



## **Pork and poultry safety in traditional markets in Cambodia: Understanding complexities and scaling up good interventions**

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This policy brief provides information to help national and provincial policymakers better manage food safety along the smallholder pig and poultry value chains in Cambodia. It proposes cost-effective, practical interventions based on evidence from a multi-year research in Cambodian traditional markets.

### **Introduction**

The Safe Food Fair Food for Cambodia project was implemented from 2017 to 2021 by the International Livestock Research Institute (ILRI) in partnership with the National Animal Health and Production Research Institute, the Livestock Development for Community Livelihood Organization, the Department of Communicable Disease Control in the Cambodian Ministry of Health and the National Institute of Public Health. The Feed the Future Livestock Systems Innovation Lab and the CGIAR Research Program on Agriculture for Nutrition and Health supported the project.

### **Key policy messages**

- Biological contamination (*Salmonella* and *Staphylococcus aureus*) of pork and chicken is important leading to high risk for consumers and financial loss.
- Enhancing risk communication is needed to inform the public of actual health risks as opposed to hazards.
- Strengthening hygiene practices in the traditional markets, especially in the context of the COVID-19 pandemic, is essential.
- Better reporting mechanisms and surveillance systems for foodborne diseases are needed at all levels.
- Incentive and light touch interventions by training developed by the project can significantly improve food safety in traditional markets.
- The task force of food safety is a bridge to translate the food safety research evidence into policy and practices.

# Food safety in Cambodia

Animal-source foods are an important, nutritious and delicious part of Cambodia's cuisine, especially pork, fish and poultry. Most livestock products are produced by smallholders, many of them women, and sold in traditional markets where women also predominate as retailers. However, in recent years, food safety concerns have been rising.

There is limited evidence on the health and economic impacts of foodborne diseases in Cambodia. Our literature review found only 25 articles. A 2010 regional World Health Organization study, which included Cambodia found a huge foodborne disease burden<sup>1</sup> caused by biological rather than chemical hazards.

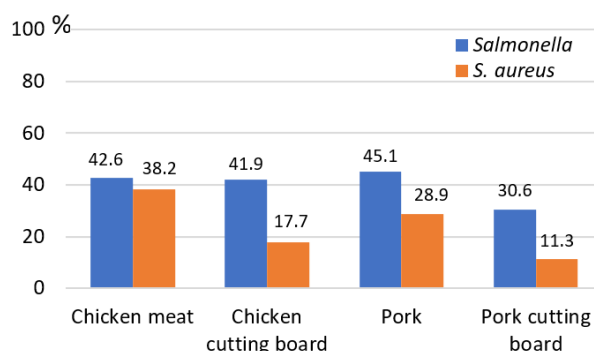
The project identified food safety impacts and barriers using system effects modelling. A theory of change was developed with a pathway and indicators. The modelling analysis, risk profiling, and the theory of change guided the project to focus activities on the pork and poultry value chains and to target two key pathogens: *Salmonella* spp. and *Staphylococcus aureus*. The project conducted activities in traditional markets in 25 provinces across the country.

## Key findings

### Microbial contamination levels in pork and poultry

The project implemented a multi-hazard survey in poultry and pig value chains. All 496 samples of pork, chicken and cutting board swabs were collected from traditional markets. Between July and August 2019, additional samples were collected from four provinces (Phnom Penh municipal, Siem Reap, Sihanoukville and Battambang). The overall prevalence of *Salmonella* and *S. aureus* in pork and chicken meat was found to be 43-45% and 29-38%, respectively (Figure 1). These levels are quite high, but similar levels have been found in other low- and middle-income countries including in the region e.g. Vietnam. These findings show foodborne disease is a major public health issue in Cambodia.

Figure 1. *Salmonella* and *S. aureus* contamination in pork and chicken in Cambodian markets.



### Financial and health burden of foodborne diseases

A cost-of-illness assessment used data from 266 cases of foodborne illness in Phnom Penh and Siem Reap collected from national hospitals, regional hospitals, provincial hospitals and community health centres. Of the 266 foodborne disease cases reported, most were acute diarrhoea (74.4%), followed by food poisoning (24.4%), typhoid (0.8%) and chronic diarrhoea (0.4%). On average, the cost of foodborne illness was 63 United States dollars (USD) per case. Per episode of hospitalization, the cost was USD 186 at the national hospital, USD 65 at a regional hospital, USD 24 at a provincial hospital and USD 8 at a community health centre.

