

Pilot Implementation of the National Antimicrobial Resistance Surveillance Plan of the Animal Health Sector of Indonesia



Directorate General of Livestock and Animal Health Services
Ministry of Agriculture



Food and Agriculture
Organization of the
United Nations



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INTRODUCTION

The Directorate General of Livestock and Animal Health Services (DGLAHS), Ministry of Agriculture (MoA), assisted by the Food and Agriculture Organization (FAO) Indonesia, developed draft National Guidelines for antimicrobial resistance (AMR) surveillance in poultry in 2017. To test the details outlined in the guidelines, DGLAHS and FAO conducted pilot AMR surveillance in August 2017. It was carried out in Subang, under one of the eight Indonesia regional Disease Investigation Centers (DIC) – and targeted *Salmonella* spp. (zoonotic) and *Escherichia coli* (commensal) bacteria in healthy broiler poultry.

MATERIALS AND METHODS

- The pilot AMR surveillance focused on broiler poultry.
- Subang DIC region holds approximately 45% of the national broiler population and supplies around 60 - 80% of broiler chicken demand in the large urban areas of the western part of Java island.
- Caecal samples were collected at random from slaughtering points along the value chain to reflect bacteria present in the catchment area, in addition to aiming to increase the Recovery Rate (RR) of *Salmonella* spp (Desmidt et. Al. 1997).
- The surveillance targeted recovery of 122 isolates (95% CI, 5% Error and 50% Design Prevalence). With an estimated recovery rate of 90% for *E. coli* and 10% for *Salmonella* spp (10%), this required collection of 1224 samples.
- These 1224 cecum samples were collected at 209 randomly selected abattoirs along the value chain in two phases
- The flow of sampling and testing of the broiler surveillance is shown in the SOP

RESULTS

Figure 1. Recovery Rate of *Salmonella* and *E. coli* Compared with Target (%)

