Appendix 5:
Food Categories **Modeled Distributions and Related Information**

Appendix 5:
Food Categories Modeled Distributions and Related Information

Table of Contents

Draft *Listeria monocytogenes* Risk Assessment

Appendix 5: Food Categories Modeled Distributions and Related Information

1. Smoked Seafood Food Category

Consumption

Table A5.1.1. Foods Included in Consumption Data Set

Food Code	Food
26100190	Fish, not specified as to type, smoked
26119190	Herring, smoked, kippered
26137190	Salmon, smoked
26151190	Trout, smoked
26315190	Oysters, smoked

Source Survey: CSFII

Figure A5.1.1. Cumulative Distribution for Serving Size
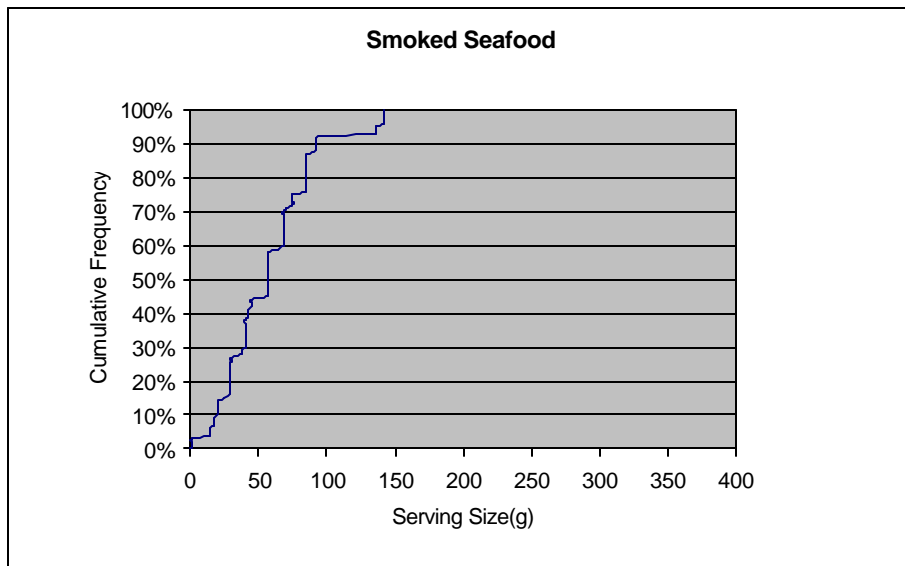
Table A5.1.2. Frequency Distribution for Amount Consumed per Serving

Percentiles (grams per serving)[a]			
50th	75th	95th	99th
57	75	136	142

Contamination at Retail

Table A5.1.3. Foods Included in Contamination Level Data Set

Foods	Reference
Finfish, cold smoked	Jemmi, 1990
Finfish, hot smoked	Jemmi, 1990
Finfish, hot/cold smoked	Dillon *et al.*, 1994
Fish, smoked	Teufel and Bendzulla, 1993
	Hartemink and Georgsson, 1991
	Weagant *et al.,* 1988
Halibut, cold smoked	Jorgensen and Huss, 1998
Mussels, smoked	Hudson *et al.,* 1992
Salmon, cold smoked	Eklund *et al.*, 1995
	Farber, 1991b
	Guyer and Jemmi, 1990
	Jorgensen and Huss, 1998
Salmon, smoked	Cortesi *et al.*, 1997
	Garland, 1995
	Hudson *et al.*, 1992

Figure A5.1.2. Cumulative Distribution for Contamination at Retail

Table A5.1.4. Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	8.60×10^{-5}	9		0.28
Weibull	7.97×10^{-2}	8.47×10^{-4}		0.42
Beta	1.89×10^{-2}	30350.483	1.00×10^{9}	0.30

Post Retail Growth

Table A5.1.5. Foods Included in Post Retail Growth Data Set

Foods	Reference
Cod, cold smoked	Dillon and Patel, 1993
Salmon, cold smoked	Duffes *et al.*, 1999
	Hudson and Mott, 1993b
	Pelroy *et al.*, 1994b
	Pelroy *et al.*, 1994a
	Peterson *et al.*, 1993
	Nilsson *et al.*, 1997
Salmon, smoked	Guyer and Jemmi, 1991
	Szabo and Cahill, 1999
Trout, hot smoked	Jemmi and Keusch, 1992

Table A5.1.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	6 to 10	15 to 45

Figure A5:1.3. C umulative Distribution for the Exponential Reference Growth Rate (5 °C)
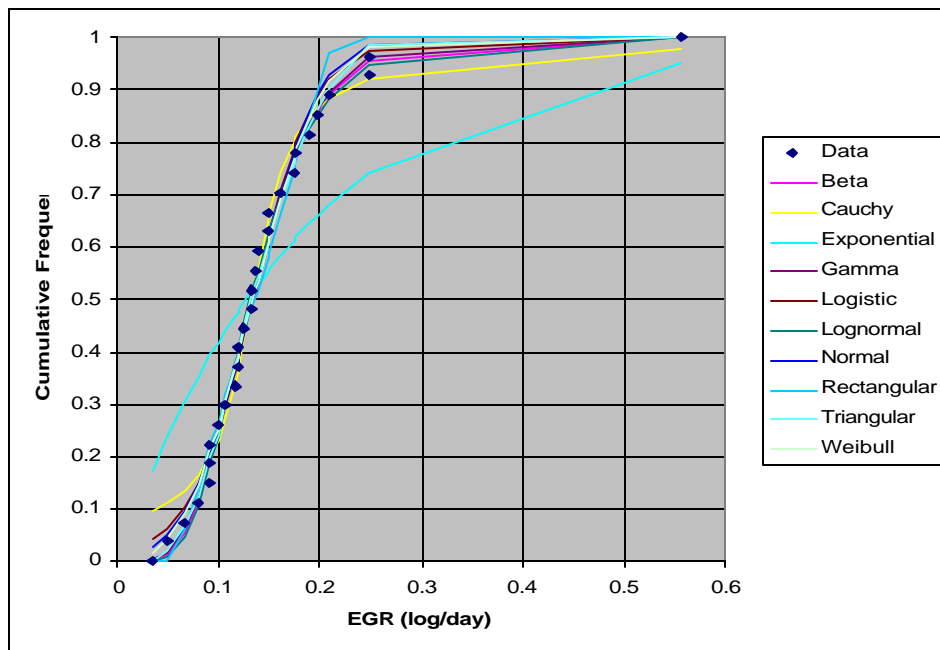
Table A5.1.7. Models Used to Characterize the Cumulative Distribution for Exponential Growth Rates

Model	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Probability
Lognormal	-2.02	0.38			0.36
Gamma	7.2	0.02			0.31
Triangular	0.04	0.11	0.27		0.16
Beta	3.95	2767.20	0.03	75.02	0.16

Table A5.1.8. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 °C

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
0.155	0.100	25

NOTE: EGR derived using random sampling of growth data.

Table A5.1.9. Maximum Growth at Various Temperatures

Temperature (°C)	<5	5-7	>7
Maximum Growth (log$_{10}$ cfu/g)	5	6.5	8

2. Raw Seafood Food Category

Consumption

Table A5.2.1. Foods Included in Consumption Data Set

Food Code	Food
2611500	Flounder, raw
2613110	Pompano, raw
2615310	Tuna, fresh, raw
2621110	Roe, sturgeon
2621310	Squid, raw
2631510	Oysters, raw
5815113	Sushi, with vegetables and fish

Source Survey: NHANES III

Figure A5.2.1. Cumulative Distribution for Serving Size
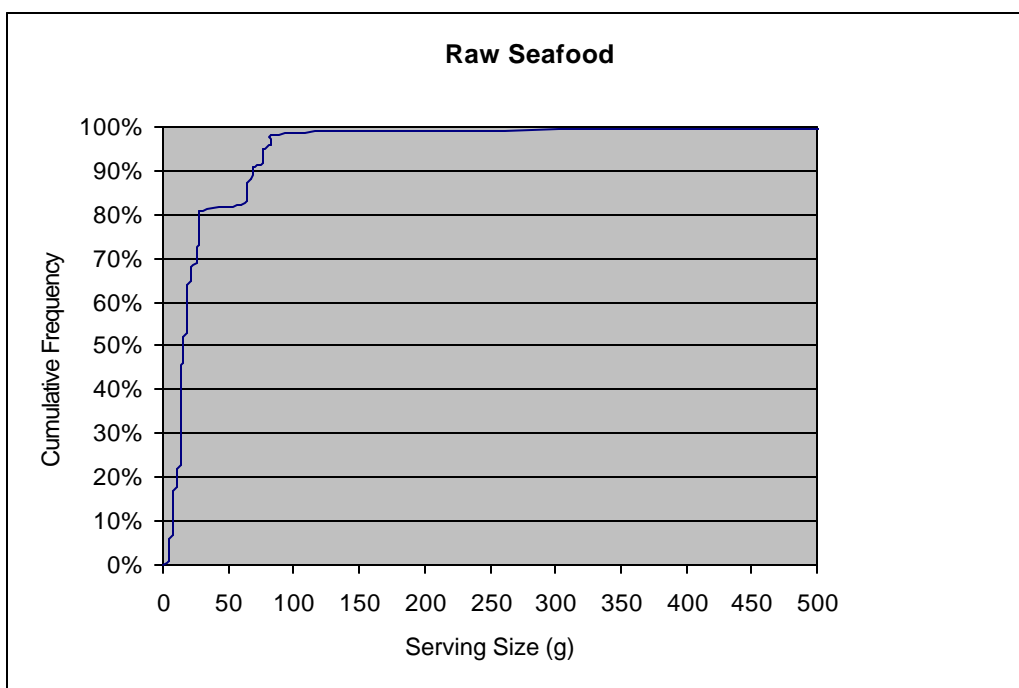
Table A5.2.2. Frequency Distribution for Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
16	28	77	136

Contamination at Retail

Table A5.2.3. Foods Included in Contamination Level Data Set

Foods	Reference
Catfish, fresh[a]	Buchanan *et al*., 1989
Clam, raw	Buchanan *et al*., 1989
	El-Shenawy and El-Shenawy, 1995
	Fuchs and Surendran, 1989
Coquina, fresh	El-Shenawy and El-Shenawy, 1995
Crab[a]	Degnan *et al.,* 1994
	El-Shenawy and El-Shenawy, 1995
Crabmeat/scallops[a]	Ng and Seah, 1995
Crustacean/shellfish	Teufel and Bendzulla, 1993
Fin fish and non-fin fish	Iida *et al*., 1998
Fin fish, fresh	Buchanan *et al*., 1989
	El-Shenawy and El-Shenawy, 1995
	Manoj *et al*., 1991
	Masuda *et al*., 1992
Fin fish, frozen	El-Shenawy and El-Shenawy, 1995
	Weagant *et al*., 1988
Fin fish, raw minced	Rorvik and Yndestad, 1991
Fin fish, ready-to-eat	Hudson *et al*., 1992
Fin fish/shellfish	Heinitz, 1999
Fin fish, aquaculture	Pullela *et al*., 1998
Fin fish, tropical	Jeyasekaran *et al*., 1996
Fish	Hartemink and Georgsson, 1991
	Karunasagar *et al.,* 1992
	Ryu *et al.,* 1992
Fish, frozen	Fuchs and Surendran, 1989
Fish, sushi	Ryu *et al.,* 1992
Fish and fish parts	Teufel and Bendzulla, 1993
Fish and non-fish	Wong *et al*., 1990
Fish and products	McLauchlin and Gilbert, 1990
Fish cakes, fingers[a]	Ng and Seah, 1995
Fish, raw	Anderson and Nørrung, 1995
	Fuchs and Surendran, 1989
Lobster tail, frozen[a]	Weagant *et al*., 1988
Mollusks, bivalve, mussels	de Simon *et al*., 1992
Mussels, depurated	Decastelli *et al*., 1993
Mussels, fresh	Ferrer and de Simón, 1993
Mussels, predepuration	Decastelli *et al*., 1993
Oysters, frozen	Weagant *et al*., 1988

Oysters, raw	Buchanan *et al*., 1989
	Colburn *et al*., 1990
	El-Shenawy and El-Shenawy, 1995
	Ferrer and de Simon, 1993
	Kaysner *et al.,* 1990
	Masuda *et al*., 1992
	Motes, 1991
Prawn, raw, sushi	Ryu *et al.,* 1992
Rainbow trout	Draughon *et al.*, 1999
Scallops, frozen[a]	Weagant *et al*., 1988
Scallops, raw[a]	Buchanan *et al*., 1989
Shellfish	Monfort *et al*., 1998
Shellfish, non-oysters	Masuda *et al*., 1992
Shellfish, ready-to-eat	Hudson *et al*., 1992
Shellfish, tropical	Jeyasekaran *et al*., 1996
Shrimp[a]	El-Shenawy and El-Shenawy, 1995
	Farber, 1991b
Shrimp, brined[a]	Rorvik and Yndestad, 1991
Shrimp, frozen[a]	Hofer and Ribeiro, 1990
Shrimp, raw[a]	Motes, 1991
	Ravomanana *et al*., 1993
Shrimp, raw/frozen[a]	Buchanan *et al*., 1989
	Weagant *et al*., 1988
Shrimp, raw/process[a]	Manoj *et al*., 1991
Squid, langostinos[a]	Weagant *et al*., 1988
Surimi, frozen [a]	Weagant *et al*., 1988
Surimi, crab[a]	Buchanan *et al*., 1989
Surimi, various[a]	Farber, 1991b
Trout, fresh	Hartemink and Georgsson, 1991
Tuna	Ng and Seah, 1995
Tuna, sushi	Ryu *et al*., 1992

[a] These foods are not generally eaten raw, but contamination data for these foods are likely to reflect contamination levels in seafoods that are consumed raw.

Figure A5.2.2. Cumulative Distribution for Contamination at Retail

Raw Seafood

Table A5.2.4. Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	8.85×10^{-7}	7.393979256		0.33
Weibull	8.89×10^{-2}	8.02×10^{-7}		0.33
Beta	7.43×10^{-3}	760247.173	1.00×10^{09}	0.35

Post Retail Growth

Table A5.2.5. Foods Included in Post Retail Growth Data Set

Foods	Reference
Catfish, raw	Fernandes *et al.*, 1998 Leung *et al.*,1992
Crab, raw	Lovett *et al.*, 1990
Fin fish, raw	Harrison *et al.*,1991 Shineman and Harrison, 1994
Oysters, raw	Kaysner *et al.*, 1990
Shrimp, raw	Harrison *et al.*,1991 Lovett *et al.*, 1990 Shineman and Harrison, 1994
Surimi	Lovett *et al.*, 1990
Trout, raw	Fernandes *et al.,*1998
Whitefish, raw	Lovett *et al.*, 1990

Table A5.2.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	1 to 2	10 to 20

Figure A5.2.3. Cumulative Distribution for the Reference Exponential Growth Rates Adjusted to 5 ˚C
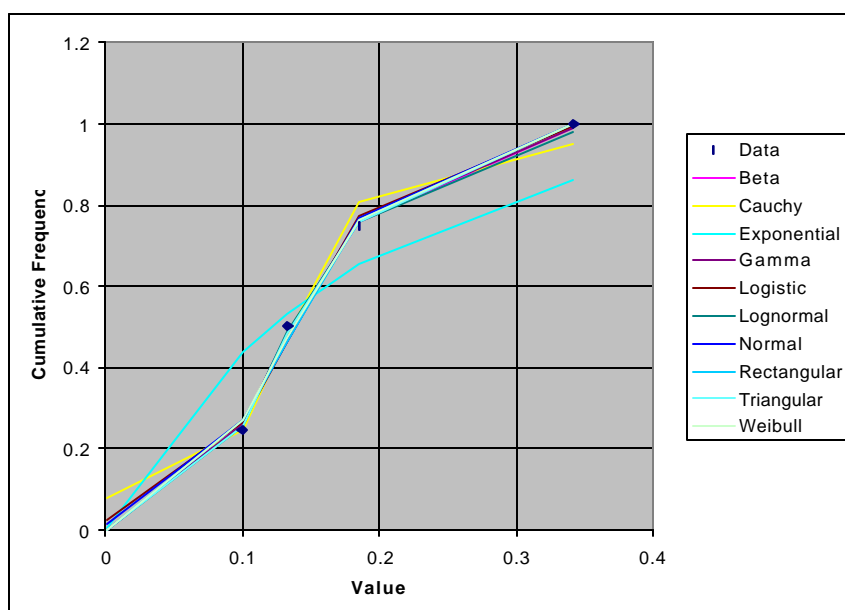
Table A5.2.7. Models Used to Characterize the Cumulative Distribution for Exponential Growth Rates

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Rectangular	0.06	0.26		0.50
Triangular	3.13×10^{-2}	1.0×10^{-1}	0.30	0.17
Lognormal	-2.0	0.45		0.16
Gamma	5.06	0.03		0.16

Table A5.2.8. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 °C

Mean ($\log_{10}$ cfu/g/day)	Std. Dev.	N
0.152	0.126	5

NOTE: EGR derived using random sampling of growth data.

