Introduction

In Malaysia, poultry are slaughtered and retailed in wet markets under very poor hygienic conditions.

SALMONELLOSIS
• High prevalence of antimicrobial-resistant *Salmonella* in poultry → **RISK!!**

• Identifying sources of contamination and dissemination of *Salmonella* during slaughter and processing, and their antimicrobial resistance profiles are imperative in reducing the prevalence and emergence of antimicrobial-resistant *Salmonella* in poultry.

### Methodology

- 182 samples were obtained from 4 wet markets in Penang and 2 wet markets and small processing plant in Perlis.
- The samples analysed included:
  - whole chicken
  - chicken cuts
  - defeathering machine,
  - chopping/cutting board,
  - knives,
  - display tables/bench,
  - floor,
  - transport crates,
  - drains,
  - drums,
  - drain water,
  - scalding water and
  - wash water.

**[Image of sampling methodology diagram]**
Salmonella isolated from Penang & Perlis (Northern states of Peninsula Malaysia)

### Prevalence of Salmonella

<table>
<thead>
<tr>
<th>Samples Tested</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drum</td>
<td>100.00</td>
</tr>
<tr>
<td>Scalding Tank Water</td>
<td>0.00</td>
</tr>
<tr>
<td>Defeathering Machine</td>
<td>9.17</td>
</tr>
<tr>
<td>Wash Water</td>
<td>100.00</td>
</tr>
<tr>
<td>Chopping Board</td>
<td>100.00</td>
</tr>
<tr>
<td>Whole Chicken</td>
<td>100.00</td>
</tr>
<tr>
<td>Chicken Cuts</td>
<td>100.00</td>
</tr>
<tr>
<td>Knife</td>
<td>100.00</td>
</tr>
<tr>
<td>Display Table</td>
<td>100.00</td>
</tr>
<tr>
<td>Floor</td>
<td>100.00</td>
</tr>
<tr>
<td>Drain Swab</td>
<td>83.33</td>
</tr>
<tr>
<td>Drain Water</td>
<td>100.00</td>
</tr>
<tr>
<td>Transport Crates</td>
<td>100.00</td>
</tr>
<tr>
<td>Bench Wash Water</td>
<td>100.00</td>
</tr>
<tr>
<td>Apron</td>
<td>66.67</td>
</tr>
<tr>
<td>Overall</td>
<td>88.46</td>
</tr>
</tbody>
</table>

### Antibiotic resistance

- 85 Salmonella isolates of the three predominant serovars
  - S. Albany (n = 41),
  - S. Brancaster (n = 26)
  - S. Corvallis (n = 18)

- In this study, the Salmonella isolates were resistant to 2-9 out of 12 antibiotics tested.
- 67/85 (78.8%) Salmonella isolates were multidrug resistant.
More diverse antibiograms were observed in Salmonella isolates isolated in Penang as compared to those isolated in Perlis.

- 12, 6 and 9 different antibiograms were obtained for S. Albany, S. Brancaster and S. Corvallis isolated from wet markets in Penang, respectively.

- 5, 3 and 1 different antibiograms were obtained for S. Albany, S. Brancaster and S. Corvallis isolated from wet markets and small scale processing plant in Perlis, respectively.

Ceftriaxone (CRO) 30 μg; Gentamicin (CN) 10 μg; Trimethoprim-sulfamethoxazole (SXT) 1.25/23.75 μg; Trimethoprim (W) 5 μg; Ciprofloxacin (CIP) 5 μg; Ampicillin-sulbactam (SAM) 10/10 μg; Sulfamethoxazole (RL) 100 μg; Amoxicillin (AML) 10 μg; Cephalothin (KF) 30 μg; Tetracycline (Te) 30 μg; Nalidixic acid (NA) 30 μg; Chloramphenicol (C) 30 μg.

Main factor for dissemination: Transportation chain
FARM MARKET

- Live poultry arriving at the wet markets might be contaminated with *Salmonella* and horizontally transmitted the pathogen during the slaughtering, defeathering, evisceration, washing, chopping & display
- The results of this study indicate that poultry and environment of wet market are consistently contaminated with *Salmonella*, suggesting that *Salmonella* thrives in the poultry processing environment

Acknowledgement

I would like to thank

- Ipoh Public Health Laboratory
- Perlis Laboratory of Food Safety & Quality
- Prof. Thong Kwai Lin

**Conclusion**

- Our results highlight the need of
  - **strict hygiene and sanitation standards** to reduce incidence of *Salmonella*,
  - as well as **judicious use of antibiotics** in poultry
- Isolation of multiple antibiotic resistant *Salmonella* is a serious issue that needs immediate attention since it can have bad implications on human health

"It is not difficult to make microbes resistant to penicillin in the laboratory by exposing them to concentrations not sufficient to kill them... There is the danger that the ignorant man may easily underdose himself and by exposing his microbes to non-lethal quantities of the drug make them resistant."

Sir Alexander Flemming, 1945
Thank you

Terima Kasih