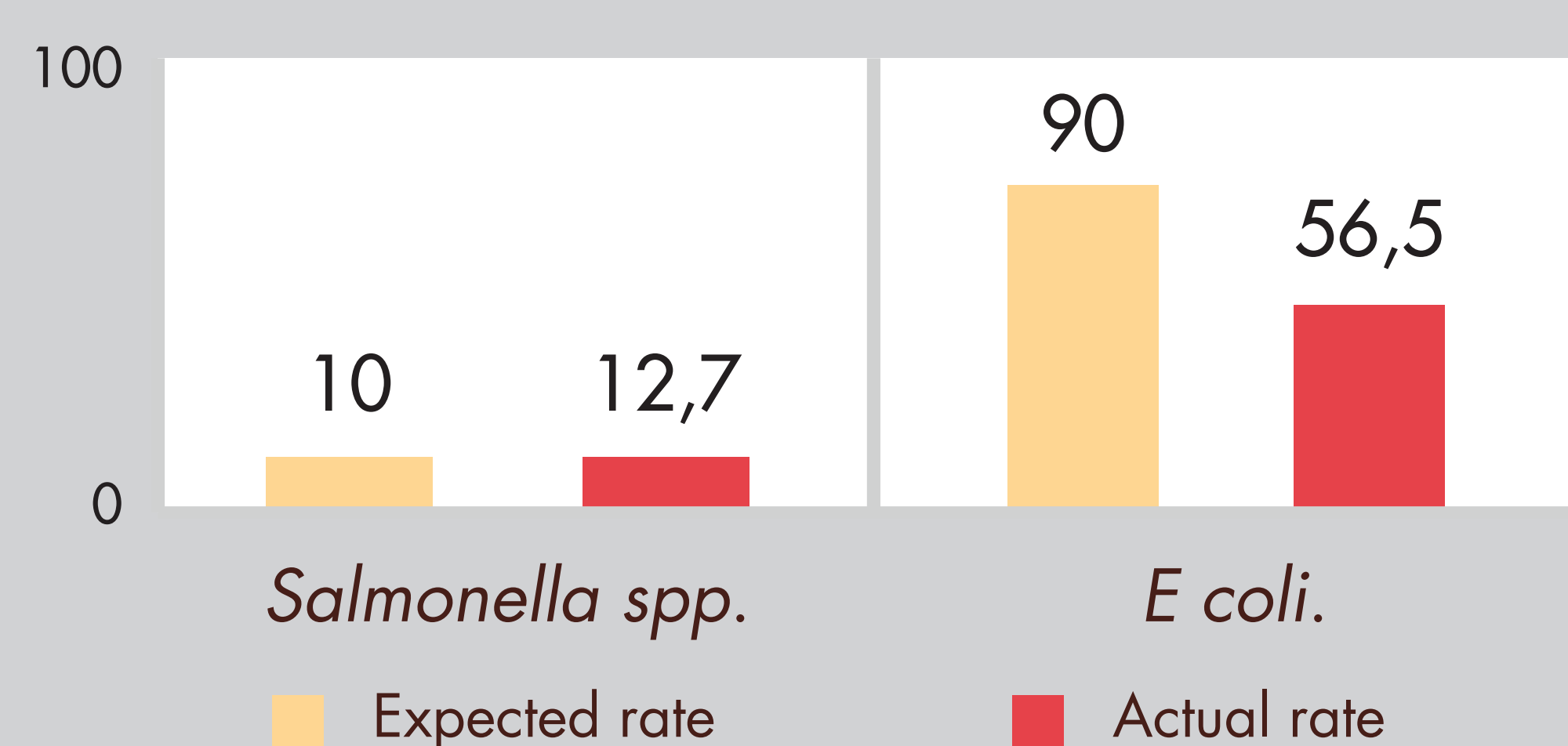


Figure 2. Recovery Rate of *Salmonella* and *E. coli* in Quartiles' Duration of Sample Storage