Table A5.2.9. Maximum Growth at Various Temperatures

Temperature (°C)	<5	5-7	>7
Maximum Growth ($\log_{10}$ cfu/g)	5	6.5	8

3. Preserved Fish Food Category

Consumption

Table A5.3.1. Foods Included in Consumption Data Set

Food Code	Food
2610017	Fish, not specified as to type, dried
2610918	Cod, dried, salted, salt removed in water
2611918	Herring, pickled
2715103	Marinated fish (Ceviche)

Source Survey: NHANES III

Figure A5.3.1. Cumulative Distribution for Serving Size
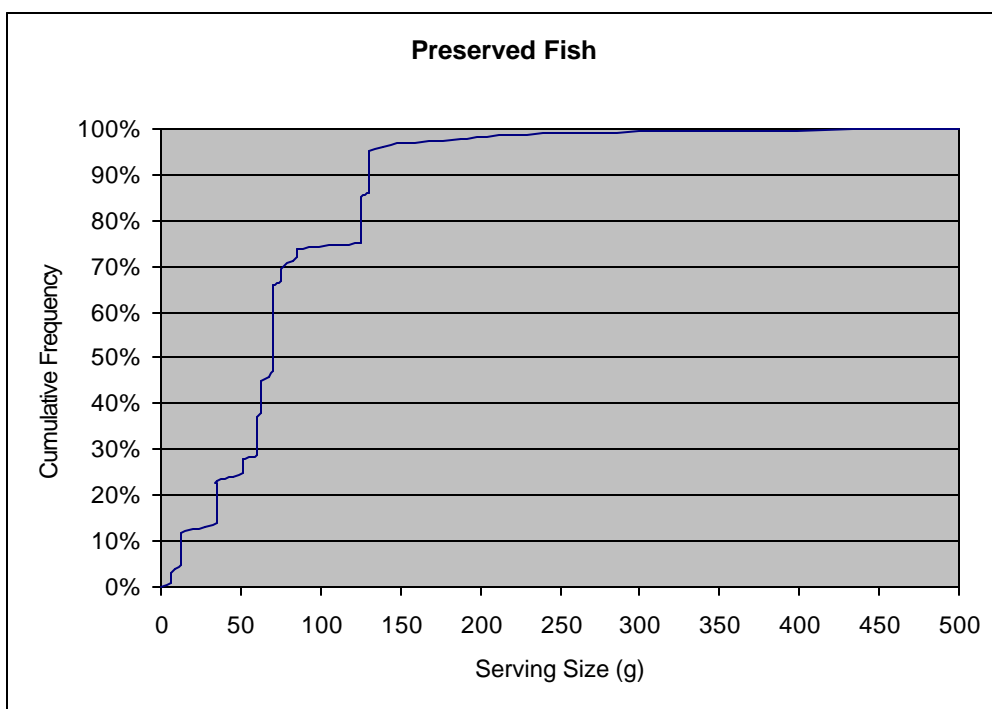
Table A5.3.2 Frequency Distribution of Amount Consumed per Serving

Percentile (grams per serving)			
50th	75th	95th	99th
70	125	130	250

Contamination at Retail

Table A5.3.3. Foods Included in Contamination Level Data Set

Food	Reference
Ceviche	Fuchs and Sirvas, 1991
Fin fish, pickled	Jemmi, 1990
Fin fish, smoked and/or salted	El-Shenawy and El-Shenawy, 1995
Fish and products, ready-to-eat	McLauchlin and Gilbert, 1990
Fish, dried, salted	Fuchs and Surendran, 1989
Fish, preserved	Anderson and Nørrung, 1995
Fish, processed	Teufel and Bendzulla, 1993
Gravad	Hartemink and Georgsson, 1991
Gravad fish	Jorgensen and Huss, 1998
	Loncarevic *et al.,* 1996
Haddock, dried	Hartemink and Georgsson, 1991
Trout, Gravad	Ericsson *et al.,* 1997

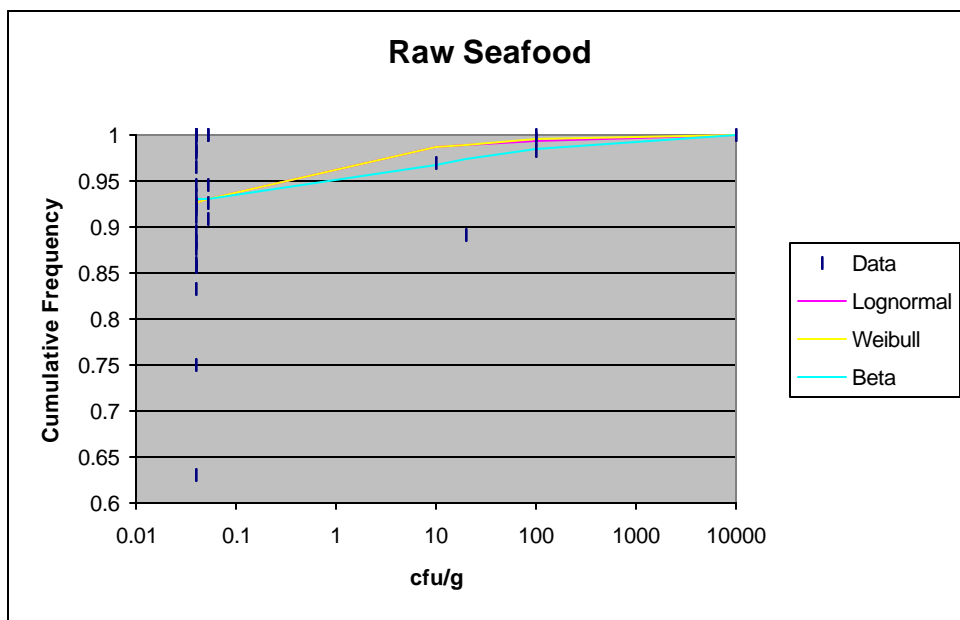**Figure A5.3.2. Cumulative Distribution for Contamination at Retail**
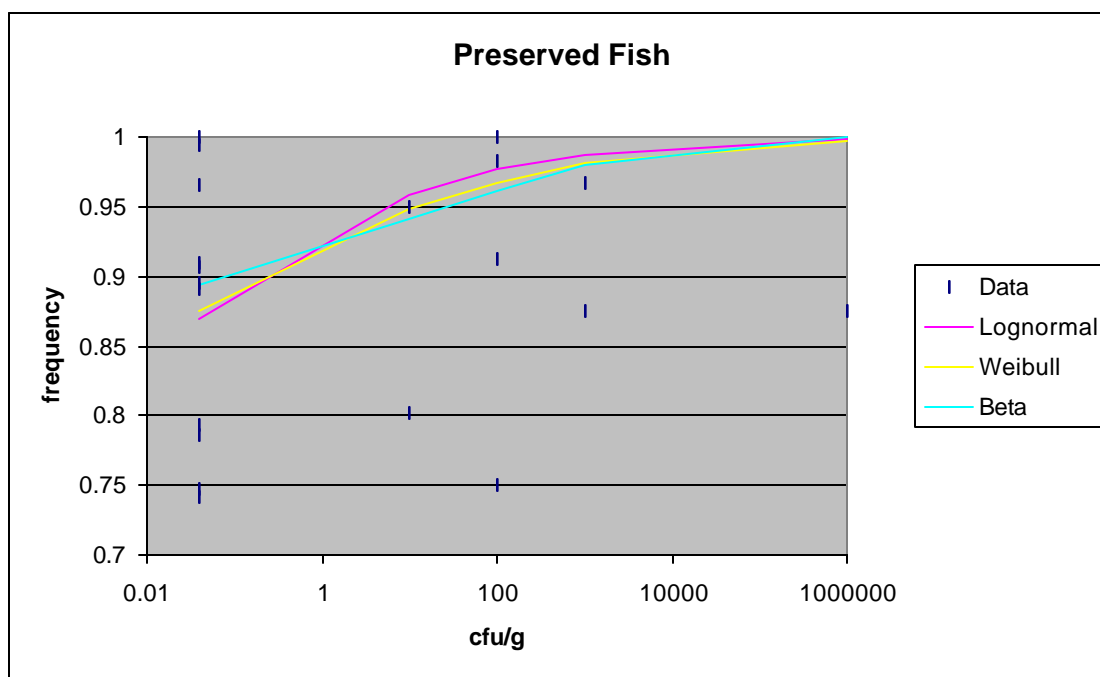
Table A5.3.4. Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	8.60×10^{-5}	9		0.28
Weibull	7.97×10^{-2}	8.47×10^{-4}		0.42
Beta	1.89×10^{-2}	30350.483	1×10^{9}	0.30

Post Retail Growth

Table A5.3.5. Foods Included in Post Retail Growth Data Set

Food	Reference
Not Applicable; no growth.	

Table A5.3.6. Consumer Storage Times Used in this Risk Assessment (days)

Not applicable; no growth

Table A5.3.7. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 ˚C

Not applicable; no growth

Table A5.3.8. Maximum Growth at Various Temperatures

Maximum growth = 10^8 cfu/g

4. Cooked Ready-to-Eat Crustaceans Food Category

Consumption

Table A5.4.1. Foods Included in Consumption Data Set

Food Code	Food
26305160	Crab, hard shell, steamed
26319130	Shrimp, steamed or boiled
27150110	Shrimp cocktail (shrimp with cocktail sauce)

Source Survey: CSFII

Figure A5.4.1. Cumulative Distribution for Serving Size

Cooked Ready-to-Eat Crustaceans

(Cumulative Frequency vs Serving Size (g))
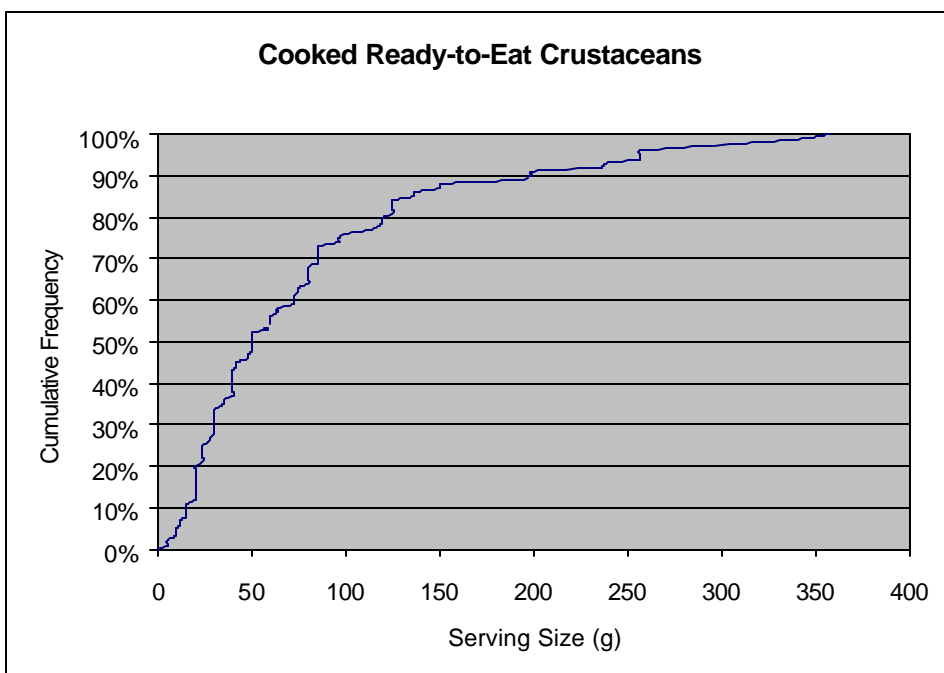
Table A5.4.2. Frequency Distribution of Amount Consumed per Serving

Percentile (grams per serving)			
50th	75th	95th	99th
50	96	256	345

Contamination at Retail

Table A5.4.3. Foods Included in Contamination Level Data Set

Food	Reference
Crab	Degnan *et al.*, 1994 Rawles *et al.*, 1995
Crab, cooked	Weagant *et al.*, 1988
Crustaceans, cooked	Richmond, 1990
Shellfish, cooked	Hartemink and Georgsson 1991
Shrimp, cooked	Ravomanana *et al.*, 1993 Weagant *et al.,* 1988
Shrimp, cooked, frozen	Valdimarsson *et al.,* 1998
Shrimp, cooked/processed	Hartemink and Georgsson, 1991
Shrimp, wholesale	Farber, 1991b

Figure A5.4.2. Cumulative Distribution for Retail Contamination
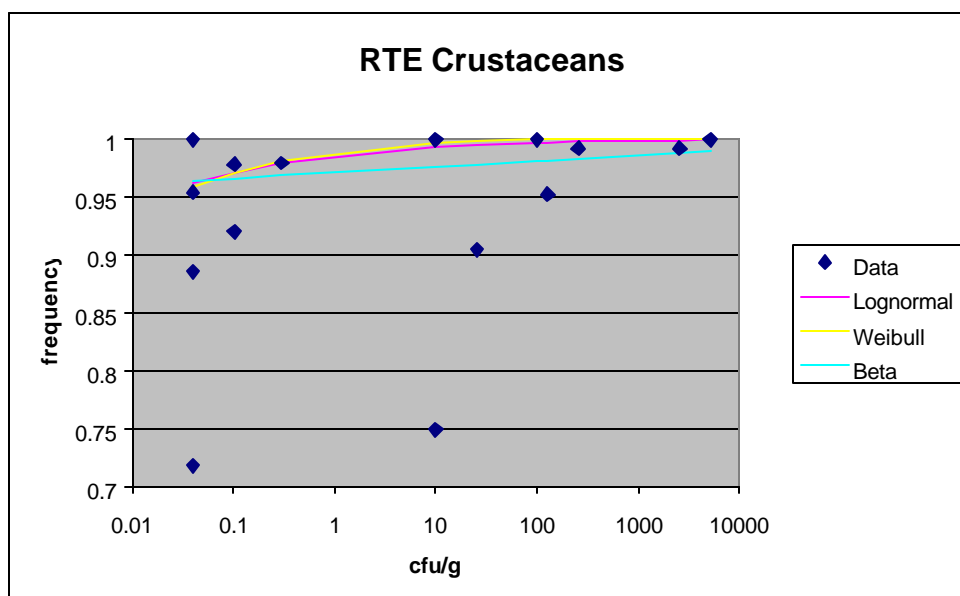
Table A5.4.4. Models Used to Characterize the Cumulative Distribution for Contamination at Retail for Cooked Ready-to-Eat Crustaceans

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	1.66×10^{-6}	9		0.35
Weibull	6.36×10^{-2}	4.11×10^{-7}		0.39
Beta	9.14×10^{-3}	71251.7732	1.00×10^{9}	0.27

Post Retail Growth

Table A5.4.5. Foods Included in Post Retail Growth Data Set

Food	Reference
Crab, cooked	Farber, 1991b
Crabmeat, pasteurized	Buchanan and Klawitter, 1992 Rawles *et al.,* 1995
Fish, smoked	Farber, 1991b
Lobster, cooked	Farber, 1991b
Shrimp, cooked	Farber, 1991b

Table A5.4.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	1 to 2	10 to 20

Figure A5.4.3. Cumulative Distribution for the Exponential Reference Growth Rate (5 °C)
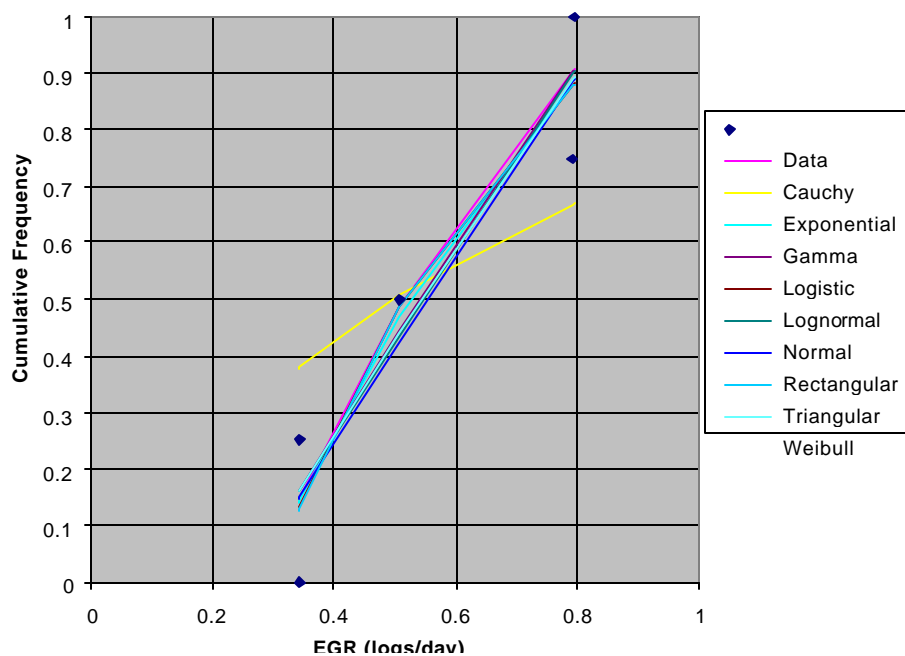
4. COOKED READY-TO-EAT CRUSTACEANS FOOD CATEGORY

Table A5.4.7. Four Models Used to Characterize the Cumulative Distribution for Exponential Growth Rates

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Rectangular	0.25	0.86		0.32
Triangular	0.24	0.34	1.06	0.25
Lognormal	-0.66	0.37		0.24
Gamma	7.69	0.07		0.19

Table A5.4.8. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 $^\circ$C

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
0.383	0.110	3

NOTE: EGR derived using random sampling of growth data.

Table A5.4.9. Maximum Growth at Various Temperatures

Temperature ($^\circ$C)	<5	5-7	>7
Maximum Growth (log$_{10}$ cfu/g)	5	6.5	8

5. Vegetables Food Category

Consumption

Table A5.5.1. Foods Included in Consumption Data Set

Food Code	Food
41203020	Kidney bean salad
41205070	Hummus
41810200	Bacon strip, meatless
41810250	Bacon bits, meatless
41810400	Breakfast link, pattie, or slice, meatless
41811400	Frankfurter or hot dog, meatless
41811600	Luncheon slice, meatless-beef, chicken, salami or turkey
41811800	Meatball, meatless
41811900	Soyburger
58101940	Taco or tostada salad, meatless, with cheese, fried flour tortilla
58151100	Sushi, not further specified
58151120	Sushi, with vegetables, no fish
58151140	Sushi, with vegetables, rolled in seaweed
71601010	Potato salad with egg
71602010	Potato salad, German style
71603010	Potato salad
71905000	Ripe plantain, raw
72101100	Beet greens, raw
72113100	Dandelion greens, raw
72116000	Endive, chicory, escarole, or romaine lettuce, raw
72116140	Caesar salad (with romaine)
72124100	Radicchio, raw
72125100	Spinach, raw
72130100	Watercress, raw
72201100	Broccoli, raw
73101010	Carrots, raw
73101110	Carrots, raw, salad
73101210	Carrots, raw, salad with apples
74101000	Tomatoes, raw
74102000	Tomatoes, green, raw
74205020	Tomato, green, pickled
74206000	Tomatoes, red, dried
74402100	Salsa, not further specified
74402110	Salsa, red, uncooked
74402150	Salsa, red, cooked, not homemade
74402200	Salsa, red, cooked, homemade

74402250	Enchilada sauce, red
74402260	Enchilada sauce, green
74402310	Green tomato-chile sauce, raw (Salsa de tomate verde cruda)
74403010	Tomato sauce
74405010	Tomato relish
74506000	Tomato and cucumber salad made with tomato, cucumber, oil, and vinegar
75100250	Raw vegetable, not further specified
75100300	Sprouts, not further specified
75100500	Alfalfa sprouts, raw
75100750	Artichoke, Jerusalem, raw
75100800	Asparagus, raw
75101000	Bean sprouts, raw (soybean or mung)
75101800	Beans, string, green, raw
75102500	Beets, raw
75102750	Brussels sprouts, raw
75103000	Cabbage, green, raw
75104000	Cabbage, Chinese, raw
75105000	Cabbage, red, raw
75105500	Cactus, raw
75107000	Cauliflower, raw
75109000	Celery, raw
75109500	Chives, raw
75109550	Cilantro, raw
75109600	Corn, raw
75111000	Cucumber, raw
75111200	Eggplant, raw
75111500	Garlic, raw
75111800	Jicama, raw
75112500	Leek, raw
75113000	Lettuce, raw
75113060	Lettuce, Boston, raw
75113080	Lettuce, arugula, raw
75114000	Mixed salad greens, raw
75115000	Mushrooms, raw
75117010	Onions, young green, raw
75117020	Onions, mature, raw
75119000	Parsley, raw
75120000	Peas, green, raw
75121000	Pepper, hot chili, raw
75121400	Pepper, poblano, raw
75121500	Pepper, Serrano, raw
75122000	Pepper, raw, not further specified
75122100	Pepper, sweet, green, raw

