IMPROVING THE NATIONAL RISK MODEL OF CAMPYLOBACTER WITH SLAUGHTERHOUSE PROCESSING DATA

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INTRODUCTION

Campylobacteriosis is a leading food-borne disease in Europe. 76% of campylobacteriosis cases in Denmark are linked to food [1]. The majority of these come from the consumption of contaminated broiler meat. A quantitative microbiological risk assessment (QMRA) for acquiring campylobacteriosis had been developed at DTU [2]. The **QMRA model** is used to evaluate activities that reduce the concentration of *Campylobacter* in the production chain and the risk to the consumer. The model currently uses a constant transition factor of *Campylobacter* on the skin to the meat (Tau) based on expert opinion (**Tau** = 1 log 10/g). The aim of the study was to establish a more accurate value for Tau based on what is observed in a production setting that includes Modified Atmosphere Packaging (MAP).

METODOLOGY

- A slaughterhouse was visited September and October 2023.
- The flocks were confirmed positive for *Campylobacter* using qPCR of dust samples.
- Random whole chickens (n=30) were selected from each flock (Fig. 1).
- The chicken was then placed in MAP and refrigerated for week.
- The concentration of *Campylobacter* was determined using NMKL 119, 3 Ed. 1.
- Tau was calculated as the difference in concentration of *Campylobacter* colonies (log10 cfu/g) between sample types and time.
- For the QMRA model, 2023 prevalence data was used, and neck skin concentrations were transformed to leg skin concentrations based on the factor difference described [3].

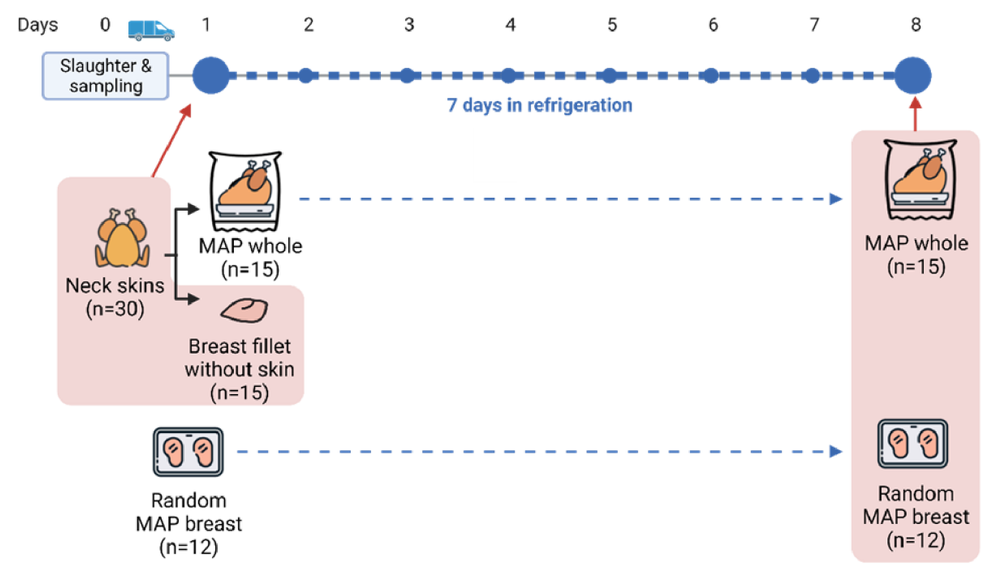

Figure 1: Study design of the sampling of *Campylobacter*-positive flocks and analysis where the concentration of Campylobacter on the skin or meat. MAP = Modified Atmosphere Packaging.

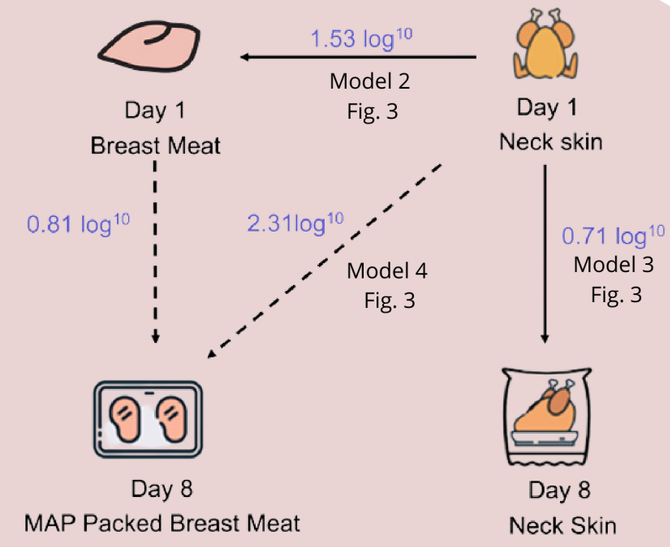

Figure 2: Tau values for the quantitative microbiological risk assessment model as the concentration found on skin or meat at day 1 or 8.