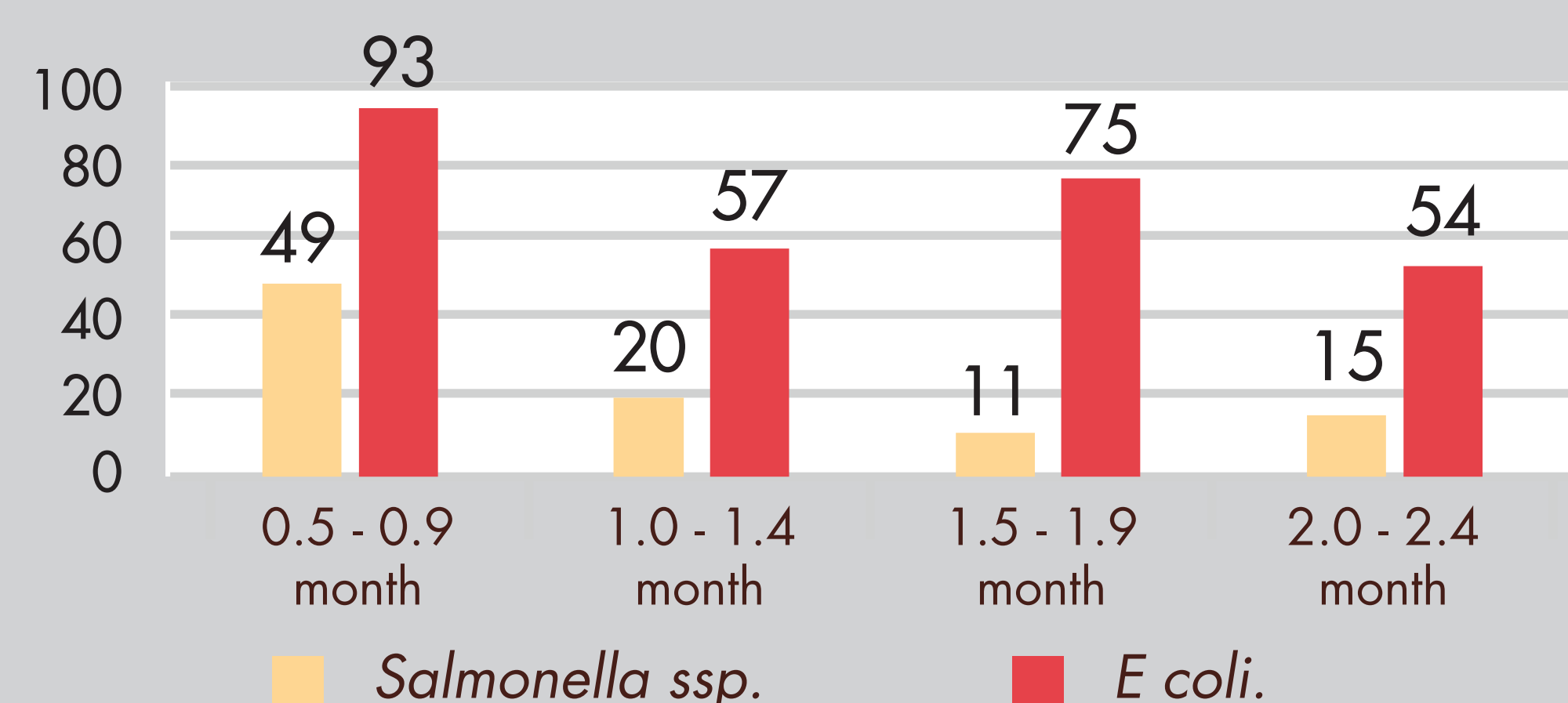


Figure 3. AST of *Salmonella* Isolates

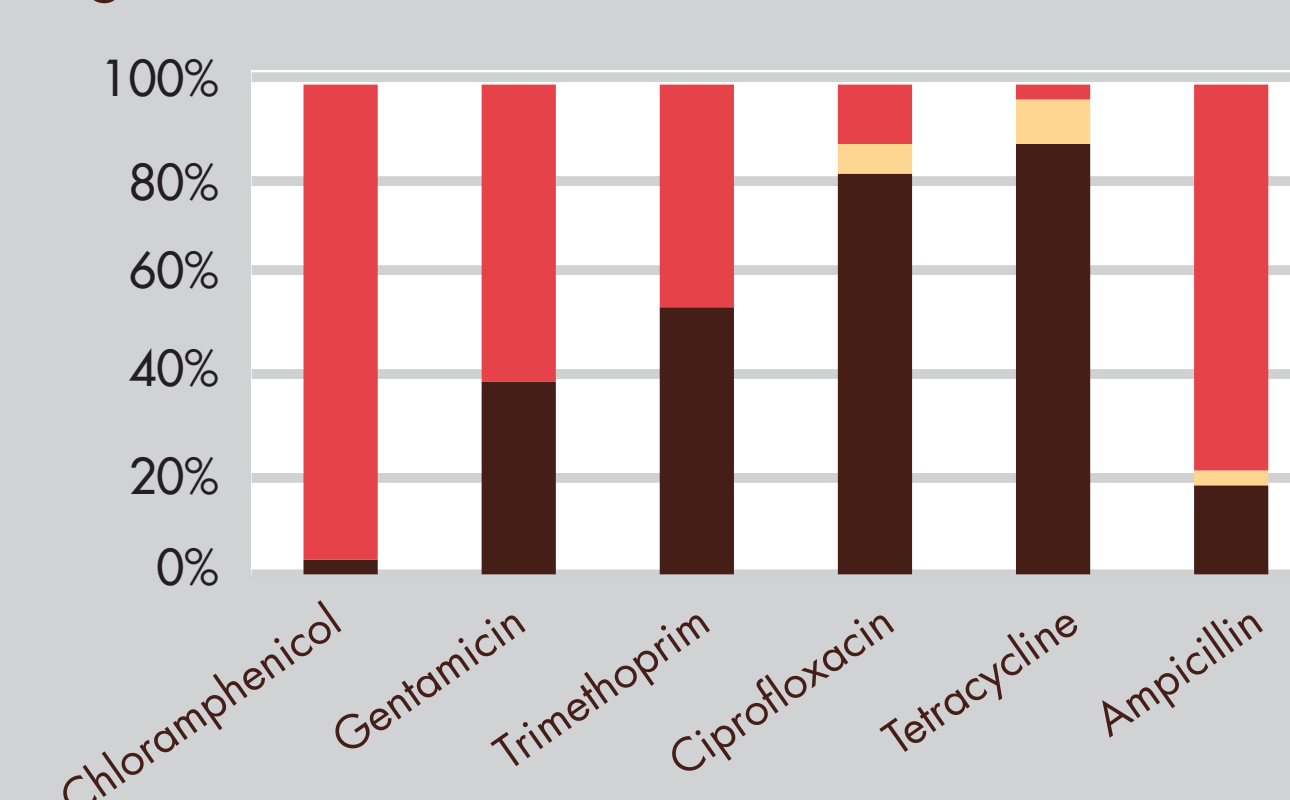