75122200	Pepper, sweet, red, raw
75124000	Pepper, banana, raw
75125000	Radish, raw
75127500	Seaweed, raw
75127750	Snowpeas (pea pod), raw
75128000	Squash, summer, yellow, raw
75128010	Squash, summer, green, raw
75129000	Turnip, raw
75140500	Broccoli salad with cauliflower, cheese, bacon bits, and dressing
75141000	Cabbage salad or coleslaw, with dressing
75141100	Cabbage salad or coleslaw with apples and/or raisins, with dressing
75141200	Cabbage salad or coleslaw with pineapple, with dressing
75142500	Cucumber salad with creamy dressing
75142550	Cucumber salad made with cucumber, oil, and vinegar
75142600	Cucumber salad made with cucumber and vinegar
75143000	Lettuce, salad with assorted vegetables including tomatoes and/or carrots, no dressing
75143050	Lettuce, salad with assorted vegetables excluding tomatoes and carrots, no dressing
75143100	Lettuce, salad with avocado, tomato, and/or carrots, with or without other vegetables, no dressing
75143200	Lettuce, salad with cheese, tomato and/or carrots, with or without other vegetables, no dressing
75143300	Lettuce, salad with egg, tomato, and/or carrots, with or without other vegetables, no dressing
75143350	Lettuce salad with egg, cheese, tomato, and/or carrots, with or without other vegetables, no dressing
75144100	Lettuce, wilted, with bacon dressing
75145000	Seven-layer salad (lettuce salad made with a combination of onion, celery, green pepper, peas, mayonnaise, cheese, eggs)
75146000	Greek Salad
75147000	Spinach salad, no dressing
75200600	Algae, dried
75201030	Artichoke salad in oil
75221100	Onion, dehydrated
75232000	Seaweed, dried
75232050	Seaweed, prepared with soy sauce
75236000	Yeast

75236500	Yeast extract spread
75302080	Bean salad, yellow and/or green string beans
75412030	Eggplant dip
75416500	Pea salad
75416600	Pea salad with cheese
75500210	Beets, pickled
75501010	Corn relish
75502010	Cauliflower, pickled
75502500	Cabbage, fresh, pickled, Japanese style
75502510	Cabbage, red, pickled
75502520	Cabbage, Kim Chee style
75503010	Cucumber pickles, dill
75503020	Cucumber pickles, relish
75503030	Cucumber pickles, sour
75503040	Cucumber pickles, sweet
75503050	Cucumber pickles, fresh
75503080	Eggplant, pickled
75503090	Horseradish
75503100	Mustard pickles
75503110	Cucumber pickles, dill, reduced salt
75505000	Mushrooms, pickled
75506010	Mustard
75506100	Mustard sauce
75507000	Okra, pickled
75510000	Olives, not further specified
75510010	Olives, green
75510020	Olives, black
75510030	Olives, green, stuffed
75511010	Peppers, hot, sauce
75511020	Peppers, pickled
75511040	Pepper, hot, pickled
75511100	Pickles, not specified as to vegetable
75512010	Radishes, pickled, Hawaiian style
75512510	Recaito (Puerto Rican little coriander)
75515010	Vegetable relish
75515100	Vegetables, pickled
91501100	Gelatin salad with vegetables
91511100	Gelatin salad, dietetic, with vegetables, sweetened with low calorie sweetener

Source Survey: CSFII

Figure A5.5.1. Empirical Cumulative Distribution For The Serving Size

Vegetables

(Empirical cumulative distribution plot: x-axis "Serving Size (g)" from 0 to 800; y-axis "Cumulative Frequency" from 0 to 1. The curve rises steeply near the origin and levels off approaching 1.)
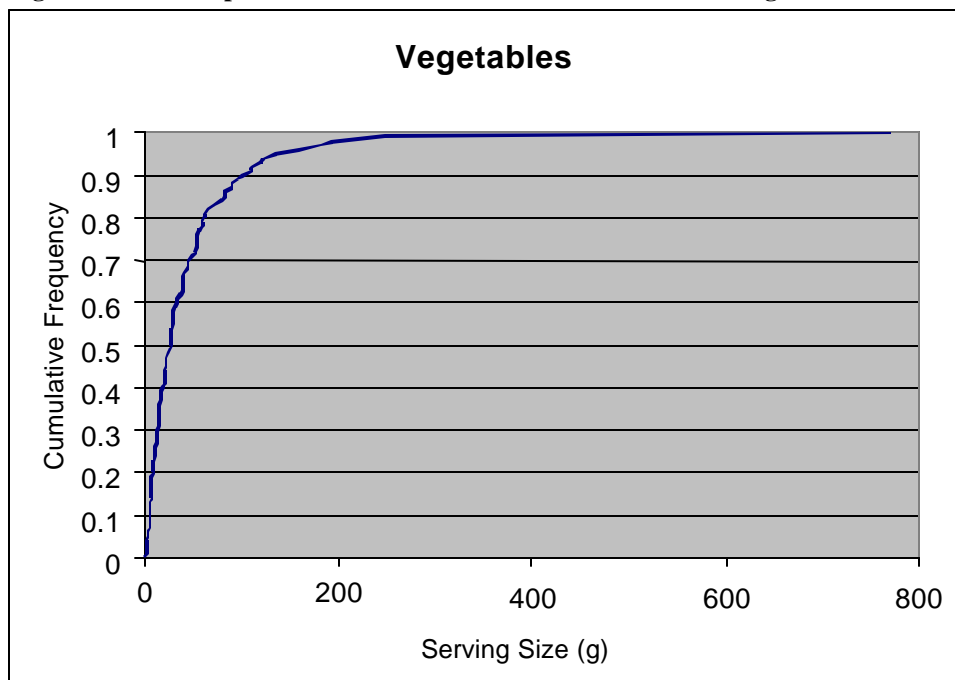
Table A5.5.2. Frequency Distribution of Amount Consumed per Serving

Percentile (grams per serving)

50th	75th	95th	99th
28	55	135	248

Contamination at Retail

Table A5.5.3. Foods Included in Contamination Level Data Set

Food	Reference
Bean sprouts	Velani and Roberts, 1991
Broccoli florets	Odumeru *et al.*, 1997
Cabbage	Heisick, *et al.,* 1989
	Salamah, 1993
	Velani and Roberts, 1991
Cabbage salad	Monge and Arias, 1996
Carrots	Salamah, 1993
	Velani and Roberts, 1991
Celery	Farber *et al.*, 1989
	Marranzano *et al.*, 1996
	Velani and Roberts, 1991
Coleslaw, mix	Odumeru *et al.*, 1997
Coleslaw, vegetable	Ng and Seah, 1995
Cress	Velani and Roberts, 1991
Cucumber	Heisick *et al.,* 1989
	Salamah, 1993
	Velani and Roberts, 1991
Fennel	Marranzano *et al.*, 1996
Legumes	Teufel and Bendzulla, 1993
Lettuce[a]	Farber *et al.*, 1989
	Heisick *et al.,* 1989
	Marranzano *et al.*, 1996
	Odumeru *et al.*, 1997
	Salamah, 1993
	Tang *et al.*, 1994
	Velani and Roberts, 1991
Mushrooms	Heisick, *et al.,* 1989
	Teufel and Bendzulla, 1993
	Velani and Roberts, 1991
Onion, spring	Velani and Roberts, 1991
Peppers	Velani and Roberts, 1991
Pepper, green	Odumeru *et al.*, 1997
Radishes	Farber *et al.,* 1989
	Heisick, *et al.,* 1989
	Velani and Roberts, 1991

Salad	de Simon *et al.*, 1992
	Garcia-Gimeno *et al.*, 1996
	Heinitz, 1999
	Lin *et al.*, 1996
	McLauchlin and Gilbert, 1990
	Uyttendaele *et al.,* 1999
	West and North Yorkshire Joint
	Working Group, 1991
Salad, mixed	Breer, 1988
	Odumeru *et al.*, 1997
Salad, potato	Ryu *et al.,* 1992
Salad, prepackaged, mixed	Velani and Roberts, 1991
Tomato	Farber *et al.,* 1989
	Velani and Roberts, 1991
Vegetables, mixed	Beckers, 1988
	Breer, 1988
	Sizmur and Walker, 1988
	Teufel and Bendzulla, 1993
	Velani and Roberts, 1991
	Wong *et al.,* 1998
Processed Vegetables	McLauchlin and Gilbert, 1990
Watercress	Velani and Roberts, 1991

Figure A5.5.2. Cumulative Distribution for Retail Contamination
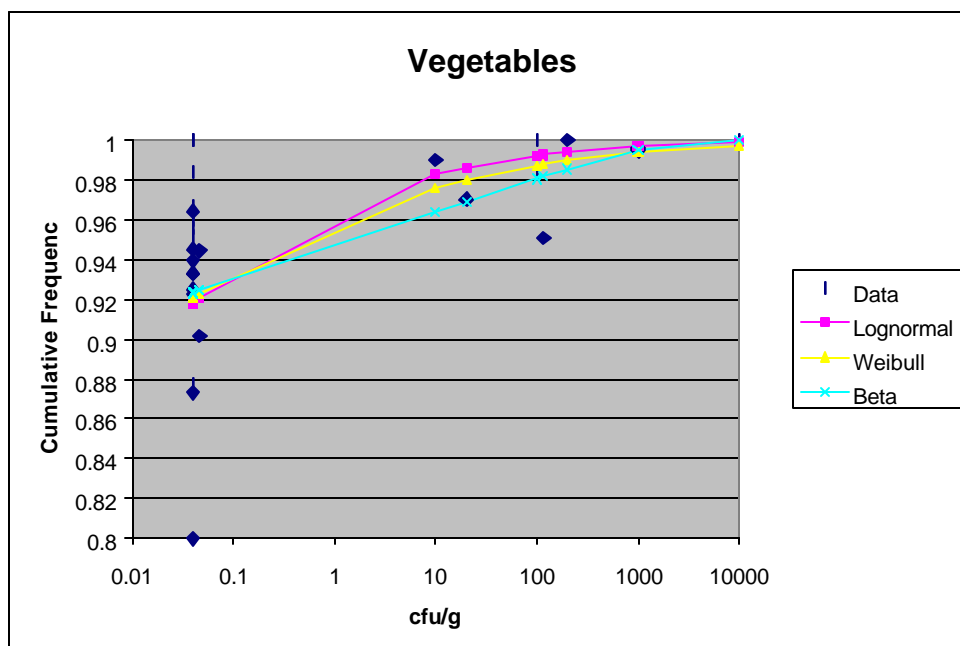
Table A5.5.4. Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	1.01×10^{-6}	7.616325		0.31
Weibull	6.98×10^{-2}	6.65×10^{-8}		0.34
Beta	7.73×10^{-3}	471073.015	1.00×10^{9}	0.35

Post Retail Growth

Table A5.5.5. Foods Included in Post Retail Growth Data Set

Foods	Reference
Asparagus	Berrang *et al.,*1989
Broccoli	Berrang *et al.,*1989
Cabbage	Beuchat *et al.,*1986
Carrots	Beuchat and Brackett, 1990a
Cauliflower	Berrang *et al.,*1989
Endive	Carlin and Nguyen-The, 1994 Carlin *et al.,*1996
Lettuce	Beuchat and Brackett, 1990b Carlin and Nguyen-The, 1994 Steinbrugge *et al.,*1988
Salads, mixed, prepackaged [a]	Sizmur and Walker, 1988
Tomatoes	Beuchat and Brackett, 1991

[a]Includes fruits/nuts

Table A5.5.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	3 to 4	8 to 12

Figure A5.5.3. Cumulative Distribution for the Exponential Growth Rate (EGR) at 5 ° C
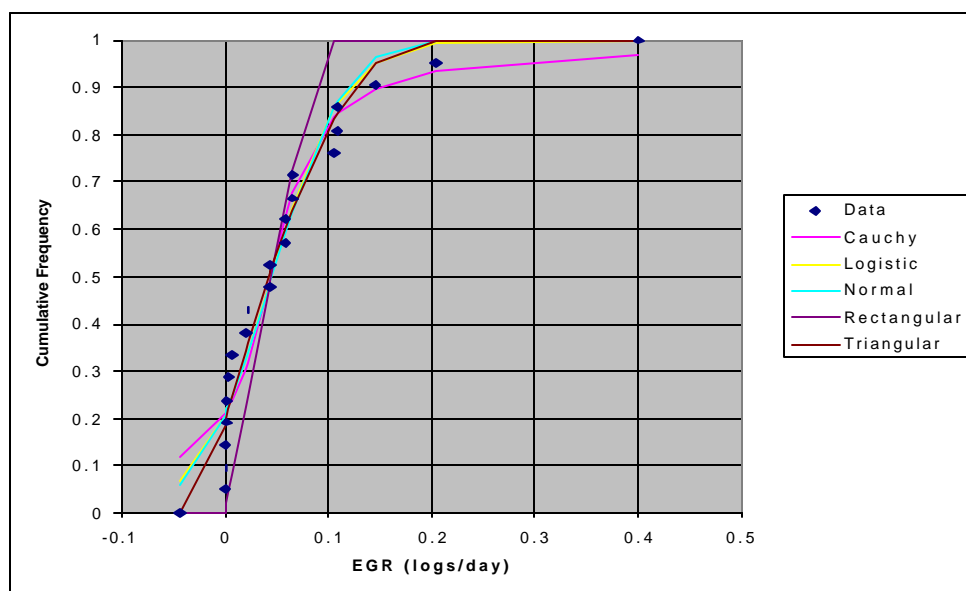
Table A5.5.7. Models Used to Characterize the Cumulative Distribution for Exponential Growth Rates

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Triangle	1.34×10^{-4}	-4.39×10^{-2}	0.194	0.98
Logistic	4.51×10^{-2}	3.38×10^{-2}		0.01
Normal	0.045	0.056		0.01

Table A5.5.8. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 °C

Mean ($\log_{10}$ cfu/g/day)	Std. Dev.	N
0.065	0.094	22

NOTE: EGR derived using triangular distribution of growth data.

Table A5.5.9. Maximum Growth at Various Temperatures

Temperature (°C)	<5	5-7	>7
Maximum Growth ($\log_{10}$ cfu/g)	5	6.5	8

6. Fruits Food Category

Consumption

Table A5.6.1. Foods Included in Consumption Data Set

Food Code	Food
42501000	Nut mixture with dried fruit and seeds
42502000	Nut mixture with seeds
61101010	Grapefruit, raw
61119010	Orange, raw
61125000	Tangelo, raw
61125010	Tangerine, raw
62101000	Fruit, dried, not further specified (assume uncooked)
62101050	Fruit mixture, dried (mixture includes three or more of the following: apples, apricots, dates, papaya, peaches, pears, pineapples, prunes, raisins)
62101100	Apple, dried, uncooked
62101300	Apple chips
62104100	Apricot, dried, uncooked
62107200	Banana chips
62110100	Date
62113100	Fig, dried, uncooked
62114050	Mango, dried
62114110	Papaya, dried
62120100	Pineapple, dried
62121100	Plum, rock salt, dried
62122100	Prune, dried, uncooked
62125100	Raisins
63100100	Fruit, not specified as to type
63101000	Apple, raw
63101150	Applesauce with other fruits
63101420	Apple, pickled
63103010	Apricot, raw
63105010	Avocado, raw
63107010	Banana, raw
63107080	Banana, red, ripe (guineo morado)
63109010	Cantaloupe (muskmelon), raw
63109700	Carambola (starfruit), raw
63110010	Cassaba melon, raw
63111010	Cherries, maraschino
63113010	Cherries, sour, red, raw

63115010	Cherries, sweet, raw (Queen Anne, Bing)
63115200	Cherries, frozen
63119010	Fig, raw
63123010	Grapes, European type, adherent skin, raw
63123020	Grapes, American type, slip skin, raw
63125010	Guava, raw
63126500	Kiwi fruit, raw
63127010	Honeydew melon, raw
63127610	Honeydew, frozen (balls)
63129010	Mango, raw
63129020	Mango, pickled
63131010	Nectarine, raw
63133010	Papaya, raw
63134010	Passion fruit, raw
63135010	Peach, raw
63135620	Peach, frozen, unsweetened
63135630	Peach, frozen, with sugar
63137010	Pear, raw
63137050	Pear, Japanese, raw
63139010	Persimmon, raw
63141010	Pineapple, raw
63143010	Plum, raw
63145010	Pomegranate, raw
63149010	Watermelon, raw
63201010	Blackberries, raw
63201600	Blackberries, frozen
63203010	Blueberries, raw
63203600	Blueberries, frozen, unsweetened
63205010	Boysenberries, raw
63219020	Raspberries, red, raw
63219610	Raspberries, frozen, unsweetened
63219620	Raspberries, frozen, with sugar
63223020	Strawberries, raw
63223030	Strawberries, raw, with sugar
63223610	Strawberries, frozen, unsweetened
63223620	Strawberries, frozen, with sugar
63301010	Ambrosia
63307010	Cranberry-orange relish, uncooked
63307100	Cranberry-raspberry Sauce
63311000	Fruit cocktail or mix (excluding citrus fruits), raw
63311050	Fruit cocktail or mix (including citrus fruits), raw
63311080	Fruit cocktail or mix, frozen
63320100	Fruit salad, Puerto Rican style (Mixture

	includes bananas, papayas, oranges, grapefruit, etc.) (Ensalada de frutas tropicales)
63401010	Apple salad with dressing
63401020	Apple and cabbage salad with dressing
63401060	Apple, candied
63402950	Fruit salad (excluding citrus fruits) with salad dressing or mayonnaise
63402960	Fruit salad (excluding citrus fruits) with cream
63402970	Fruit salad (excluding citrus fruits) with cream substitute
63402980	Fruit salad (excluding citrus fruits) with marshmallows
63403000	Fruit salad (excluding citrus fruits) with pudding
63403010	Fruit salad (including citrus fruits) with salad dressing or mayonnaise
63403020	Fruit salad (including citrus fruit) with cream
63403030	Fruit salad (including citrus fruits) with cream substitute
63403040	Fruit salad (including citrus fruits) with marshmallows
63403100	Fruit dessert with cream and/or pudding and nuts
63408010	Guacamole with tomatoes
63408200	Guacamole with tomatoes and chili peppers
63409010	Guacamole, not further specified
63409020	Chutney
63411010	Cranberry salad, congealed
63412010	Pear salad with dressing
63413020	Pineapple salad with cream cheese
91501020	Gelatin dessert with fruit
91501040	Gelatin dessert with fruit and whipped cream
91501080	Gelatin dessert with fruit and cream cheese
91501090	Gelatin dessert with fruit, vegetable, and nuts
91511020	Gelatin dessert, dietetic, with fruit, sweetened with low calorie sweetener
91511090	Gelatin dessert, dietetic, with fruit and vegetable(s), sweetened with low calorie sweetener
91511110	Gelatin dessert, dietetic, with fruit and whipped topping, sweetened with low calorie sweetener

