Regional, Seasonal, and Temporal Variations in the Prevalence of Antimicrobial-Resistant Escherichia coli Isolated from Pigs at Slaughter in Denmark (1997-2005)

The aim of this study was to analyze and discuss regional, seasonal, and temporal trends in the occurrence of antimicrobial-resistant Escherichia coli isolated from pigs at slaughter in Denmark between 1997 and 2005. Data on antimicrobial-resistant E. coli were obtained from the Danish Integrated Antimicrobial Resistance Monitoring and Research Programme database. The Cochran-Armitage trend test was used to detect the presence and evaluate the significance of regional, seasonal, and annual trends in the occurrence of antimicrobial-resistant E. coli for four drugs. Associations between resistance and explanatory variables region, season, and the year of isolate sampling were analyzed using a logistic regression model. The Cochran-Armitage test provided evidence of significant temporal trends for ampicillin-resistant E. coli (an increasing trend, p <0.0001) and streptomycin-resistant E. coli (a decreasing trend, p <0.0001). The prevalence of ampicillin-resistant E. coli increased over time for all seasons (p <0.001) except for winter when no significant variations in prevalence of resistant E. coli were captured over time. On the other hand, a significant decreasing trend in prevalence of streptomycin-resistant E. coli was observed for the spring, summer, and winter months (p <0.001); however, there were no statistically significant trends for the autumn months (p > 0.05). The prevalence of ampicillin-resistant E. coli was observed to increase over time for the various regions, whereas that for streptomycin-resistant E. coli presented an overall significant decrease over time. The estimated odds ratios from the logistic regression model indicated varying risks for the occurrence of resistance by season and by region. The winter months were associated with an increased risk for the occurrence of resistant E. coli as compared to the other seasons of the year. Our study provides evidence of statistically significant regional, seasonal, and temporal variations for ampicillin- and streptomycin-resistant E. coli isolated from pigs at slaughter in Denmark between 1997 and 2005.

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