>
</tr>
<tr>
<td>Imported/exported poultry for slaughter³</td>
<td>1</td>
<td>Montforts (1999)¹ ; EMA²</td>
</tr>
</tbody>
</table>
National Strategic Plan (NSP) on Antimicrobial Resistance (AMR) 2017-2021 Thailand

Brain Storm to develop NSP on AMR 18-19 Aug 2015
National Strategic Plan (NSP) on Antimicrobial Resistance (AMR) 2017-2021 Thailand

**Vision**
Reduction of mortality, morbidity and economic impacts from AMR

**Mission**
Establish policies and national multi-sectoral mechanisms which support effective and sustained AMR management system

**Endorsement**
Have been endorsed by the cabinet on 17 Aug 2016
Goals

• 50% reduction in AMR morbidity

• 20% reduction in antimicrobial use in human

• 30% reduction in antimicrobial use in animal

• 20% increase of public knowledge on AMR and awareness of appropriate use of antimicrobials

• Capacity of the national AMR management system is improved to level 4*

(* This is measured by the WHO’s Joint External Evaluation Tool (JEE) for International Health Regulations (2005))
6 Strategies

• AMR surveillance system using One Health approach

• Regulation of antimicrobial distribution

• Infection prevention and control and antimicrobial stewardship in humans

• AMR prevention and control and antimicrobial stewardship in agriculture and companion animals

• Public knowledge on AMR and awareness of appropriate use of antimicrobials

• Governance mechanisms to develop and sustain AMR-related actions
National Strategic Plan (NSP) on Antimicrobial Resistance (AMR) 2017-2021 Thailand

Livestock sector on NAP on AMR 26-27 Sep 2016
National Strategic Plan (NSP) on Antimicrobial Resistance (AMR) 2017-2021 Thailand

Workshop for NAP on AMR on 9-11 Nov 2016
Control the use of Antimicrobial Drugs

• Improve the regulations to control the use of antimicrobial drugs

• Control distribution channels of active pharmaceutical ingredients (API) by drug Law

• **Restriction on CIA** (Treatment: Colistin, Cephalosporins & Fluoroquinolones)

• Monitor antimicrobial drugs in feed at feed mill and farm mixer

• **Law enforcement of illegal drugs and substances**
Drug Act 1967 : Thai FDA : MOPH

- Thai FDA disallows antimicrobials to be registered under the growth promoter
- Reclassification and control distribution channel of antimicrobials
- Thai FDA will reject any application of new antibimicrobials that are used in humans (e.g. carbapenems) to be used in animals

Feed Quality Control Act 2015 : (DLD : MOAC)

- In 2006 : The use of antimicrobials as growth promoter was banned in poultry/Partial banned since 2000
- In 2015 : all antimicrobials are prohibited to be used as growth promoters
- Regulation on Medicated Feed
Control the use of Antimicrobial Drugs

Training of Veterinarians who responsible for a mixing of antimicrobial drugs at feed mills.
15-17 Feb 2017
Control the use of Antimicrobial Drugs

The right drug/ The right dose and period/ The right withdrawal time

Vet Prescription
Multi - stakeholders on AMR/AMU

- The Thai Veterinary Medical Association Under Royal Patronage
- The Veterinary Practitioner Association of Thailand
- Thai Swine Veterinary Society
- Thai Poultry Veterinary Association
- The Animal Husbandry Association of Thailand
- Animal Health Products Association
- Thai Feed Mill Association, etc.

Government  
(ACFS, DOF & DOA)

Vet School (University)

Private Sectors  
(Companies/Producers)

DLD

Vet Council

Non Governmental Organizations

ASEAN  
OIE  
FAO  
WHO  
USAID

MOPH
Multi - stakeholders on AMR/AMU

Code of practice for control of the use of vet drugs
National Bureau of Agricultural Commodity and Food Standards (ACFS)

AMU guideline:
Swine
Pet (Dog & Cat)
Farm mixer certification
Multi - stakeholders on AMR/AMU

Technical cooperation with Food and Agriculture Organization (FAO) of the United Nations

TECHNICAL COOPERATION PROGRAMME (TCP)

Enhancing National Capacities for Antimicrobial Resistance Risk Management in Animal Food Production in Thailand

Pilot project on AMU in swine
Collaborate in veterinary medicinal products, medicated feed control system and related issues such as AMR for both regulation and laboratory
Multi - stakeholders on AMR/AMU

World Bank and OIE
“The Economic Cost of Antimicrobial Resistance”
23 – 31 May 2016
Better Training for Safer Food Initiative

Responding to the global challenge of AMR threats: toward a one health approach
Bangkok, 15-18 November 2016

Panel 2: Surveillance of AMR and use of antimicrobials

Responding to the global challenge of AMR threats: toward a one health approach
15-18 Nov 2016
Harmonize and implement standard method for AMR testing
Surveillance Resistance bacteria and resistance genes in food chain
Develop National Vet AMR Surveillance System
Residue Monitoring Plan
Alternative ways to reduce AMU

- Biosecurity
- Good nutrition
- Vaccination
- Autogenous Vaccine
- Prebiotic / Probiotic
- Herb
- Enzyme
Thank you