Source Survey: CSFII

Figure A5.6.1. Empirical Cumulative Distribution For The Serving Size
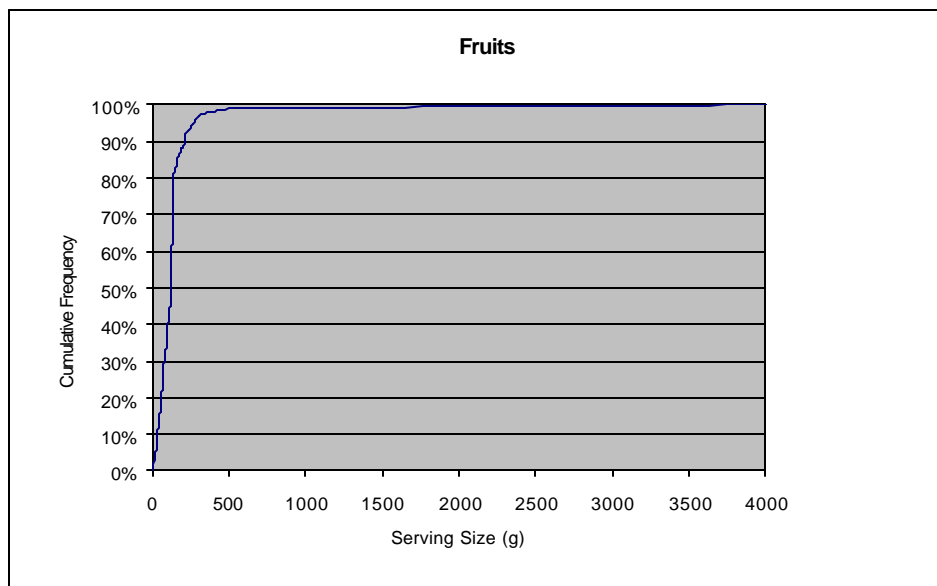
Table A5.6.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	**75th**	**95th**	**99th**
118	138	272	570

Contamination at Retail

Table A5.6.3. Foods Included in Contamination Level Data Set

Food	Reference
Coconut, grated	McLauchlin and Gilbert, 1990
Fruit products	Heinitz, 1999
	Teufel and Bendzulla, 1993
Fruit, fresh	Teufel and Bendzulla, 1993
Fruit and nuts	West and North Yorkshire Joint Working Group, 1991
Nuts/edible seeds	Heinitz, 1999
Salad, fruit/nut/herbs	McLauchlin and Gilbert, 1990

Figure A5.6.2. Cumulative Distribution for Retail Contamination
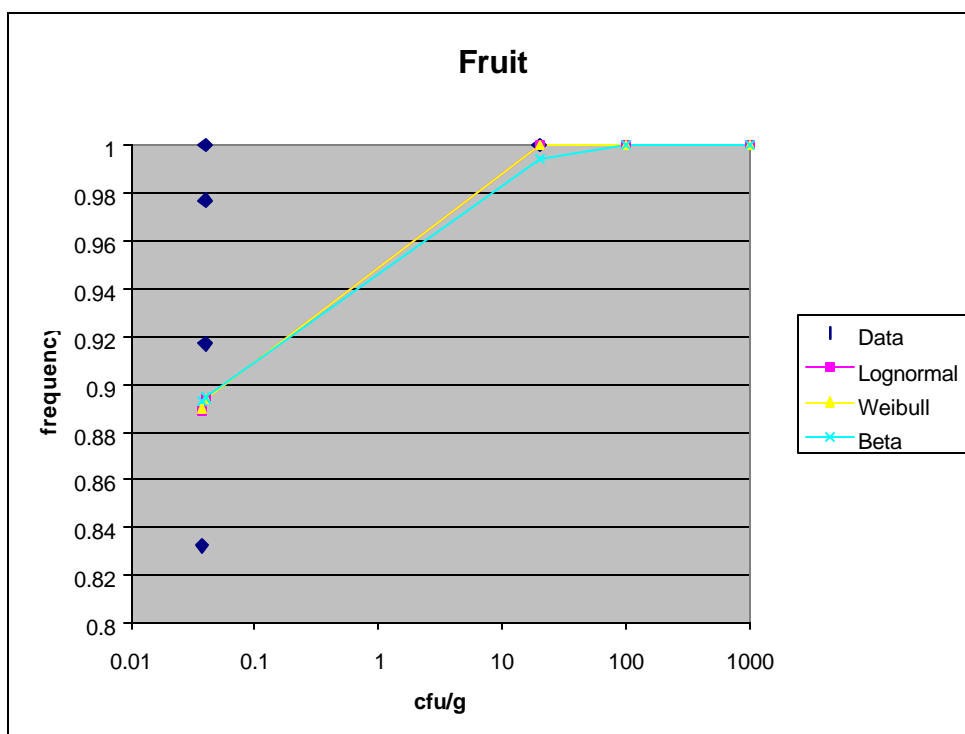
Table A5.6.4. Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	1.98×10^{-3}	2.41		0.36
Weibull	2.34×10^{-1}	1.27×10^{-3}		0.34
Beta	1.90×10^{-2}	39405269.6	1.00×10^{9}	0.30

Post Retail Growth

Table A5.6.5. Foods Included in Post Retail Growth Data Set

Foods	Reference
Orange, juice	Parish and Higgins, 1989

Table A5.6.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	3 to 4	8 to 12

Table A5.6.7. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 °C

Mean ($\log_{10}$ cfu/g/day)	Std. Dev.	N
0.041	NA	1

NOTE: Because of the lack of data from fruits, EGR derived using random sampling of growth data from vegetables.

Table A5.6.8. Maximum Growth at Various Temperatures

Temperature (°C)	<5	5-7	>7
Maximum Growth ($\log_{10}$ cfu/g)	5	6.5	8

7. Soft Mold-Ripened and Blue-Veined Cheeses Food Category

Consumption

Table A5.7.1. Foods Included in Consumption Data Set

Food Code	Food
14101010	Cheese, Blue or Roquefort
14103010	Cheese, Camembert
14103020	Cheese, Brie

Source Survey: CSFII

Figure A5.7.1. Cumulative Distribution for Serving Size
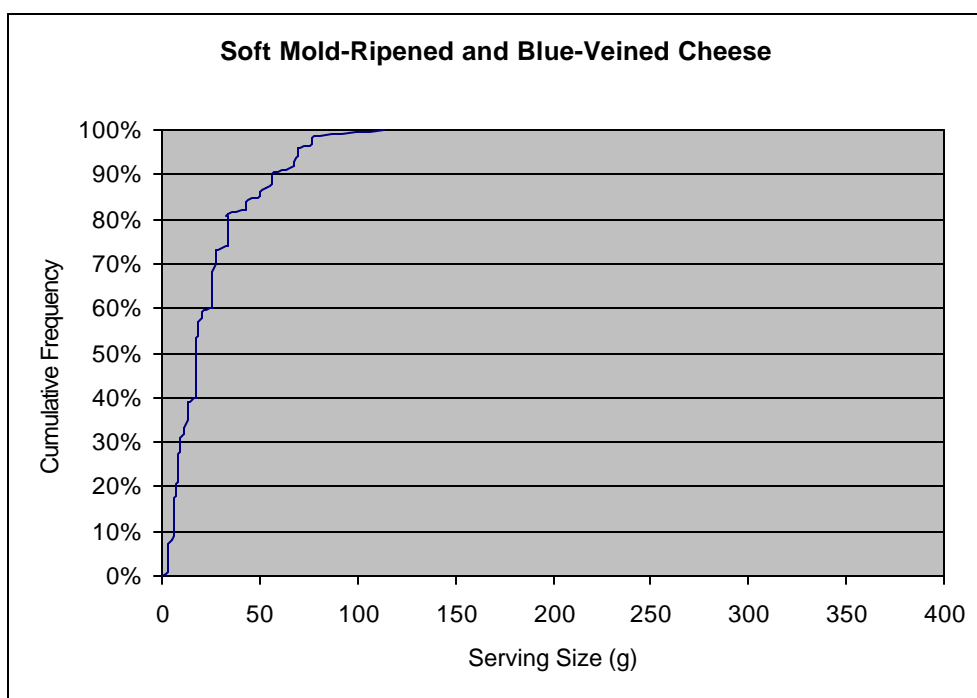
Table A5.7.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
17	34	69	87

Contamination at Retail

Table A5.7.3. Foods Included in Contamination Level Data Set

Foods	Reference
Brie/Camembert	Beckers, 1988
Blue cheese	Oregon Dept of Agriculture, 2000
Camembert	Oregon Dept of Agriculture, 2000
Cheese, blue-veined	De Boer and Kuik, 1987
Cheese, mold-ripened	Rodler and Korbler, 1989
Cheese, mold-ripened and blue-veined	Greenwood *et al.*, 1991 Loncarevic *et al.*, 1995
Cheese, soft, semi-soft	Breer and Schopfer, 1989
Cheese, white mold	Breer and Schopfer, 1989
Gorgonzola	Pinto and Reali, 1996

Figure A5.7.2. Cumulative Distribution for Retail Contamination
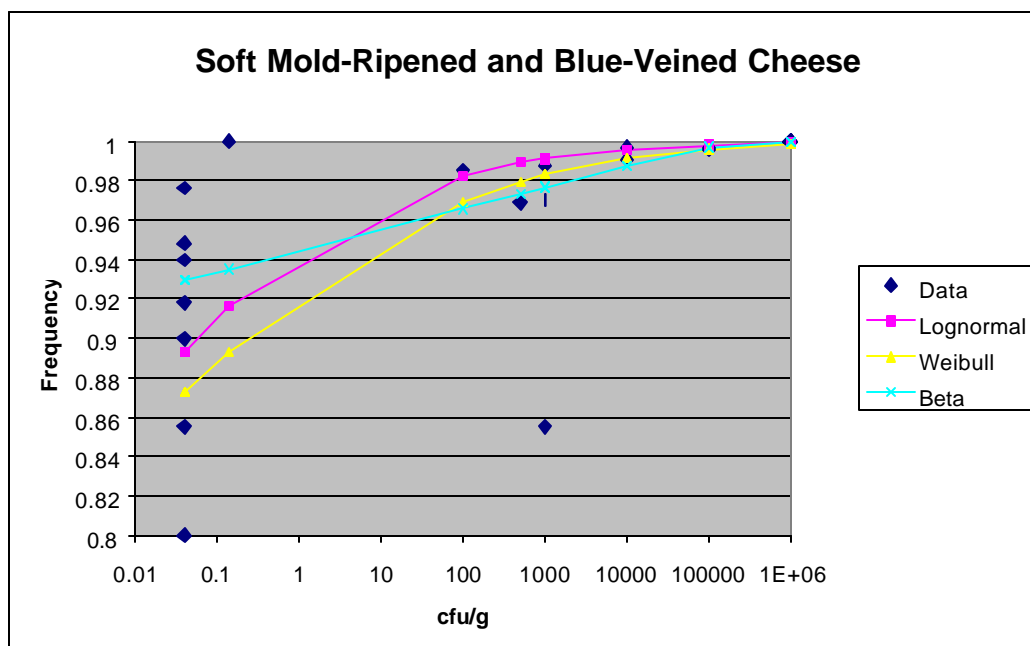
Table A5.7.4. Three Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	5.47×10^{-7}	9		0.20
Weibull	6.75×10^{-2}	9.04×10^{-7}		0.24
Beta	4.90×10^{-3}	4643.10891	1.00×10^{9}	0.56

Post Retail Growth

Table A5.7.5 Foods Included in Post Retail Growth Data Set

Foods	Reference
Blue cheese	Papageorgiou and Marth, 1989a
Camembert	Back *et al.,* 1993
	Farber *et al.,*1987
	Ryser and Marth, 1987b
	Sulzer and Busse, 1993

Table A5.7.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	6 to 10	15 to 45

Figure A5.7.3 Cumulative Distribution for the Exponential Reference Growth Rate (5 °C)

Table A5.7.7. Models Used to Characterize the Cumulative Distribution for Exponential Growth Rates

Model	Parameter 1	Parameter 2	Probability
Rectangular	0.0001	0.092437	0.42
Exponential	1.79×10^{1}		0.20
Normal	0.043793	0.041704	0.20
Logistic	4.39×10^{2}	2.58×10^{-2}	0.19

Table A5.7.8. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 °C

Mean ($\log_{10}$ cfu/g/day)	Std. Dev.	N
0.058	0.068	7

NOTE: EGR derived using random sampling of growth data.

Table A5.7.9. Maximum Growth at Various Temperatures

Temperature (°C)	<5	5-7	>7
Maximum Growth (log $_{10}$ cfu/g)	5	6.5	8

8. Goat, Sheep, and Feta Cheese Food Category

Consumption

Table A5.8.1. Foods Included in Consumption Data Set

Food Code	Food
14104400	Cheese, Feta
14104700	Cheese, goat

Source Survey: CSFII

Figure A5.8.1.Cumulative Distribution for Serving Size

Goat, Sheep, and Feta Cheese
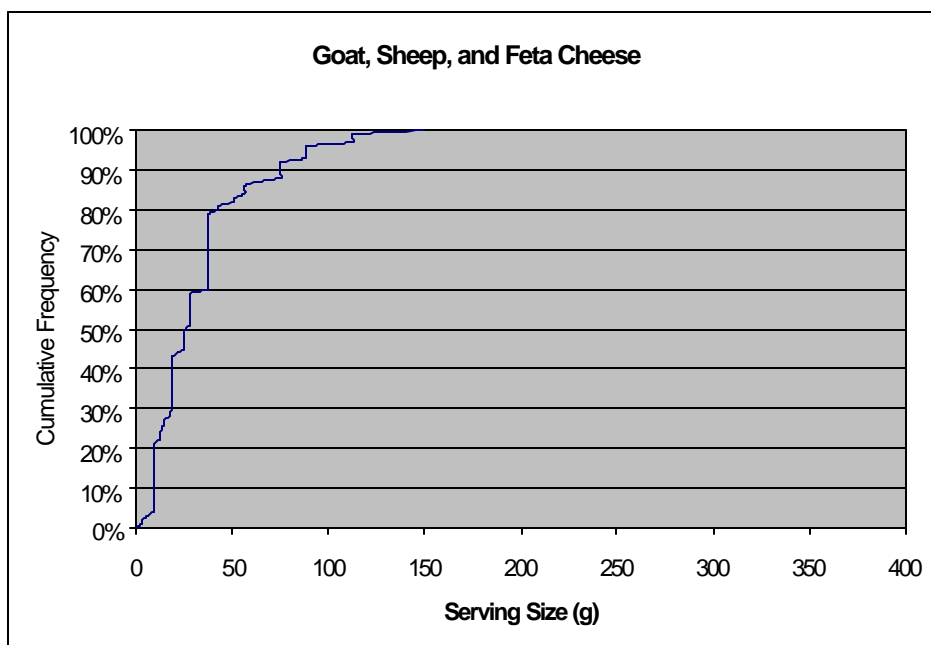
Table A5.8.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
26	38	88	113

Contamination at Retail

Table A5.8.3. Foods Included in Contamination Level Data Set

Foods	Reference
Anari	McLauchlin *et al.*, 1990
Cheese, goat	Greenwood *et al.*, 1991
	McLauchlin *et al.*, 1990
	Oregon Dept of Agriculture, 2000
	Teufel and Bendzulla, 1993
Cheese, sheep	Greenwood *et al.*, 1991
	Oregon Dept of Agriculture, 2000
	Sanchez-Rey *et al.*, 1993
	Teufel and Bendzulla, 1993
Feta	McLauchlin *et al.*, 1990
Ogjestost	McLauchlin *et al.*, 1990
Halloumi	McLauchlin *et al.*, 1990

Figure A5.8.2.Cumulative Distribution for Retail Contamination

Table A5.8.4. Three Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	1.47×10^{-7}	9		0.34
Weibull	7.07×10^{-2}	2.83×10^{-8}		0.33
Beta	8.03×10^{-3}	1084415.69	1.00×10^9	0.33

Post Retail Growth

Table A5.8.5. Foods Included in Post Retail Growth Data Set

Foods	Reference
Cheese, goat	Tham, 1988
Feta	Papageorgiou and Marth, 1989b
Turkish white/ Brined cheese	Sarimehmetoglu and Kaymaz, 1994

Table A5.8.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	6 to 10	15 to 45

Table A5.8.7. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 °C

The exponential growth rate (log/day at 5 °C) used a triangular distribution based on the minimum, most frequent and maximum of the three values taken from the literature: 0, 0.015, -0.008.