### Food safety and nutrition for women and children

A cross-sectional survey was conducted among 100 women in Phnom Penh and 105 in Siem Reap on their food insecurity experience, perceptions and consumption frequency. In urban Phnom Penh, most women responded with neutral perceptions about the safety of such foods, while in Siem Reap there were larger variances in response with more women having positive and negative perceptions. Overall, negative perceptions are strongly associated with low frequency of intake of meat, fruits and vegetables in both children and mothers, particularly in Phnom Penh. In addition, chemical contamination is of greater concern than biological hazards, and women resort to growing or catching their own food. Best evidence is that biological hazards are actually much more important in terms of burden of disease. This finding has been observed in many other studies and is due to faulty risk perception. These findings imply outreach to correct misperceptions could increase consumption of nutritious foods.

### Health risks of consuming contaminated foods

The study used a quantitative microbial risk assessment to estimate the risk of acquiring salmonellosis after consuming contaminated pork and chicken salad. In all, 204 chicken meat and 204 pork samples were collected from 52 traditional markets in 25 provinces for *Salmonella* analyses. Four salad cooking scenarios at household were simulated to assess the occurrence and levels of *Salmonella* cross-contamination from raw chicken carcasses via kitchen utensils and hands to ready-to-eat chicken salad. Annual incidence rates of salmonellosis estimated from consuming chicken salad, pork salad and mixtures of chicken and pork salads were found to be 11%, 4% and 15%, respectively. Cross-contamination while preparing the chicken salad was most important followed by the prevalence of *Salmonella* on chicken at the market. The risk of salmonellosis due to chicken and pork salad

<sup>1</sup> Havelaar, A. H. et al. 2015. World Health Organization Global Estimates and Regional Comparisons of the Burden of Foodborne Disease in 2010. PLoS Med 12(12): e1001923.

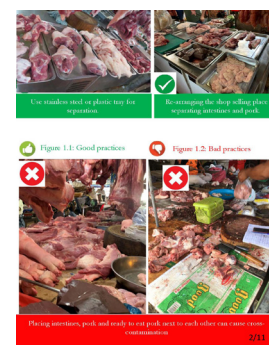
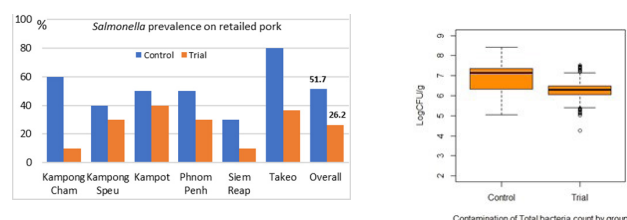
consumption is high. Control measures may include improving the safety of retailed chicken and pork at markets and improving hygiene practices and equipment during salad preparation at households.

## Incentive-based and light-touch interventions to improve food safety in traditional markets

To improve hygiene practices and knowledge of pork retailers the project developed and implemented intervention packages that included provision of equipment and training of pork sellers on good hygiene practices using the project's handbook of five key actions (see photo). Equipment was low cost (USD 20 per retailer) and evidence-based and provided an incentive for retailers.

A randomized controlled trial found low to moderate compliance of pork vendors in cleaning and disinfection of shop equipment and hands was observed in the trial group. There was a significantly lower overall level of bacteria and *Salmonella* prevalence in the trial group. These differences varied across the six provinces (Figure 2). The knowledge, attitude and practice scores of retailers in the intervention significantly improved. The light-touch intervention demonstrated an effective improvement of safety of pork at traditional retail. Stronger policy engagement, consumer recognition of shops using the intervention packages and frequent monitoring and follow-up of hygienic practice are necessary to enhance the compliance of retailers with the intervention packages.

Figure 2. Comparison of microbial contamination in intervention study.



## Policy translation, capacity building and networking

The project established a task force for food safety risk assessment comprising policymakers and researchers from research institutes and universities. The task force used the project findings to improve food safety. The project also trained MSc and PhD students from Cambodia and the United States of America on risk assessment, laboratory techniques, gender and system effect modelling.

### Authors

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### Photo credit

ILRI/Rortana Chea

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