Risk assessment for the monitoring of antibiotic resistance in meat products

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NEW! NEW!! NEW!!! SENSITIVITY ANALYSIS NON QUANTITATIVE RISK ASSESSMENT

OBJECTIVES

Compare the **risk for consumers** arising from the **exposure to antibiotic resistant bacteria** (*Campylobacter* spp., *E. coli*, *Enteroccocus* spp.) at the retail level, from meat of:

➡ **four different types** (poultry, pork, beef and veal)
➡ distributed in **four different product categories** (fresh meat, frozen meat, raw and dried meat products and heat-treated meat products)

MATERIALS & METHODS

➡ Score-based risk assessment
➡ Change in prevalence from slaughter to retail
➡ Input parameters: real data & expert opinion
➡ Parameters defined with three categories (low, medium, high)
➡ Combination of parameters through combination tables
➡ Only high risk for the consumer were considered relevant for ranking the different meat products

EXAMPLE
combination table used for the contamination at slaughter

	LOW	MED	HIGH
LOW	low	low	low
MED	med	med	high
HIGH	high	high	high

KEY POINTS OF THE RISK ASSESSMENT

➡ **Prevalence** of contamination with **resistant bacteria**
➡ Human health **consequences** of an infection with a specific bacteria resistant to a specific antimicrobial
➡ **Consumption** volume of a specific product
➡ **Output** of the assessment => **proportion of risk** attributed to each product for consumer for the 16 combination of meat products

STRUCTURE OF THE RISK ASSESSMENT
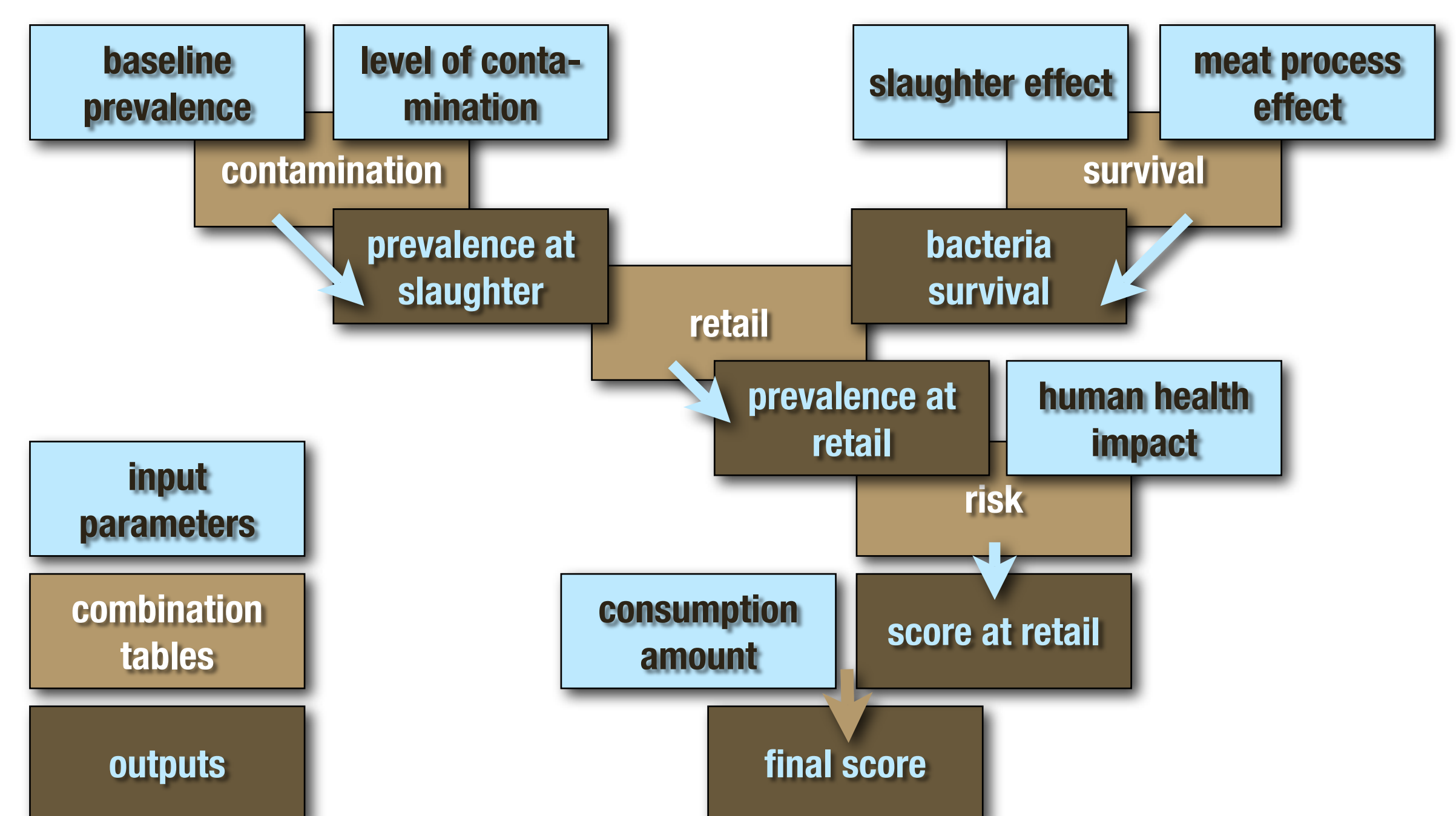
RESULTS

Relative **percentage of total risk** attributed to each type of product resulting in a **human health risk**. The sum of all risks was set to 100.

	FRESH			FROZEN			HEAT-TREATED			RAW & DRIED			TOTAL OF HIGH RISK
	HIGH	MED	LOW	HIGH	MED	LOW	HIGH	MED	LOW	HIGH	MED	LOW	
POULTRY	3.1	0.0	5.1	3.6	1.0	4.3	0.0	0.0	1.7	0.0	0.0	0.2	6.7
PORK	1.5	1.5	10.3	0.5	0.5	3.5	0.0	0.0	19.6	2.0	2.0	13.8	4.0
BEEF	0.0	0.0	9.8	0.0	0.0	1.8	0.0	0.0	2.0	0.4	0.2	5.6	0.4
VEAL	0.1	0.9	3.6	0.0	0.1	0.2	0.0	0.0	1.0	0.0	0.0	0.1	0.1
TOTAL	4.7	2.4	28.8	4.1	1.6	9.8	0	0	24.3	2.4	2.2	19.7	

➡ **Poultry** (fresh & frozen meat) **& pork** (raw & dried meat products) are of higher risk for consumers
➡ **11.2%** of the 144 evaluated combinations of bacteria and antibiotic classified as **high human health risk**
➡ **42% of high risk** combination correspond to **fresh meat**

SENSITIVITY ANALYSIS

➡ Illustrate the **possibility** of performing a **SA** on a **non quantitative risk assessment**
➡ **Assess** how influential **inputs parameters** are on the output of the risk assessment
➡ Assess the **influence of combination tables** on the output
➡ **1009 combinations** of **parameters** were tested
➡ **Modified output compared** to **original** output
➡ **Rankings** within high risk categories were **compared**

Percentage of mismatch between modified outputs and original outputs due to the modification of each parameter and combination tables.

CONCLUSIONS

➡ The model presented here provided information for setting priorities in the management of the Swiss monitoring programme on antimicrobial resistance
➡ The sensitivity analysis helped validating this model, thus assuring robustness of evidence-based decision making

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