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
-0.008	0.008	3

Table A5.8.8. Maximum Growth at Various Temperatures

Temperature (°C)	<5	5-7	>7
Maximum Growth (log$_{10}$ cfu/g)	5	6.5	8

9. Fresh Soft Cheeses Food Category

Consumption

Table A5.9.1. Foods Included in Consumption Data Set

Food Code	Food
14131500	Queso Asadero
14132000	Queso Chihuahua
14133000	Queso Fresco
14203510	Puerto Rican white cheese (queso del pais, blanco)

Source Survey: CSFII

Figure A5.9.1. Cumulative Distribution for Serving Size
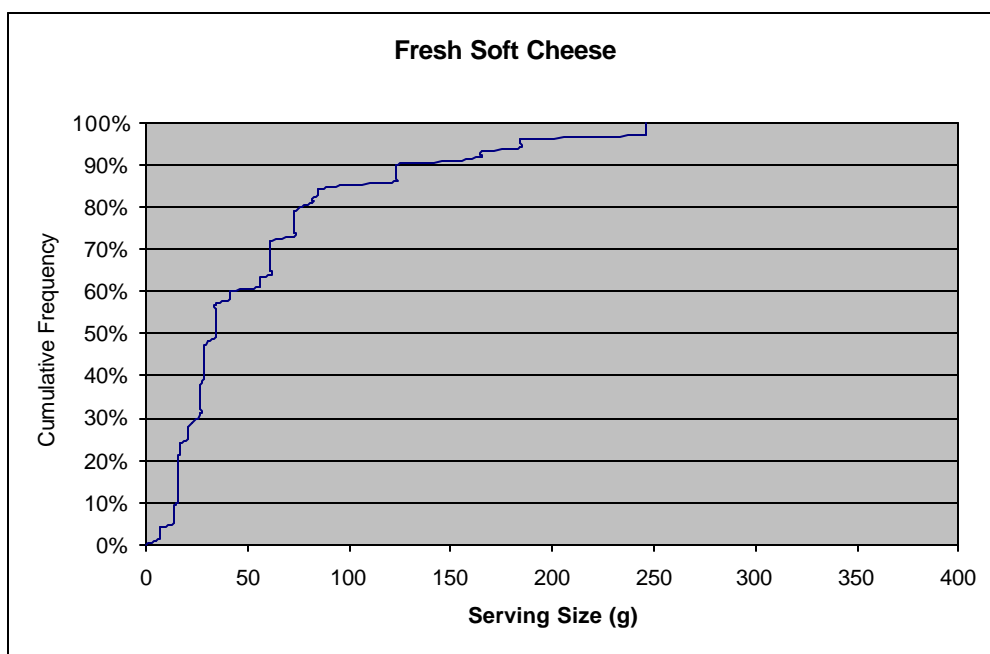
Table A5.9.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
34	73	185	246

Contamination at Retail

Table A5.9.3. Foods Included in Contamination Level Data Set

Foods	Reference
Fresh cheese	Weber *et al.,* 1988
	Gelosa, 1990
Hispanic-style soft cheese	Oregon Department of Agriculture, 2000
Quesofresco, requesoy (fresh cheese)	Ubach *et al.,* 1991

NOTE: Data from soft-ripened cheese made from unpasteurized milk (Loncarevic *et al.,* 1995 and Beckers, 1988) were used to describe the shape of the distribution curve. However, the fraction of contaminated samples was adjusted to be consistent with the fresh soft cheese data.

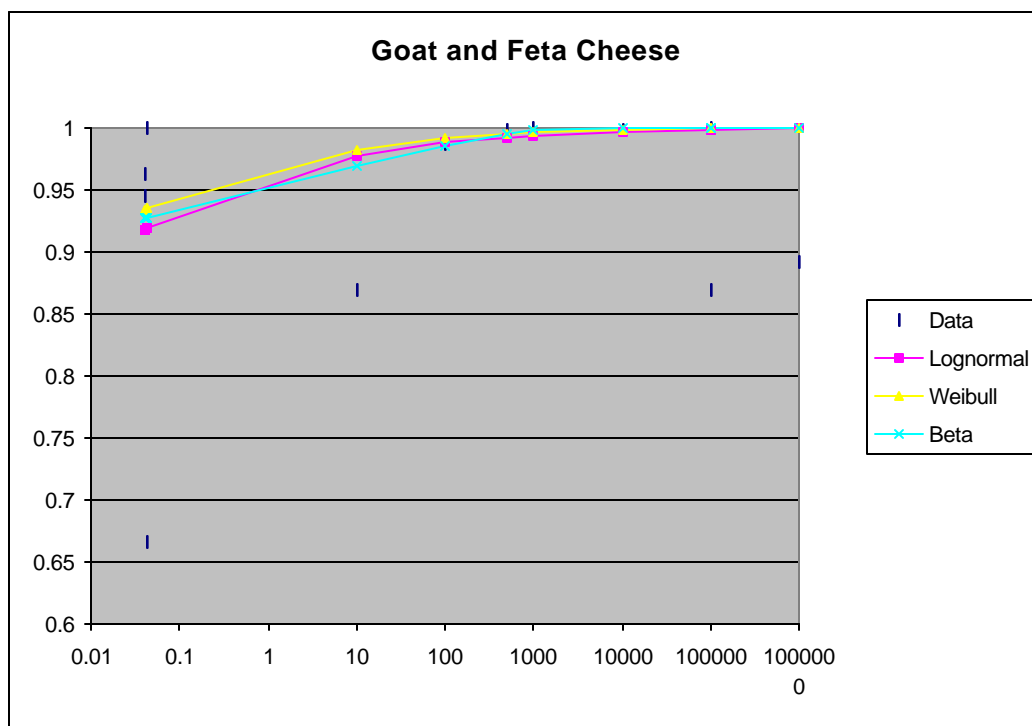**Figure A5.9.2. Cumulative Distribution for Retail Contamination**
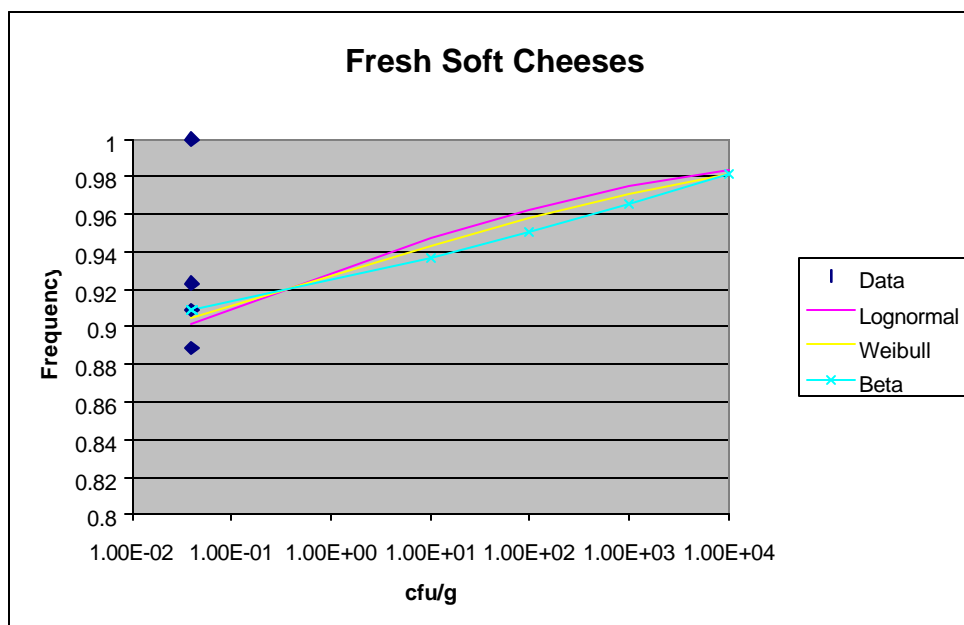
Table A5.9.4. Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	3.42×10^{-2}	9		0.31
Weibull	9.40×10^{-2}	9.20×10^{-1}		0.34
Beta	4.14×10^{-2}	6022.86775	1.00×10^{9}	0.35

Post Retail Growth

Table A5.9.5. Foods Included in Post Retail Growth Data Set

Foods	Reference
Queso blanco	Glass *et al.*, 1995

Table A5.9.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	6 to 10	15 to 45

Table A5.9.7. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 °C

The growth rate for Soft Mold-Ripened and Blue-Veined Cheese was used as a surrogate for Fresh Soft Cheeses.

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
0.142	NA	1

NOTE: EGR derived using random sampling of growth data.

Table A5.9.8. Maximum Growth at Various Temperatures

Temperature (°C)	<5	5-7	>7
Maximum Growth (log$_{10}$ cfu/g)	5	6.5	8

Figure A5.9.3 Soft mold-ripened and Blue-veined Cheese Data used as Surrogate for Cumulative Distribution for the Exponential Reference Growth Rate (5 °C)
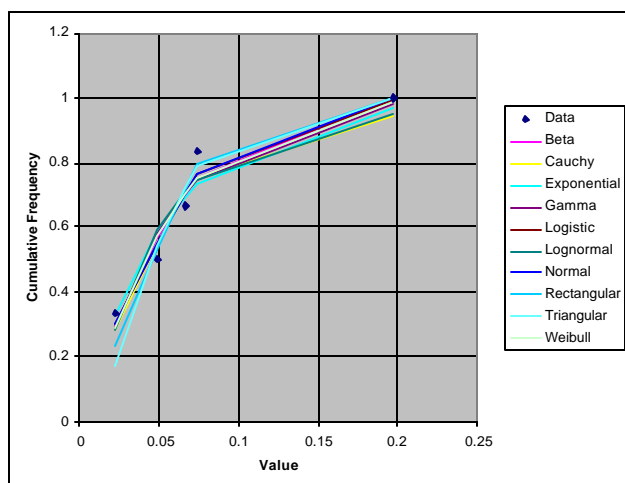
Table A5.9.9. Models from Soft mold-ripened and Blue-veined Cheese Data used as Surrogate to characterize the Cumulative Distribution for Exponential Growth Rates

Model	Parameter 1	Parameter 2	Probability
Rectangular	0.0001	0.092437	0.42
Exponential	1.79×10^{1}		0.20
Normal	0.043793	0.041704	0.20
Logistic	4.39×10^{-2}	2.58×10^{-2}	0.19

10. Heat-Treated Natural Cheeses and Processed Cheese Food Category

Consumption

Table A5.10.1. Foods Included in Consumption Data Set

Food Code	Food
14106200	Cheese, Monterey
14106500	Cheese, Monterey, lowfat
14107010	Cheese, Mozzarella, not further specified
14107030	Cheese, Mozzarella, part skim
14107040	Cheese, Mozzarella, low sodium
14107060	Cheese, Mozzarella, nonfat or fat free
14107200	Cheese, Muenster
14200100	Cheese, cottage, not further specified
14201010	Cheese, cottage, creamed, large or small curd
14201200	Cottage cheese, farmer's
14201500	Cheese, Ricotta
14202010	Cheese, cottage, with fruit
14203010	Cheese, cottage, dry curd
14203020	Cheese, cottage, salted, dry curd
14204010	Cheese, cottage, lowfat (1-2% fat)
14204020	Cheese, cottage, lowfat, with fruit
14204030	Cheese, cottage, lowfat, with vegetables
14205010	Cheese, cottage, low sodium
14206010	Cheese, cottage, lowfat, low sodium
14301010	Cheese, cream
14303010	Cheese, cream, lowfat
14410100	Cheese, processed, American and Swiss blends
14410200	Cheese, processed, American or Cheddar type
14410210	Cheese, processed, American or Cheddar type, low sodium
14410300	Cheese, processed, American or Cheddar type, lowfat
14410310	Cheese, processed, American, Cheddar, or Colby, lowfat, low sodium
14410330	Cheese, processed cheese product, American or Cheddar type, reduced fat
14410340	Cheese, processed cheese product, American or Cheddar type, reduced fat, reduced sodium
14410350	Cheese, processed, American or Cheddar type, nonfat or fat free
14410380	Cheese, processed cream cheese product, nonfat or fat free
14410400	Cheese, processed, Swiss
14410410	Cheese, processed, Swiss, low sodium
14410420	Cheese, processed, Swiss, lowfat
14410440	Cheese, processed, Swiss, lowfat, low sodium
14410450	Cheese, processed cheese product, Swiss, reduced fat
14410500	Cheese, processed cheese food
14410600	Cheese, processed, with vegetables
14410710	Cheese, processed, Mozzarella, low sodium
14420200	Cheese spread, cream cheese or Neufchatel base
14420300	Cheese spread, pressurized can
14501010	Imitation cream cheese

14502010 Imitation cheese, American or cheddar type
14502040 Imitation cheese, American or cheddar type, low cholesterol
14504010 Imitation mozzarella cheese
14610200 Cheese, cottage cheese, with gelatin dessert
14610210 Cheese, cottage cheese, with gelatin dessert and fruit

Source Survey: CSFII

Figure A5.10.1. Empirical Cumulative Distribution For The Serving Size

Table A5.10.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
21	42	113	226

Contamination at Retail

Table A5.10.3. Foods Included in Contamination Level Data Set

Foods	Reference
Cottage cheese	McLauchlin and Gilbert, 1990
	West and North Yorkshire Joint
	Working Group, 1991
Cream cheese	Oregon Dept of Agriculture, 2000
Monterey Jack	Oregon Dept of Agriculture, 2000
Mozzarella	Pinto and Reali, 1996
	Oregon Dept of Agriculture, 2000
Muenster	Oregon Dept of Agriculture, 2000
String cheese	Oregon Dept of Agriculture, 2000
Unripened soft cheese	Greenwood *et al.,* 1991

Figure A5.10.2. Cumulative Distribution for Retail Contamination

Table A5.10.4. Three Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	5.47×10^{-7}	9		0.20
Weibull	6.75×10^{-2}	9.04×10^{-7}		0.24
Beta	4.90×10^{-3}	4643.10891	1.00×10^{9}	0.59

Post Retail Growth

Table A5.10.5. Foods Included in Post Retail Growth Data Set

Foods	Reference
Cottage cheese	Genigeorgis *et al.,* 1991 Chen and Hotchkiss, 1993 Fedio *et al.,* 1994 El-Shenawy and Marth, 1990
Cream cheese	Genigeorgis *et al.,* 1991 Cottin *et al.,* 1990
Ricotta	Papageorgiou *et al.,* 1996 Genigeorgis *et al.,* 1991
Teleme cheese	Genigeorgis *et al.,* 1991
Mozzarella	Stecchini *et al.,* 1995

Table A5.10.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	6 to 10	15 to 45

Figure A5.10.3. Cumulative Distribution for the Exponential Reference Growth Rate (5 ^{0}C)
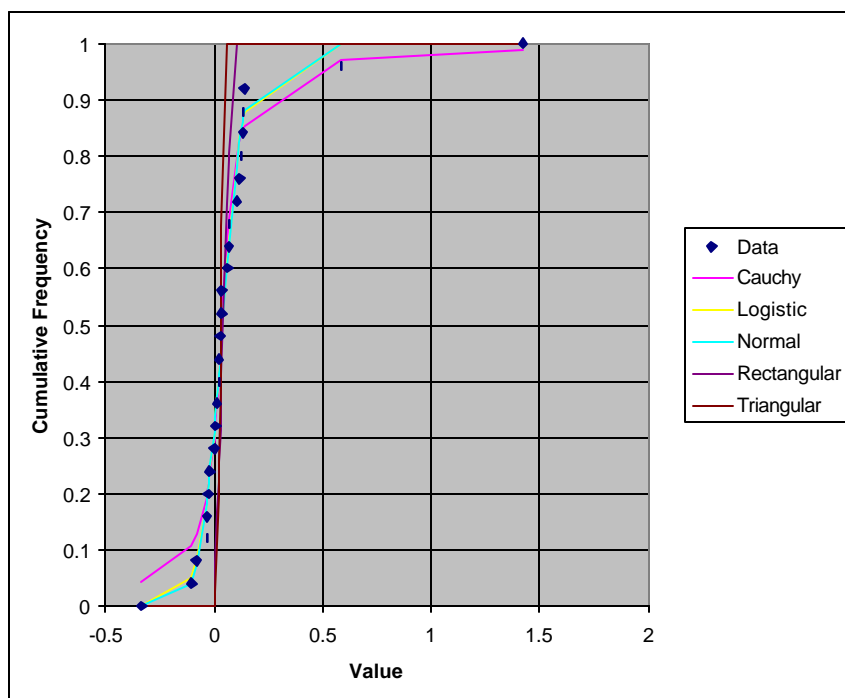
Table A5.10.7. Three Models Used to Characterize the Cumulative Distribution for Exponential Growth Rates

Model	Parameter 1	Parameter 2	Probability
Normal	0.058	0.057	0.49
Logistic	0.058	0.094	0.48
Cauchy	0.056	0.060	0.03

Table A5.10.8. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 °C

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
0.105	0.289	28

NOTE: EGR derived using random sampling of growth data.

Table A5.10.9. Maximum Growth at Various Temperatures

Temperature (°C)	<5	5-7	>7
Maximum Growth (log$_{10}$ cfu/g)	5	6.5	8

11. Aged Cheese Food Category

Consumption

Table A5.11.1. Foods Included in Consumption Data Set

Food Code	Food
14010100	Cheese, Cheddar or American type, Not Specified as to natural or processed
14100100	Cheese, natural, not further specified
14102010	Cheese, Brick
14104010	Cheese, natural, Cheddar or American type
14104020	Cheese, Cheddar or American type, dry, grated
14104200	Cheese, Colby
14104250	Cheese, Colby Jack
14104600	Fontina
14105010	Cheese, Gouda or Edam
14105200	Cheese, Gruyere
14106010	Cheese, Limburger
14108010	Cheese, Parmesan, dry grated
14108020	Cheese, Parmesan, hard
14108050	Cheese, Parmesan, low sodium
14108060	Parmesan cheese topping, fat free
14108400	Cheese, Provolone
14108410	Cheese, Provolone, reduced fat, reduced sodium
14109010	Cheese, Swiss
14109020	Cheese, Swiss, low sodium
14109030	Cheese, Swiss, lowfat
14110010	Cheese, Cheddar or Colby, low sodium
14110020	Cheese, Cheddar or Colby, low sodium, lowfat
14110030	Cheese, Cheddar or Colby, lowfat
14131000	Queso Anejo (aged Mexican cheese)

Source Survey: CSFII

Figure A5.11.1. Cumulative Distribution for Serving Size

Aged Cheese

Table A5.11.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
27	43	85	142

Contamination at Retail

Table A5.11.3. Foods Included in Contamination Level Data Set

Foods	Reference
Cheese, semi-soft and hard	Teufel and Bendzulla, 1993
	Oregon Dept of Agriculture, 2000
	Pinto and Reali, 1996
Cheese, hard	Breer and Schopfer, 1989
	Greenwood *et al.*, 1991
	McLauchlin and Gilbert, 1990
	Oregon Dept of Agriculture, 2000
	West and North Yorkshire Joint Working Group, 1991
	Weber *et al.,* 1988

Figure A5.11.2. Cumulative Distribution for Retain Contamination
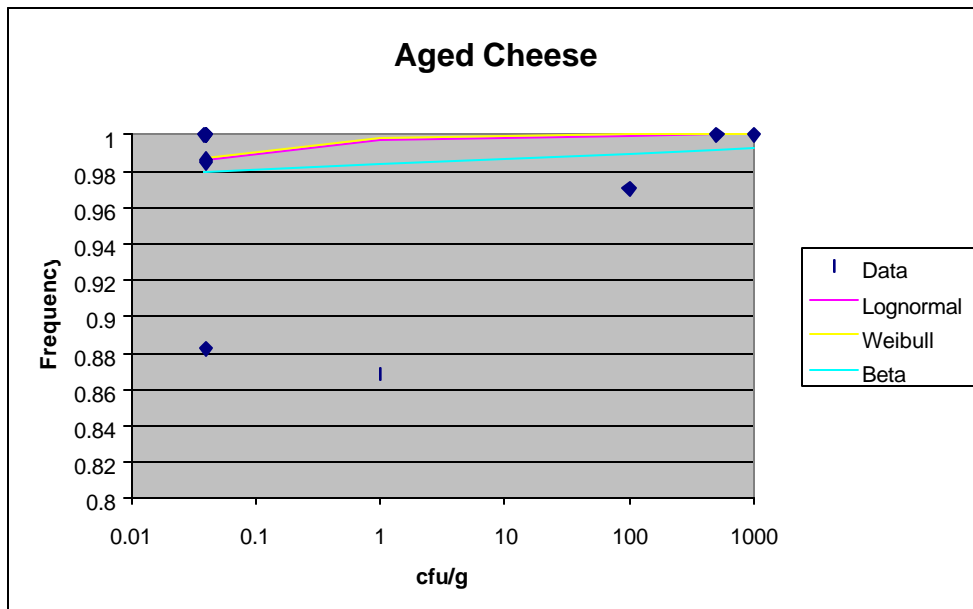
Table A5.11.4. Three Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	2.51×10^{-7}	1.21×10^{1}		0.30
Weibull	1.21×10^{-1}	2.26×10^{-7}		0.29
Beta	1.29×10^{-3}	1881.29903	1.00×10^{9}	0.41

