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Consumer Storage Practices for Refrigerated Ready-to-Eat Foods: Results of a Web-based Survey of Pregnant Women, Seniors, and the Remaining Population

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Background

- 2,500 Americans contract listeriosis each year; of these, 1 in 5 dies from the illness
- At-risk populations
 - Pregnant women, their unborn fetuses, and neonates
 - Seniors
 - Immunocompromised individuals
- *Listeria monocytogenes* (*Lm*) risk assessment showed that keeping refrigerated ready-to-eat (RTE) foods stored at 40°F or lower and consuming RTE foods as soon as possible can reduce risk of listeriosis by 50%

Study Design (I)

- Conducted survey to collect data on unopened and opened storage times for ten refrigerated, RTE foods
- Surveyed nationally representative sample of U.S. adults using Web-enabled panel
- Sample design
 - Pregnant women (aged 18–40)—took census of pregnant women on panel
 - Seniors (aged 60+)
 - Remaining population (aged 18–59)

Study Design (II)

- Questionnaire design
 - Two versions of questionnaire
 - Collected unopened and opened storage times for most recent purchase of product
- Sent survey via e-mail to 2,428 adults; received 2,060 completed surveys (85% completion rate)
- Number of completed surveys (n)
 - Pregnant women (249)
 - Seniors (946)
 - Remaining population (865)

RTE Foods Included in Analysis (I)

- Unopened and opened storage times for
 - Bagged salads
 - Precut fresh fruit
 - Precut fresh vegetables
 - Frankfurters
 - Vacuum-packed luncheon meats



RTE Foods Included in Analysis (II)

- Combined storage time (unopened and opened)
 - Smoked seafood
 - Cooked crustaceans (shrimp/crab legs)
 - Soft cheeses (e.g., Camembert, blue cheese, queso fresco)
 - Freshly-sliced deli meats
 - Deli salads (e.g., potato salad, chicken salad)



Analysis Procedures

- Estimated weighted percentage of respondents who stored product within USDA/FDA storage time guidelines, by subpopulation
 - Compared estimates for pregnant women vs. remaining population and seniors vs. remaining population
- For products in which adherence to guidelines was low, assessed demographic characteristics of respondents who do not follow recommended guidelines
 - Gender, age, education, marital status, household size, race/ethnicity, income, metro status, at-risk individual in household, geographic region

Number of Respondents Who Purchased each Food

Food	Pregnant Women	Seniors	Remaining Population	All Respondents
Frankfurters	213	405	368	986
Bagged salads	234	379	362	975
Precut fresh vegetables	175	354	346	875
Deli salads	106	243	205	554
Precut fresh fruit	142	187	201	530
Vacuum-packed luncheon meats	105	206	218	529
Freshly sliced deli meats	115	218	174	507
Cooked crustaceans	81	189	180	450
Soft cheeses	101	138	141	380
Smoked seafood	65	114	110	289

Stored Unopened Product within Storage Time Guidelines

Food	Storage Time (≤ x days)	Percentage			
		Pregnant Women	Seniors	Remaining Population	All Respondents
Frankfurters	14	96.0 (<i>p</i> <0.05)	97.9	98.9	98.6
Precut fresh fruit	7	97.3	98.2	98.0	98.0
Precut fresh vegetables	14	91.8	97.0	95.9	96.0
Vacuum-packed luncheon meats	14	95.1	99.1 (<i>p</i> <0.01)	95.2	96.0

Stored Opened Product within Storage Time Guidelines

Food	Storage Time (≤ x days)	Percentage			
		Pregnant Women	Seniors	Remaining Population	All Respondents
Precut fresh fruit	5	92.8	92.9	90.3	90.9
Bagged salads	5	77.5	91.1	86.7	87.4
Frankfurters	7	77.6	85.1	87.6	86.7
Precut fresh vegetables	5	71.5	72.9	69.5	70.2
Vacuum-packed luncheon meats	5	59.9	62.2	54.8	56.6

Stored Product within Storage Time Guidelines (Combined Unopened & Opened Storage Time)

Food	Storage Time (≤ x days)	Percentage			
		Pregnant Women	Seniors	Remaining Population	All Respondents
Smoked seafood	14	74.7 (<i>p</i> <0.01)	86.2	94.6	92.2
Cooked crustaceans	4	56.4	75.2	71.2	71.6
Deli salads	5	63.4	70.8	61.4	63.8
Freshly sliced deli meats	5	41.2	57.6	48.4	50.1
Soft cheeses	7	21.4 (<i>p</i> <0.01)	31.3 (<i>p</i> <0.05)	51.7	47.8

Analysis of Demographic Characteristics: Vacuum-packed Deli Meats, Freshly Sliced Deli Meats, Deli Salads, Soft Cheeses

- Individuals who have attended college are more likely than those with a high school education to store freshly sliced deli meats and soft cheeses outside guidelines
- White, non-Hispanics are more likely than individuals of other races/ethnicities to store soft cheeses outside guidelines
- Individuals living in Midwest and West are more likely to store freshly sliced deli meats outside guidelines (significant at $p < 0.10$ for deli salads and soft cheeses)
- Respondents with at-risk individual in household are more likely to store freshly sliced deli meats within guidelines (significant at $p < 0.10$ for vacuum-packed luncheon meats)

Educational Programs on Listeriosis Prevention Should...

- Inform pregnant women that they are at-risk for listeriosis
 - Some pregnant women were not aware of the recommendations to reheat deli meats (53%) and to avoid unpasteurized soft cheeses (44%)
- Provide information on recommended storage times for different RTE foods, especially soft cheeses, deli/luncheon meats, and deli salads
- Recommend consumers use a refrigerator thermometer and provide information on safe refrigerator temperature

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