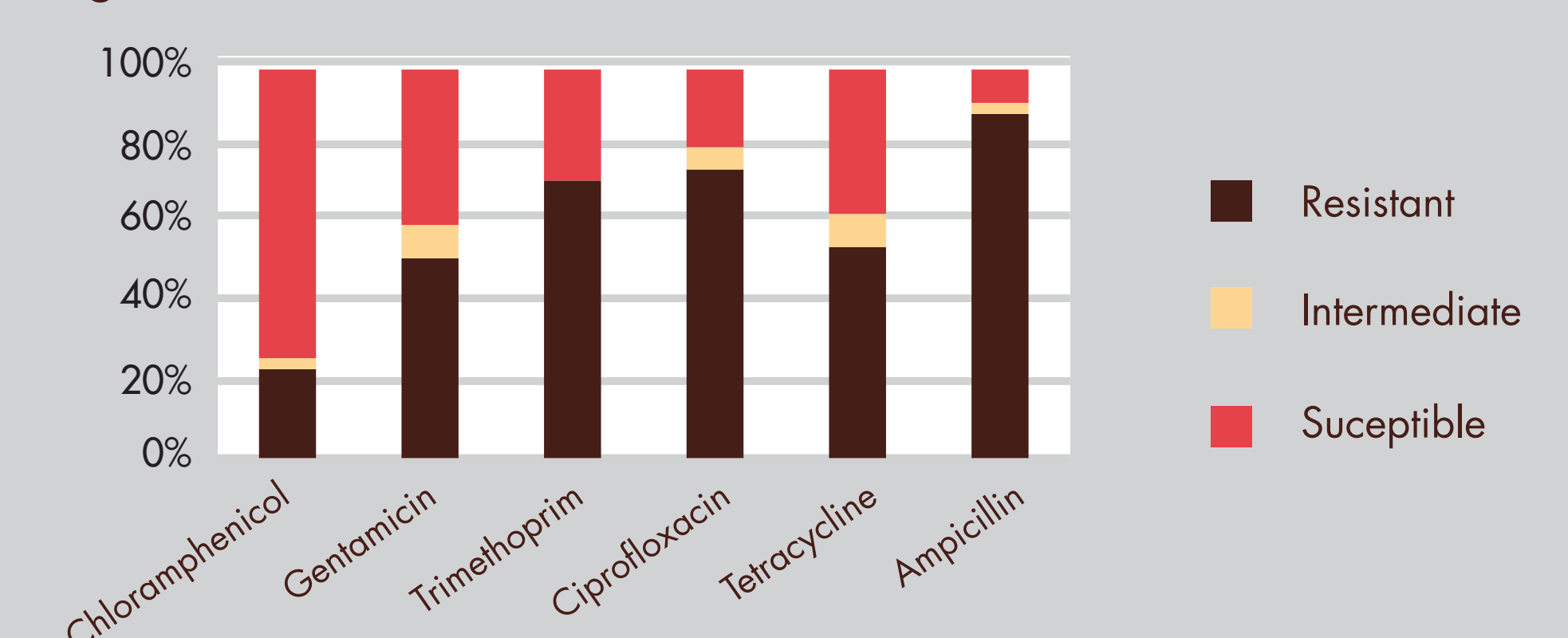
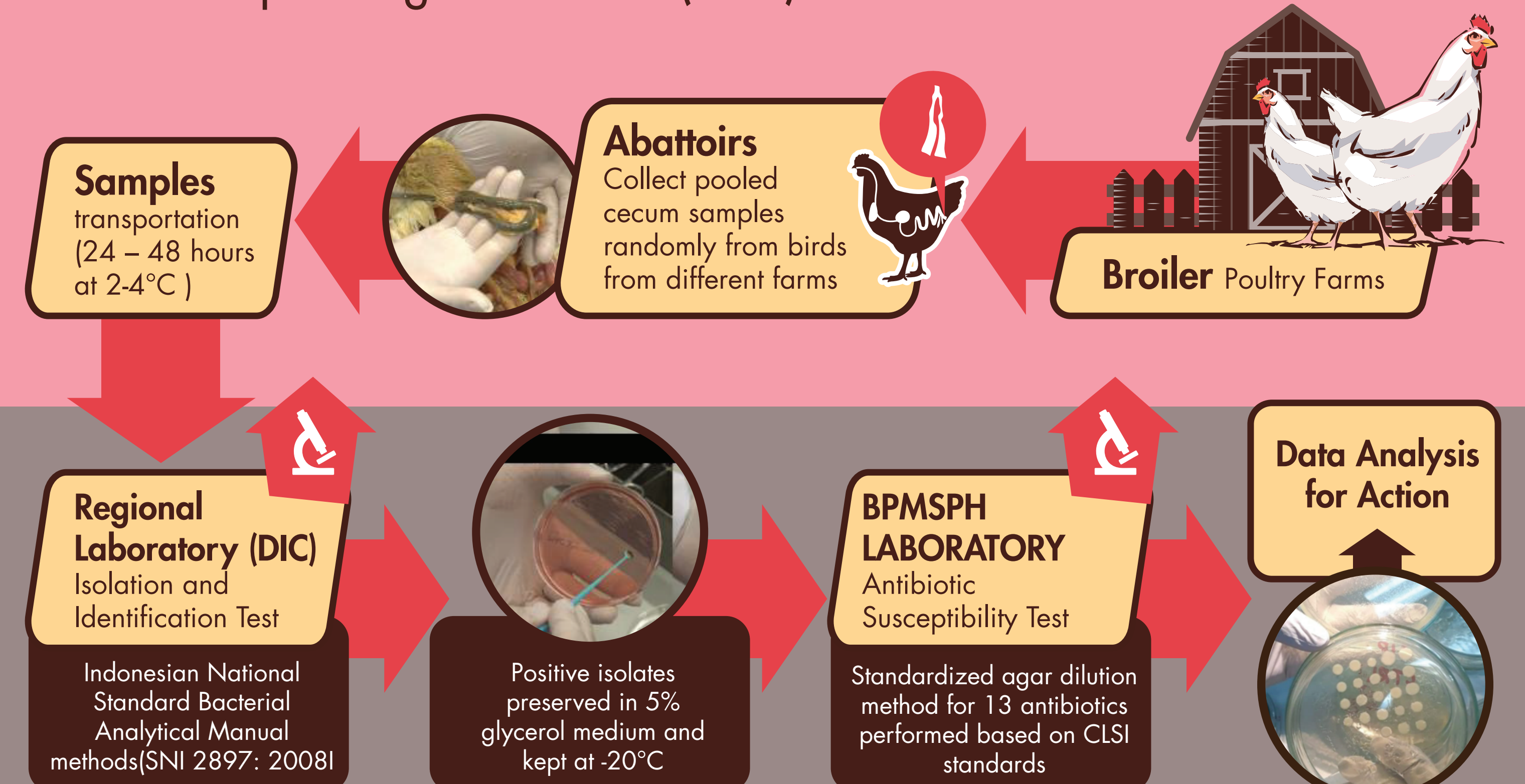