Post Retail Growth

Table A5.11.5. Foods Included in Post Retail Growth Data Set

Foods	Reference
Brick, surface ripened	Ryser and Marth, 1989a
Cheddar	Ryser and Marth, 1987a
Colby	Yousef and Marth, 1988
Emmenthaler	Bachmann and Spahr, 1995 Kaufmann, 1990
Gouda	Northolt *et al.,*1988
Gruyere	Kaufmann, 1990
Havarté	Ryser and Marth, 1989a
Limburger	Ryser and Marth, 1989a
Parmesan	Yousef and Marth, 1990
Swiss	Buazzi *et al.,*1992
Tilsiter	Bachmann and Spahr, 1995
Trappist	Ryser and Marth, 1989a Kovincic *et al.,* 1991

Table A5.11.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	6 to 10	90 to 180
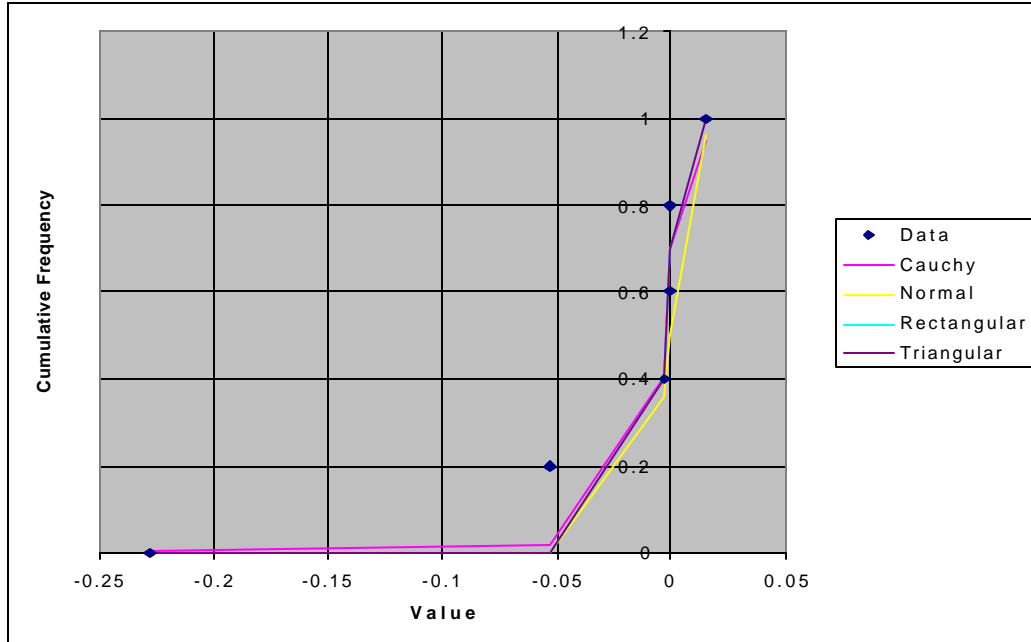
Figure A5.11.3. Cumulative Distribution for the Exponential Reference Growth Rate (5 °C)

Table A5.11.7. Models Used to Characterize the Cumulative Distribution for Exponential Growth Rates

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Rectangle	-0.007	0.003		0.67
Triangle	-0.008	-0.012	0.007	0.33

Table A5.11.8. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 °C

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
-0.031	0.080	8

Table A5.11.9. Maximum Growth at Various Temperatures

Temperature (°C)	<5	5-7	>7
Maximum Growth (log$_{10}$ cfu/g)	5	6.5	8

12. Pasteurized Fluid Milk Food Category

Consumption

Table A5.12.1. Foods Included in Consumption Data Set

Food Code	Food
11100000	Milk, not further specified
11111000	Milk, cow's, fluid, whole
11111160	Milk, calcium fortified, cow's, fluid, 1% fat
11111170	Milk, calcium fortified, cow's, fluid, skim or nonfat
11112000	Milk, cow's, fluid, lowfat, not specified as to percent fat
11112110	Milk, cow's, fluid, 2% fat
11112120	Milk, cow's, fluid, acidophilus, 1% fat
11112130	Milk, cow's, fluid, acidophilus, 2% fat
11112210	Milk, cow's, fluid, 1% fat
11113000	Milk, cow's, fluid, skim or nonfat, 0.5% or less butterfat
11114300	Milk, cow's, fluid, lactose reduced, 1% fat
11114310	Milk, cow's, fluid, lactose reduced, 1% fat, fortified with calcium
11114320	Milk, cow's, fluid, lactose reduced, nonfat
11114321	Milk, cow's, fluid, lactose reduced, nonfat, fortified with calcium
11114330	Milk, cow's, fluid, lactose reduced, 2% fat
11116000	Milk, goat's, fluid, whole
11511000	Milk, chocolate, not further specified
11511100	Milk, chocolate, whole milk-based
11511200	Milk, chocolate, lowfat milk-based
11511300	Milk, chocolate, skim milk-based
11519050	Milk, flavors other than chocolate, whole milk-based
11520000	Milk, malted, unfortified, not specified as to flavor, made with milk
11525000	Milk, malted, fortified, natural flavor, made with milk
11526000	Milk, malted, fortified, chocolate, made with milk
11527000	Milk, malted, fortified, not specified as to flavor, made with milk

Source Survey: CSFII

Figure A5.12.1. Empirical Cumulative Distribution For The Serving Size
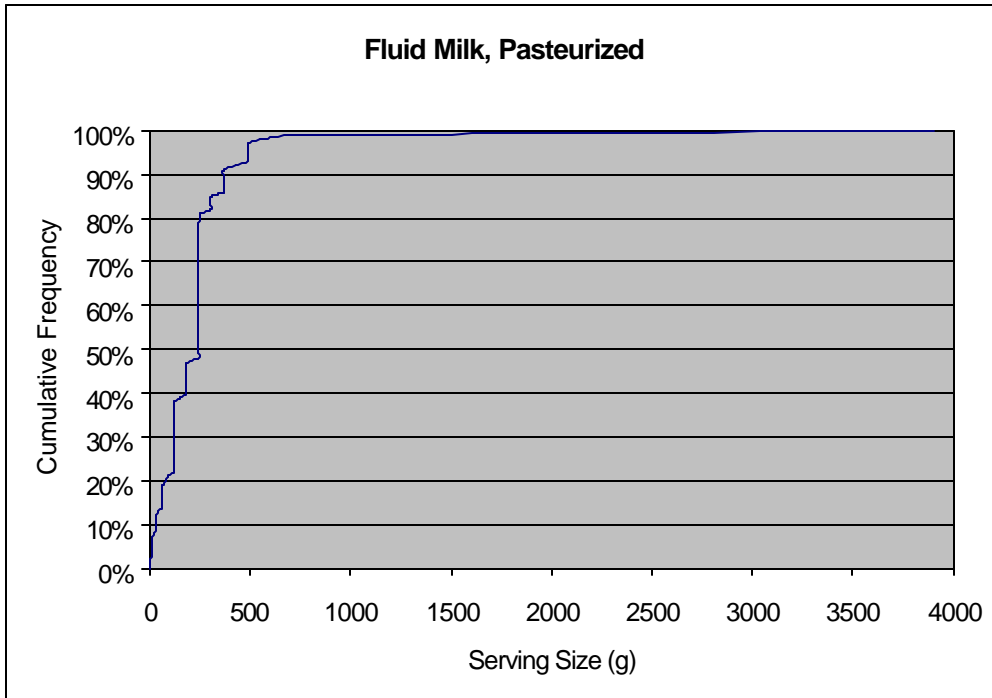
Table A5.12.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
244	245	488	732

Contamination at Retail

Table A5.12.3. Foods Included in Contamination Level Data Set

Foods	References
Pasteurized fluid milk	Ahrabi *et al.*, 1997
	Arnold and Coble, 1995
	Beckers, 1988
	Casarotti *et al.,* 1994
	Farber *et al.*, 1989
	Fernandez-Garayzbal *et al.*, 1986
	Frey, *et al.,* 2000b
	Gelosa, 1990
	Harvey and Gilmour, 1992
	Gohil *et al.*, 1995
	Greenaway and Drew, 1990
	Greenwood *et al.*, 1991
	Ibrahim *et al.*, 1992
	International Dairy Foods Association, 2000[b]
	Kozak *et al.*, 1996[b]
	Laciar *et al.,* 1999
	McLauchlin and Gilbert, 1990
	Mícková, 1991
	Moura *et al.*, 1993
	Rola, 1994
	Roy, 1992
	Sharif and Tunail, 1991
	Teufel and Bendzulla, 1993
	Tiscione *et al.*, 1994
	Venables, 1989
	West and North Yorkshire Joint Working Group, 1991

[a]The data for milk were employed in two steps. First, all available data from North America and Europe were used to derive a distribution of contamination data for these milk food categories. Second, the non U.S. data were removed, and the distributions were refit by adjusting only the scale parameters (e.g. the mean) to make the distribution consistent with U.S. prevalence data.
[b]Samples collected in the United States.

Figure A5.12.2. Cumulative Distribution for Retail Contamination
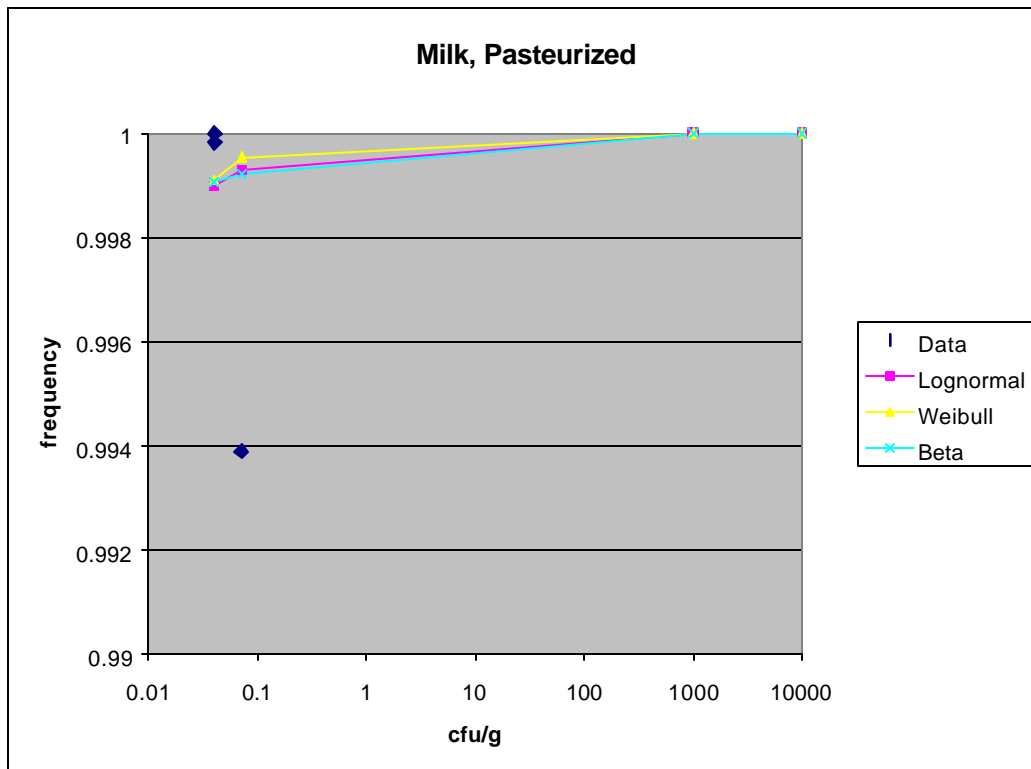
Table A5.12.4. Three Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	1.17×10^{-8}	5.114583		0.34
Weibull	1.62×10^{-1}	2.48×10^{-7}		0.33
Beta	6.47×10^{-4}	6.8×10^{8}	1.0×10^{-9}	0.33

Post Retail Growth

Table A5.12.5. Foods Included in Post Retail Growth Data Set

Food	Reference
Fluid milk, pasteurized	Northolt *et al.*, 1988
Fluid milk, unpasteurized	Farber *et al.*,1990
	Northolt *et al.*, 1988
Fluid milk, skim/whole/chocolate	Rosenow and Marth, 1987
Fluid milk, UHT	Rajkowski *et al.,* 1994

Table A5.12.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	3 to 5	10 to 12

Figure A5.12.3. Cumulative Distribution for the Exponential Reference Growth Rate (5 ^{0}C)
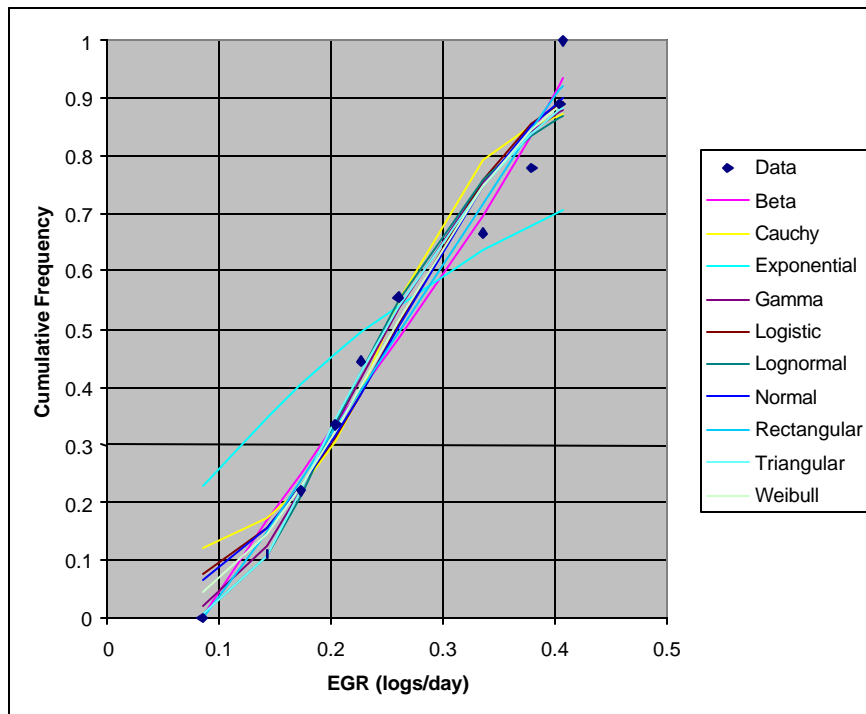
Table A5.12.7. Four Models Used to Characterize the Cumulative Distribution for Exponential Growth Rates

Model	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Probability
Rectangular	0.092	0.434			0.72
Triangular	0.070	0.169	0.554		0.12
Beta	0.902	0.799	0.084	0.419	0.09
Gamma	5.185	0.052			0.07

Table A5.12.8. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 $^{°}$C

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
0.262	0.115	10

NOTE: EGR derived using random sampling of growth data.

Table A5.12.9 Maximum Growth at Various Temperatures

Temperature (5 $^{°}$C)	<5	5-7	>7
Maximum Growth (log$_{10}$ cfu/g)	7	7.5	8

13. Fluid Milk, Unpasteurized Food Category

Consumption

Table A5.13.1. Foods Included in Consumption Data Set

Food Code	Food

NONE

NOTE: Unpasteurized Fluid Milk consumption was estimated to be 0.5% of pasteurized milk (see Table A5.12.1. Fluid milk, pasteurized food category)

Figure A5.13.1. Cumulative Distribution for Serving Size

The cumulative distribution for Pasteurized Fluid Milk was used, see Fig. A5.12.1.

Table A5.13.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
244	245	488	732

Contamination at Retail

Table A5.13.3. Foods Included in Contamination Level Data Set

Foods[a]	Reference
Unpasteurized fluid milk, cow	Anon., 1989
	Arias *et al.*, 1994
	Beckers *et al.*, 1987
	Casarotti *et al.*, 1994
	Davidson *et al.*, 1989
	Desmasures *et al.*, 1997
	Dominguez Rodrigues *et al.*, 1985
	Donnelly *et al.*, 1988[b]
	Doyle and Schoeni, 1986[b]
	El-Leboudy and Fayed, 1992
	El Marrakchi *et al.*, 1993
	Farber *et al.*,1988
	Fedio and Jackson, 1990
	Fenlon and Wilson, 1989
	Fenlon *et al.,* 1995
	Fernandez Garayzabul *et al.*, 1987
	Gledel, 1986
	Greenwood *et al.*, 1991
	Harvey and Gilmour, 1992
	Laciar *et al.,* 1999
	Liewen and Plautz, 1988[b]
	Lovett *et al.*, 1987 [b]
	Luisjuan-Morales *et al.*, 1995
	Lund *et al.,* 1991[b]
	McLauchlin and Gilbert, 1990
	Moura *et al.*, 1993
	Oni *et al.*, 1989
	Patterson *et al.,* 1989[b]
	Razavi-Rohani and Hedaiatinia, 1990
	Rea *et al.*, 1992
	Rodler and Koerbler, 1989
	Rohrbach *et al.*, 1992, 1991[b]
	Slade and Collins-Thompson, 1988
	Steele *et al.,* 1997
	Stone, 1987
	Takai *et al.,* 1990
	Teufel and Bendzulla, 1993
Unpasteurized fluid milk, goat	McLauchlin *et al.*, 1990
Unpasteurized fluid milk, non-bovine	McLauchlin and Gilbert, 1990
	Teufel and Bendzulla, 1993

[a]The data were employed in two steps. First, all available data from North America and Europe were used to derive a distribution of contamination data for these milk food categories. Second, the non European data were removed, and the distributions were refit by adjusting only the scale parameters (e.g. the mean) to make the distribution consistent with U.S. prevalence data.
[b]North American data.