RESULTS

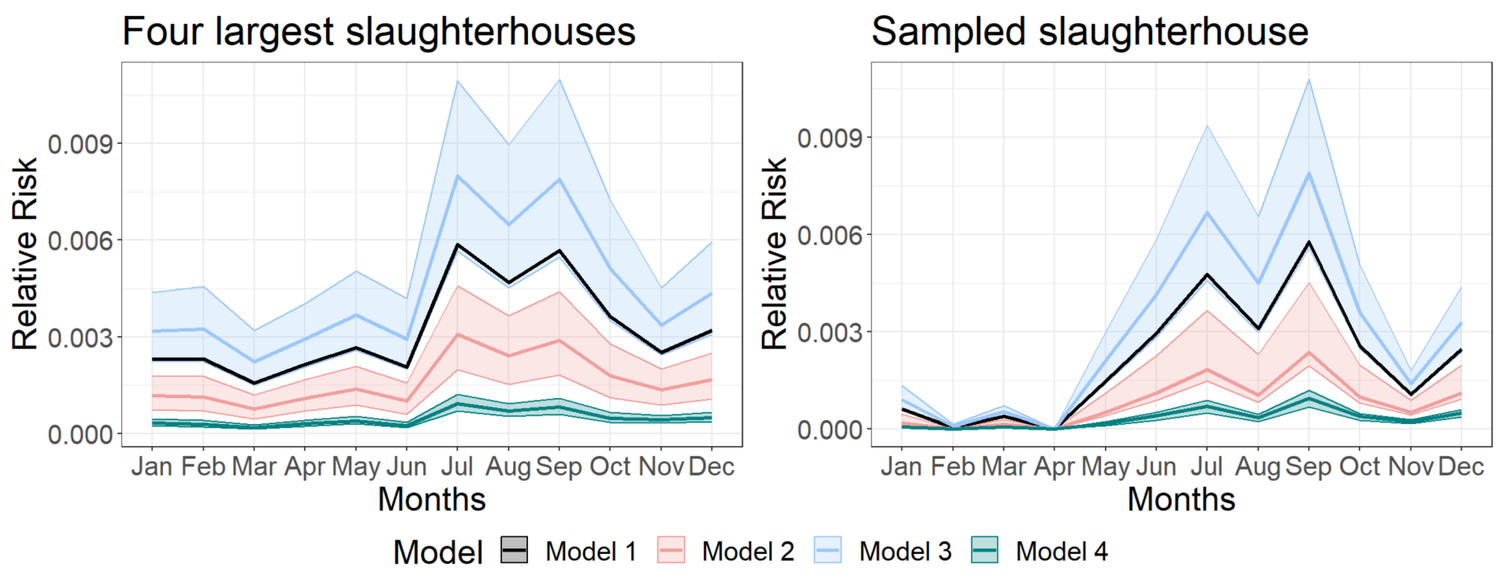

Figure 3: Monthly quantitative microbiological risk assessment for acquiring campylobacteriosis in 2023 if consuming contaminated broiler meat when using the value for transfer of *Campylobacter* from skin to meat (Tau) for all slaughterhouses (A) and the slaughterhouse sampled in this study (B). The original risk model (Model 1, red, [2]); neck skin to breast filet meat (Model 2, black), neck skin to skin on whole MAP-packed chicken after 7 days (blue, Model 3), and neck skin to MAP-packed breast filet meat after 7 days (Model 4, green). Dashed lines indicate standard deviations for the experimental data.

Table 1: Difference (%) in relative risk of getting campylobacteriosis based on the original value for Tau (1 log10 cfu/g) in the QMRA model and this study.

	ALL SLAUGHTERHOUSES	SAMPLED SLAUGHTERHOUSE
NECK SKIN WITH BREAST MEAT THE SAME DAY	-48.9%	-68.8%
NECK SKIN WITH MAP BREAST MEAT AFTER 7 DAYS	-38.2%	-84.8%
NECK SKIN WITH NECK SKIN ON WHOLE MAP CHICKEN AFTER 7 DAYS	38.2%	39.2%

DISCUSSION

Eating chicken with skin could **represent a higher risk in the QMRA model**. It may be more nuanced to consider meat with or without skin when estimating the risk of campylobacteriosis, as Tau may change depending on the product consumed.

Seven days in MAP reduced the concentration of *Campylobacter* with 0,71-0,81 log10/g.

The relative risk was lower using Tau estimated by the current study compared to using the original value of 1. The difference between the relative risk estimates was larger for the sampled slaughterhouse compared to including all the slaughterhouses.

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