

Título Estimating the effect of retailer's handling practices and socioeconomic disparities on microbial levels at the time of purchase

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Estimating the effect of retailer's handling practices and socioeconomic disparities on microbial levels at the time of purchase

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Justification: Socioeconomic disparities not only can result in differential access to food but also in procurement of food of lower quality and safety.

Objective: The objectives of this study were to assess the existence of differential handling practices at retailers within socioeconomically different neighborhoods and to compare the effects of handling practices among neighborhoods based on the probability distribution of the microbial concentration at the time of purchase.

Methods: We surveyed all food retail stores (N= 333) at four socioeconomically different neighborhoods within a large city (Buenos Aires, Argentina). The surface temperature of two chilled products (a custard-like dessert and sliced ham) was recorded at the time of purchase using an IR thermometer. The expiration date of the samples was also recorded, when available, and used to calculate the residence time of the samples in the stores. The frequency distribution functions for temperature and residence time of the data collected in combination with the growth parameters corresponding to two pathogens associated to outbreaks in the selected products were introduced into a stochastic model to estimate the probability of microbial concentration at the time of purchase at each neighborhood.

Results: 20% or less of the custard samples (N= 196) and 15 % or less of the ham samples (N=392) were stored at the recommended storage temperatures ($\leq 5^{\circ}\text{C}$), regardless of the store location. The mean temperature for custard and ham were 8.5 and 9.3°C. The samples' temperature and residence time frequency distributions were described by asymmetric distribution functions (Log Normal and Weibull, respectively). While the parameters of the temperature distribution functions were similar for all neighborhoods, those of the residence time denoted significant slower product rotation in stores located in low income neighborhoods. The mean residence time was 10 and 20 days at stores within high and low-income neighborhoods, respectively. The outputs of the stochastic model with 10,000 iterations, consistently estimated higher probabilities of purchasing products with higher microbial levels at retailers within low income neighborhoods.

Significance: The information obtained can provide valuable inputs for risk assessment modeling and can inform intervention strategies to reduce risks for underserved populations.