Figure A5.13.2. Cumulative Distribution for Contamination at Retail

Fluid Milk, Unpasteurized
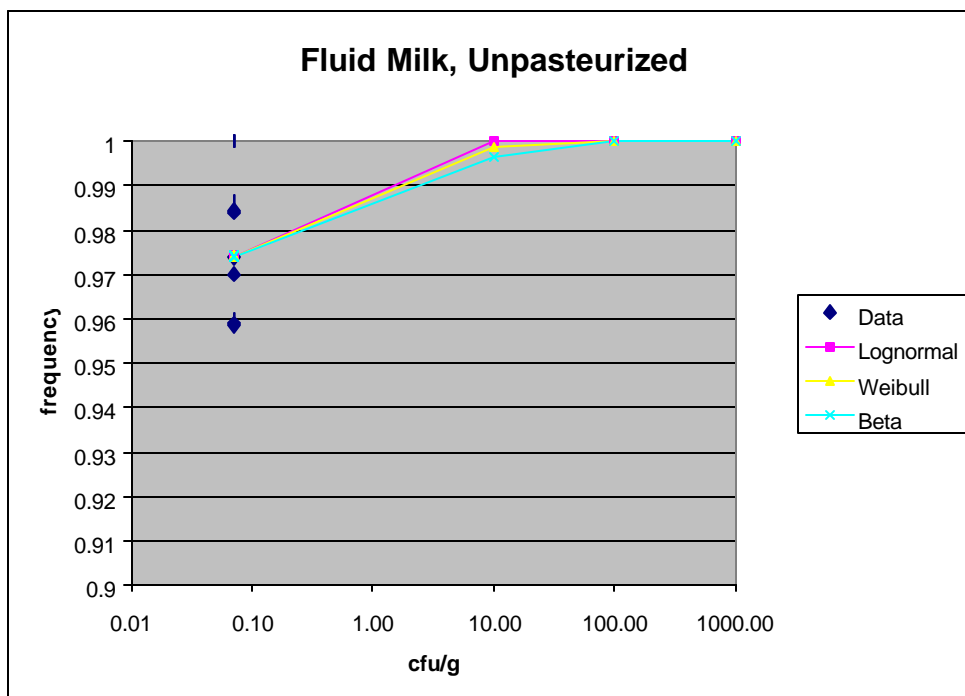
Table A5.13.4. Three Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	9.46×10^{-4}	2.219432		0.33
Weibull	01.23	1.86×10^{-6}		0.33
Beta	4.93×10^{-3}	3.9×10^{7}	1.0×10^{a}	0.33

Post Retail Growth

Table A5.13.5. Growth Rate

The growth rate distribution for Pasteurized Milk was also used for Unpasteurized Fluid Milk

Table A5.13.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	3 to 4	6 to 10

Table A5.13.7. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 ˚C

Mean ($\log_{10}$ cfu/g/day)	Std. Dev.	N
0.262	0.115	10

NOTE: EGR derived using random sampling of growth data.

Figure A5.13.3. Cumulative Distribution for the Exponential Reference Growth Rate (5 ^{0}C), same as Fig. A5.12.3)
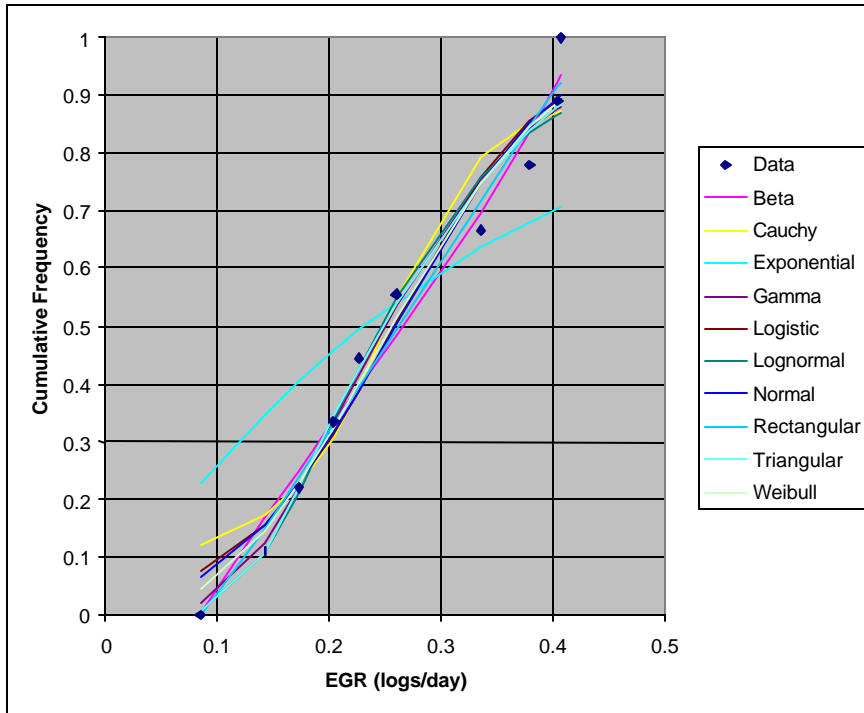
Table A5.13.8. Four Models Used to Characterize the Cumulative Distribution for Exponential Growth Rates (Same as Table A5.12.8)

Model	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Probability
Rectangular	0.092	0.434			0.72
Triangular	0.070	0.169	0.554		0.12
Beta	0.902	0.799	0.084	0.419	0.09
Gamma	5.185	0.052			0.07

Table A5.13.9. Maximum Growth at Various Temperatures

Temperature ($^\circ$C)	<5	5-7	>7
Maximum Growth (log $_{10}$ cfu/g)	7	7.5	8

14. Ice cream and Frozen Dairy Products Food Category

Consumption

Table A5.14.1. Foods Included in Consumption Data Set

Food Code	Food
11459990	Yogurt, frozen, not specified as to flavor, not specified as to type of milk
11460000	Yogurt, frozen, flavors other than chocolate, not specified as to type of milk
11460100	Yogurt, frozen, chocolate, not specified as to type of milk
11460150	Yogurt, frozen, not specified as to flavor, lowfat milk
11460160	Yogurt, frozen, chocolate, lowfat milk
11460170	Yogurt, frozen, flavors other than chocolate, lowfat milk
11460190	Yogurt, frozen, not specified as to flavor, nonfat milk
11460200	Yogurt, frozen, chocolate, nonfat milk
11460250	Yogurt, frozen, flavors other than chocolate, with sorbet or sorbet coated
11460300	Yogurt, frozen, flavors other than chocolate, nonfat milk
11460400	Yogurt, frozen, chocolate, nonfat milk, with low calorie sweetener
11460410	Yogurt, frozen, flavors other than chocolate, nonfat milk, with low calorie sweetener
11460420	Yogurt, frozen, not specified as to flavor, whole milk
11460430	Yogurt, frozen, chocolate, whole milk
11460440	Yogurt, frozen, flavors other than chocolate, whole milk
11461200	Yogurt, frozen, sandwich
11461250	Yogurt, frozen, cone, chocolate
11461260	Yogurt, frozen, cone, flavors other than chocolate
11461270	Yogurt, frozen, cone, flavors other than chocolate, lowfat milk
13110000	Ice cream, not further specified
13110100	Ice cream, regular, flavors other than chocolate
13110110	Ice cream, regular, chocolate
13110120	Ice cream, rich, flavors other than chocolate
13110130	Ice cream, rich, chocolate
13110200	Ice cream, soft serve, flavors other than chocolate
13110210	Ice cream, soft serve, chocolate
13110220	Ice cream, soft serve, not specified as to flavor
13110400	Milk dessert, frozen, flavors other than chocolate (no butterfat)
13110450	Milk dessert, frozen, chocolate (no butterfat)
13120050	Ice cream bar or stick, not chocolate covered or cake covered
13120100	Ice cream bar or stick, chocolate covered
13120110	Ice cream bar or stick, chocolate or caramel covered, with nuts
13120120	Ice cream bar or stick, rich chocolate ice cream, thick chocolate covering
13120121	Ice cream bar or stick, rich ice cream, thick chocolate

	covering
13120130	Ice cream bar or stick, rich ice cream, chocolate covered, with nuts
13120140	Ice cream bar or stick, chocolate ice cream, chocolate covered
13120300	Ice cream bar, cake covered
13120400	Ice cream bar or stick with fruit
13120500	Ice cream sandwich
13120550	Ice cream cookie sandwich
13120700	Ice cream cone with nuts, flavors other than chocolate
13120710	Ice cream cone, chocolate covered, with nuts, flavors other than chocolate
13120720	Ice cream cone, chocolate covered or dipped, flavors other than chocolate
13120730	Ice cream cone, no topping, flavors other than chocolate
13120740	Ice cream cone, no topping, not specified as to flavor
13120750	Ice cream cone with nuts, chocolate ice cream
13120770	Ice cream cone, no topping, chocolate ice cream
13120790	Ice cream sundae cone
13120800	Ice cream soda, flavors other than chocolate
13120810	Ice cream soda, chocolate
13121100	Ice cream sundae, fruit topping, with whipped cream
13121200	Ice cream sundae, prepackaged type, flavors other than chocolate
13121300	Ice cream sundae, chocolate or fudge topping, with whipped cream
13122100	Ice cream pie, no crust
13122500	Ice cream pie, with cookie crust, fudge topping, and whipped cream
13124100	Sorbet and ice cream
13125100	Ice cream with sherbet
13126000	Ice cream, fried
13130100	Ice milk, not further specified
13130300	Ice milk, flavors other than chocolate
13130310	Ice milk, chocolate
13130350	Ice milk, premium, flavors other than chocolate
13130360	Ice milk, premium, chocolate
13130590	Ice milk, soft serve, not specified as to flavor
13130600	Ice milk, soft serve, flavors other than chocolate
13130610	Ice milk, soft serve, chocolate
13130620	Ice milk, soft serve cone, flavors other than chocolate
13130630	Ice milk, soft serve cone, chocolate
13130640	Ice milk, soft serve cone, not specified as to flavor
13135000	Ice milk sandwich
13140100	Ice milk bar or stick, chocolate coated
13140110	Ice milk bar or stick, chocolate covered, with nuts
13140550	Ice milk cone, chocolate
13140600	Ice milk sundae, soft serve, chocolate or fudge topping, with whipped cream
13140630	Ice milk sundae, soft serve, fruit topping, with whipped cream

13140660	Ice milk sundae, soft serve, chocolate or fudge topping (without whipped cream)
13140670	Ice milk sundae, soft serve, fruit topping (without whipped cream)
13140680	Ice milk sundae, soft serve, not fruit or chocolate topping (without whipped cream)
13140700	Ice milk creamsicle or dreamsicle
13140900	Ice milk, fudgesicle
13141100	Ice milk, with sherbet or ice cream
13142000	Milk dessert bar or stick, frozen, with coconut
13150000	Sherbet, all flavors
13160100	Milk dessert, frozen, lowfat, made with low calorie sweetener, flavors other than chocolate
13160150	Milk dessert, frozen, nonfat, made with low calorie sweetener, chocolate
13160160	Milk dessert, frozen, nonfat, made with low calorie sweetener, flavors other than chocolate
13160200	Milk dessert, frozen, lowfat, flavors other than chocolate
13160210	Milk dessert, frozen, lowfat, chocolate
13160400	Milk dessert, frozen, milkfat free, flavors other than chocolate
13160410	Milk dessert, frozen, milkfat free, chocolate
13160600	Milk dessert, frozen, made with low calorie sweetener, flavors other than chocolate
13160650	Milk dessert, frozen, made with low calorie sweetener, chocolate
13161000	Milk dessert bar, frozen, made from lowfat milk
13161600	Milk dessert bar, frozen, made from lowfat milk and low calorie sweetener
13161630	Ice milk bar or stick, with low calorie sweetener, chocolate coated

Source Survey: CSFII

Figure A5.14.1. Empirical Cumulative Distribution For The Serving Size

Ice cream and Frozen Dairy Products
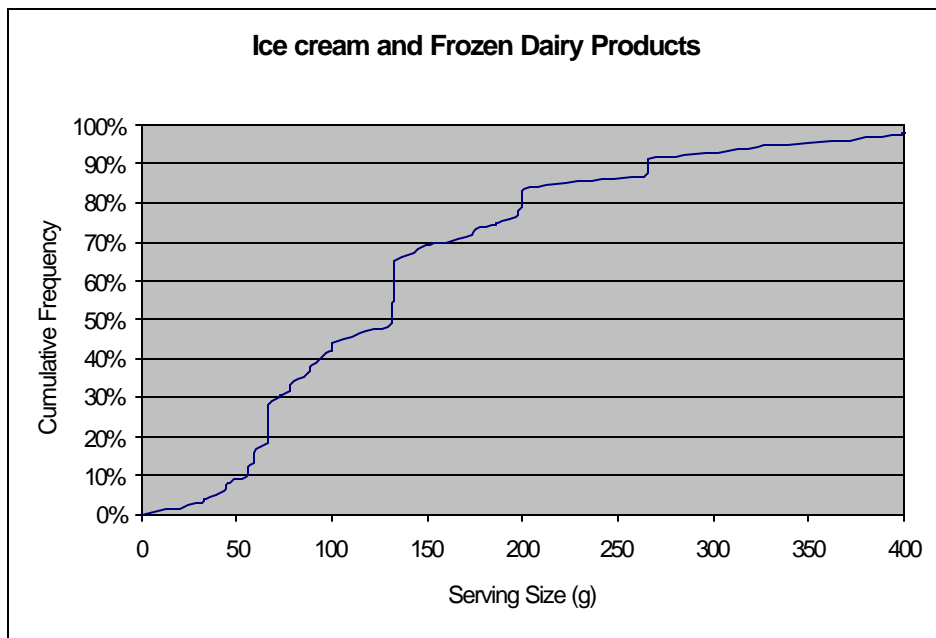
Table A5.14.2. Frequency Distribution of Amount Consumed per Serving

Percentile (grams per serving)			
50th	75th	95th	99th
132	186	330	454

Contamination at Retail

Table A5.14.3. Foods Included in Contamination Level Data Set

Foods	Reference
Ice cream	Arnold and Coble, 1995
	Ciftcioglu *et al*., 1992
	Farber *et al*., 1989
	Greenwood *et al.,* 1991
	Heinitz, 1999
	International Dairy Foods Assoc., 1999
	Kozak *et al*., 1996
	Maifreni *et al*., 1993
	McLauchlin and Gilbert, 1990
	Monge *et al*., 1994
	Ng and Seah, 1995
	West and North Yorkshire Joint Working Group, 1991
Ice cream, iced products	Teufel and Bendzulla, 1995
Ice cream, mix	Farber *et al.,* 1989
Ice cream novelty	Farber *et al*., 1989
	International Dairy Foods Assoc., 1999
	Kozak *et al*., 1996
Ice milk	Kozak *et al*., 1996

Figure A5.14.2. Cumulative Distribution for Retail Contamination
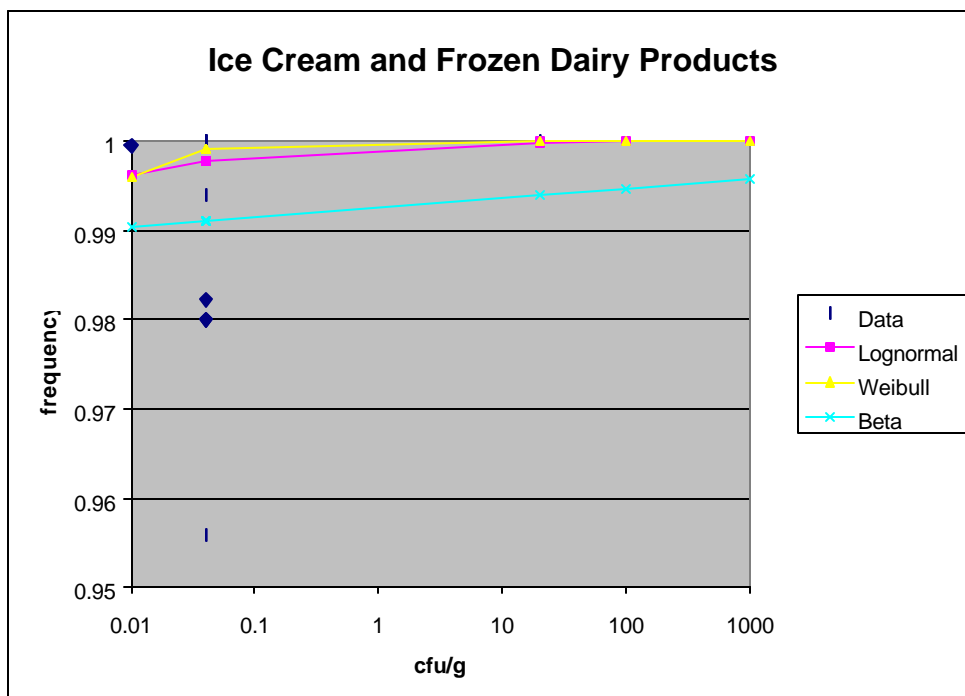
Table A5.14.4. Three Models Used to Characterize the Cumulative Distribution for Retail Contamination.

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	2.66×10^{-11}	7.407		0.32
Weibull	1.71×10^{-1}	4.49×10^{-7}		0.29
Beta	4.76×10^{-4}	87	1.0×10^{-9}	0.39

Post Retail Growth

Table A5.14.5. Growth Rate

Foods	Reference

  No growth was modeled for this category.