Figure 4. AST of *E. coli* Isolates



Standard Operating Procedures (SOP)



DISCUSSION

- The results of sample testing showed that the cecum samples gave a higher than expected recovery rate for *Salmonella* spp (12.7%), but a lower than expected rate for *E. coli* (56.5%) (Figure 1). This could have been caused by the long freezer storage time of samples before being tested (Figure 2) and the varying volumes of caecal contents (large, small or empty) available for testing.
- *Salmonella* spp resistance rates were 87%, 80%, 55%, 38%, 17%, and 3% for tetracycline, ciprofloxacin, trimethoprim, gentamicin, ampicillin, and chloramphenicol, and *E. coli* 88%, 72%, 70 %, 53%, 51%, and 23% for ampicillin, ciprofloxacin, trimethoprim, tetracycline, gentamicin, and chloramphenicol respectively showed AMU practices that were not appropriate at the farm level (Figure 3 and 4).

RECOMMENDATIONS

- To improve the recovery rates of *E. coli*, the DIC laboratory must: 1) ensure that the caeca to be sampled are fresh, full and lesion-free; 2) isolate and identify *E. coli* bacteria using selective media (MacConkey agar) followed by biochemical confirmation using indole, Methyl Red Voges Proskauer, and citrate tests (IMVIC).
- Sample collection and transport, cold storage at 2-4 oC and sample delivery times (<48 hours) should be improved. In addition, for remote sampling locations always store samples in a livestock service refrigerator before transport to the laboratory.
- Harmonize the test methods for all laboratories involved in national AMR surveillance.
- Conduct studies on antimicrobial use (AMU) in this catchment area to compare with AMR patterns and refine AMR control policy.

CONCLUSIONS

- The pilot surveillance study showed that protracted storage of samples in a freezer, as well as poor sample quality and quantity reduces the rate of bacterial recovery.
- Based on this pilot, the draft AMR Surveillance Guidelines were improved and adopted by the Ministry of Agriculture (MoA) for use at all MoA Disease Investigation Centers in Indonesia.

Acknowledgements

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