Table A5.14.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum

Not Relevant

Table A5.14.7. Maximum Growth at Various Temperatures (log)

Temperature (^{0}C)	<5	5-7	>7
Maximum Growth		Not Relevant	

15. Miscellaneous Dairy Products Food Categories

Consumption

Table A5.15.1. Foods Included in Consumption Data Set

Food Code	Food
11115000	Buttermilk, fluid, nonfat
11115200	Buttermilk, fluid, 2% fat
11410000	Yogurt, not specified as to type of milk or flavor
11411010	Yogurt, plain, not specified as to type of milk
11411100	Yogurt, plain, whole milk
11411200	Yogurt, plain, lowfat milk
11411300	Yogurt, plain, nonfat milk
11420000	Yogurt, vanilla, lemon, or coffee flavor, not specified as to type of milk
11421000	Yogurt, vanilla, lemon, or coffee flavor, whole milk
11422000	Yogurt, vanilla, lemon, maple, or coffee flavor, lowfat milk
11423000	Yogurt, vanilla, lemon, maple, or coffee flavor, nonfat milk
11424000	Yogurt, vanilla, lemon, maple, or coffee flavor, nonfat milk, sweetened with low calorie sweetener
11425000	Yogurt, chocolate, not specified as to type of milk
11427000	Yogurt, chocolate, nonfat milk
11430000	Yogurt, fruit variety, not specified as to type of milk
11431000	Yogurt, fruit variety, whole milk
11432000	Yogurt, fruit variety, lowfat milk
11433000	Yogurt, fruit variety, nonfat milk
11433500	Yogurt, fruit variety, nonfat milk, sweetened with low-calorie sweetener
11512000	Cocoa, hot chocolate, not from dry mix, made with whole milk
11512500	Spanish style hot chocolate drink, Puerto Rican style, made with evaporated milk
11513000	Cocoa and sugar mixture, milk added, not specified as to type of milk
11513100	Cocoa and sugar mixture, whole milk added
11513200	Cocoa and sugar mixture, lowfat milk added
11513300	Cocoa and sugar mixture, skim milk added
11513400	Chocolate syrup, milk added, not specified as to type of milk
11513500	Chocolate syrup, whole milk added
11513600	Chocolate syrup, lowfat milk added
11513700	Chocolate syrup, skim milk added
11516000	Cocoa, whey, and low calorie sweetener mixture, lowfat milk added
11519000	Milk beverage, made with whole milk, flavors other than chocolate
11531000	Eggnog, made with whole milk
11541000	Milk shake, not specified as to flavor or type
11541110	Milk shake, homemade or fountain type, chocolate
11541120	Milk shake, homemade or fountain type, flavors other than chocolate
11541400	Milk shake with malt
11541500	Milk shake, made with skim milk, chocolate
11541510	Milk shake, made with skim milk, flavors other than

	chocolate
11542100	Carry-out milk shake, chocolate
11542200	Carry-out milk shake, flavors other than chocolate
11551050	Milk fruit drink
11552200	Milk-based fruit drink
11560000	Chocolate flavored drink, whey- and milk-based
11560020	Flavored milk drink, whey- and milk-based, flavors other than chocolate
12100100	Cream, not specified as to light, heavy, or half and half
12110100	Cream, light, fluid
12110300	Cream, light, whipped, unsweetened
12120100	Cream, half and half
12130100	Cream, heavy, fluid
12140000	Cream, heavy, whipped, sweetened
12140100	Cream, whipped, pressurized container
12310100	Sour cream
12310200	Sour cream, half and half
12310300	Sour cream, reduced fat
12310350	Sour cream, light
12310370	Sour cream, fat free
12320200	Sour cream, filled, sour dressing, nonbutterfat
12350000	Dip, sour cream base
12350020	Dip, sour cream base, reduced calorie
12350100	Spinach dip, sour cream base
14620100	Dip, cream cheese base
14620120	Shrimp dip, cream cheese base
14620150	Dip, cheese with chili pepper (chili con queso)
14620200	Dip, cheese base other than cream cheese
81100500	Butter, not further specified
81101000	Butter, stick, salted
81101010	Butter, whipped, tub, salted
81101020	Butter, whipped, stick, salted
81101100	Butter, stick, unsalted
81101110	Butter, whipped, tub, unsalted
81101500	Light butter, stick, salted
81101510	Light butter, stick, unsalted
81101520	Light butter, whipped, tub, salted
81104500	Vegetable oil-butter spread, stick, salted
81104510	Vegetable oil-butter spread, tub, salted
81104550	Vegetable oil-butter spread, reduced calorie, stick, salted
81104560	Vegetable oil-butter spread, reduced calorie, tub, salted
81105010	Butter-margarine blend, stick, salted
81105020	Butter-margarine blend, tub, salted
81105030	Butter-margarine blend, stick, unsalted
81105500	Butter-Vegetable oil blend

Source Survey: CSFII

Figure A5.15.1. Empirical Cumulative Distribution For The Serving Size

Miscellaneous Dairy Products

(Chart: Cumulative Frequency (%) vs. Serving Size (g))
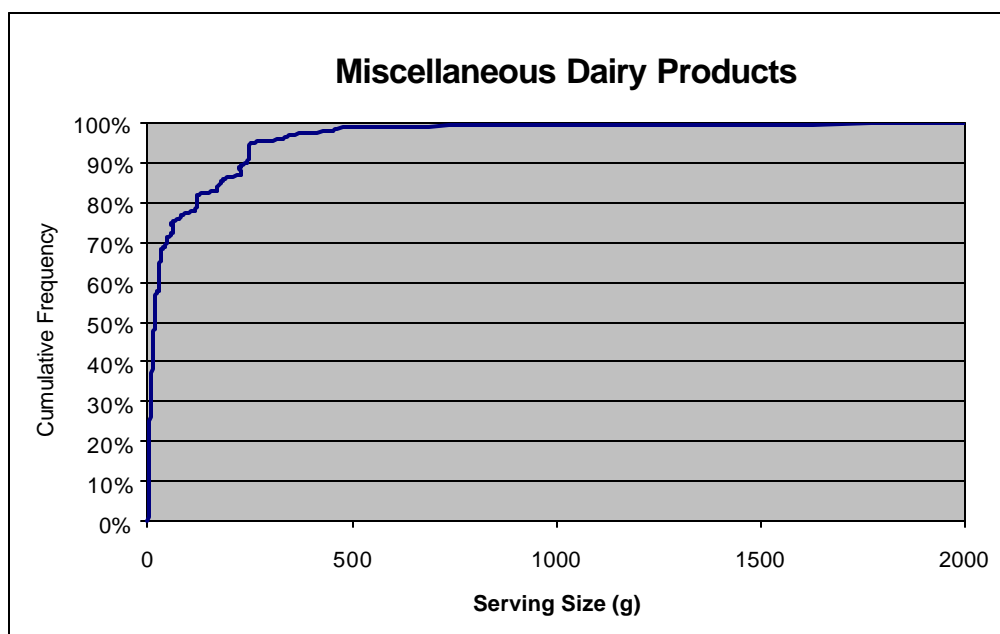
Table A5.15.2 Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
15	61	254	490

Contamination at Retail

Table A5.15.3. Foods Included in Contamination Level Data Set

Foods	Reference
Butter	Kozak *et al.,* 1996 Teufel and Bendzulla, 1993
Cream	Greenwood *et al.,* 1991 Kozak *et al.,* 1996 McLauchlin and Gilbert, 1990 Ng and Seah, 1995
Food – imitation milk product	Heinitz, 1999
Food – Cream half & half	Kozak *et al*., 1996
Milk products	Heinitz, 1999
Yogurt	Greenwood *et al*., 1991 McLauchlin *et al*., 1990 McLauchlin and Gilbert, 1990 Ng and Seah, 1995 West and North Yorkshire Joint Working Group, 1991
Dairy spreads	Ng and Seah, 1995

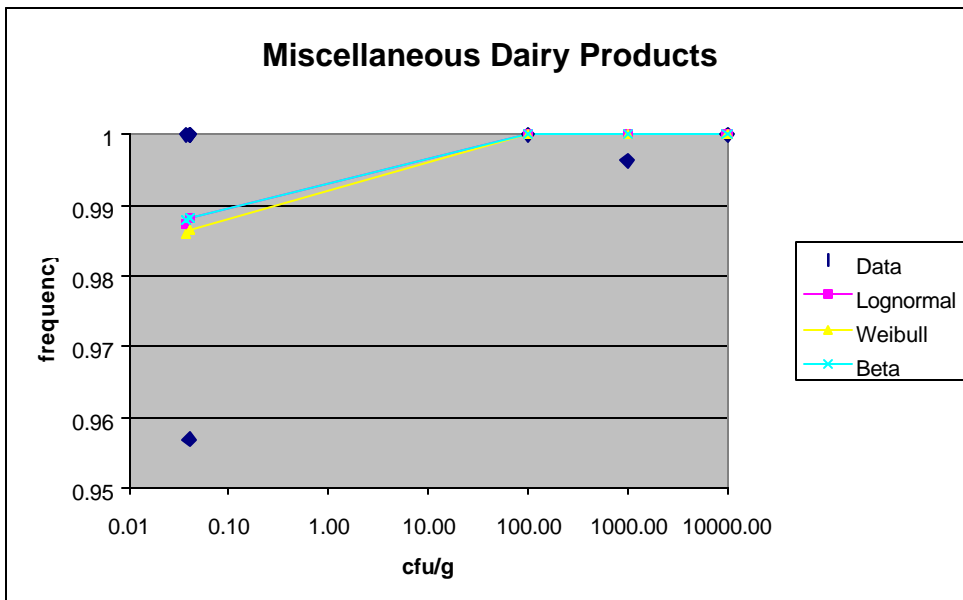**Figure A5.15.2. Cumulative Distribution for Retail Contamination**

Table A5.15.4. Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	2.96×10^{-5}	3.189266		0.34
Weibull	1.19×10^{-1}	1.85×10^{-7}		0.33
Beta	5.52×10^{-3}	1765751539	1.00×10^{9}	0.34

Post Retail Growth

Table A5.15.5. Foods Included in Post Retail Growth Data Set

Foods	Reference
Butter	Olsen *et al.,* 1988
Buttermilk	Choi *et al.,* 1988
	Schaack and Marth, 1988
Cream	Rosenow and Marth, 1987
Milk, evaporated	Farrag *et al.,* 1990
Milk, sweetened condensed	Farrag *et al.,* 1990
Yogurt	Choi *et al.,* 1988
	Schaack and Marth, 1988
	Siragusa and Johnson, 1988b

Table A5.15.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	6 to 10	15 to 45

Figure A5.15.3. Cumulative Distribution for the Exponential Reference Growth Rate (5 ^{0}C)
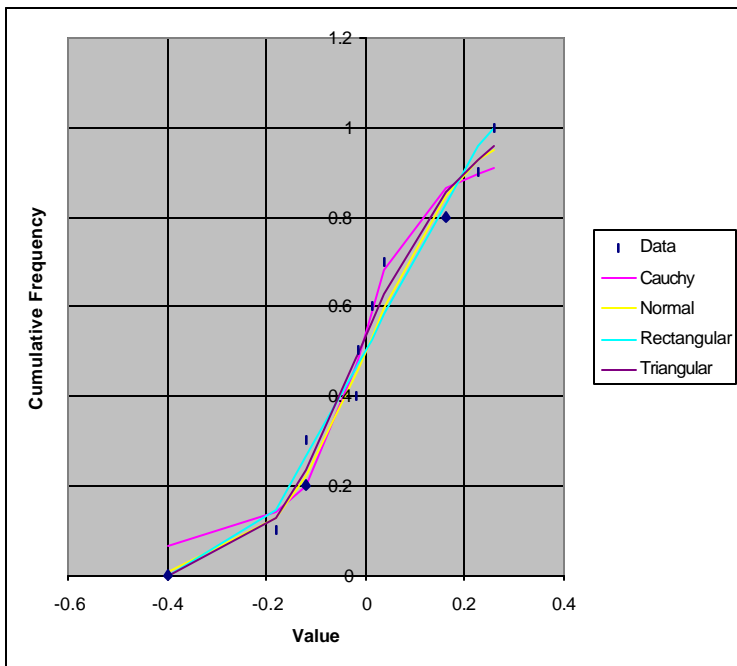

Table A5.15.7. Models Used to Characterize the Cumulative Distribution for the Exponential Growth Rate

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Triangle	-0.034	-0.045	0.37	0.55
Rectangular	-0.25	0.25		0.45

Table A5.15.8. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 $^\bullet$C

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
0.014	0.192	11

NOTE: EGR derived using random sampling of growth data.

Table A5.15.9. Maximum Growth at Various Temperatures

Temperature ($^\circ$C)	<5	5-7	>7
Maximum Growth (log$_{10}$ cfu/g)	5	6.5	8

16. Frankfurters Food Category

Consumption

Table A5.16.1. Foods Included in Consumption Data Set

Food Code	Food
25210110	Frankfurter, wiener, or hot dog, not further specified
25210150	Frankfurter or hot dog, cheese-filled
25210210	Frankfurter or hot dog, beef
25210220	Frankfurter or hot dog, beef and pork
25210230	Frankfurter or hot dog, beef and pork, lowfat
25210250	Frankfurter or hot dog, meat and poultry, fat free
25210280	Frankfurter or hot dog, meat and poultry
25210310	Frankfurter or hot dog, chicken
25210410	Frankfurter or hot dog, turkey
25210510	Frankfurter or hot dog, low salt
25210610	Frankfurter or hot dog, beef, lowfat
25210700	Frankfurter or hot dog, meat and poultry, lowfat
27120210	Frankfurter or hot dog, with chili, no bun
27120250	Frankfurter or hot dog with tomato-based sauce (mixture)
27560300	Corn dog (frankfurter or hot dog with cornbread coating)
27560320	Frankfurter or hot dog, plain, on bun
27560330	Frankfurter or hot dog, with cheese, plain, on bun
27560340	Frankfurter or hot dog, with catsup and/or mustard, on bun
27560350	Pig in a blanket (frankfurter or hot dog wrapped in dough)
27560360	Frankfurter or hot dog, with chili, on bun
27560370	Frankfurter or hot dog with chili and cheese, on bun

Source Survey: CSFII

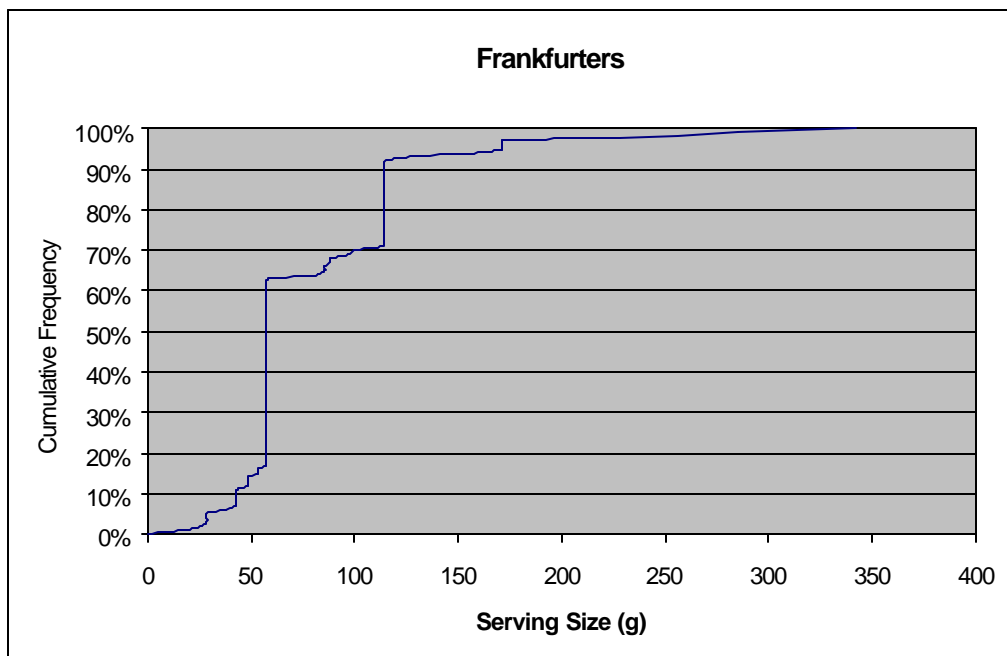**Figure A5.16.1. Cumulative Distribution for Serving Size**

Table A5.16.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
57	114	171	285

Table A5.16.3. Parameters for pre-retail growth for FSIS data sets

	Distribution	Parameter 1	Parameter 2	Parameter 3
Temperature (EC)	Uniform	2.0	5.0	
time (days)	Triangle	10	20	30

Contamination at Retail

Table A5.16.4. Foods Included in Contamination Level Data Set

Foods	Reference
Hot dogs	Hayes *et al.,* 1992
	Levine, 2000
	Wang and Muriana, 1994
Hot dogs, chicken/pork	Ng and Seah, 1995
Hot dogs, turkey	Wenger *et al.*, 1990

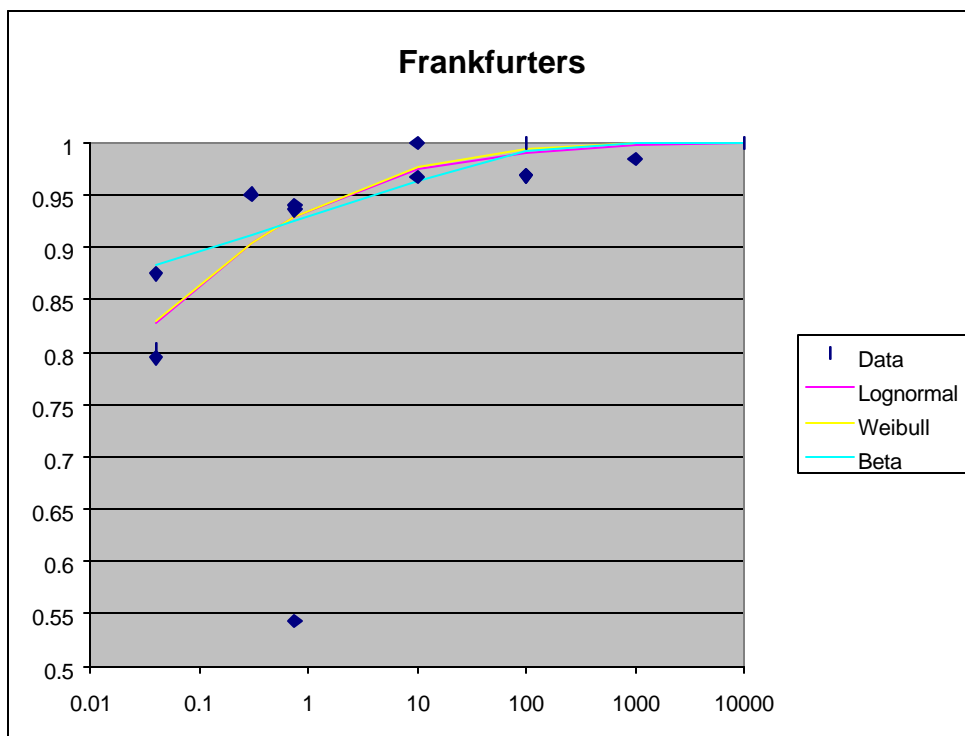**Figure A5.16.2. Cumulative Distribution for Retail Contamination**

Table A5.16.5. Three Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Accumulative distribution for the distribution of *Listeria monocytogenes* in hot dogs.   Three models were used to characterize the cumulative distribution for contamination at retail.

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	2.23×10^{-4}	5.499648		0.39
Weibull	1.37×10^{-1}	6.15×10^{-4}		0.39
Beta	1.60×10^{-2}	6161333.69	1.00×10^{9}	0.22

Post Retail Growth

Table A5.16.6. Foods Included in Post Retail Growth Data Set

Foods	Reference
Frankfurters	Glass and Doyle, 1989
	McKellar *et al.,*1994
Hot dog, poultry	McKellar *et al.,*1994
Hot dog, turkey	Wederquist *et al.,*1994

Table A5. 16.7. Consumer Storage Times Used in this Risk Assessment (days)

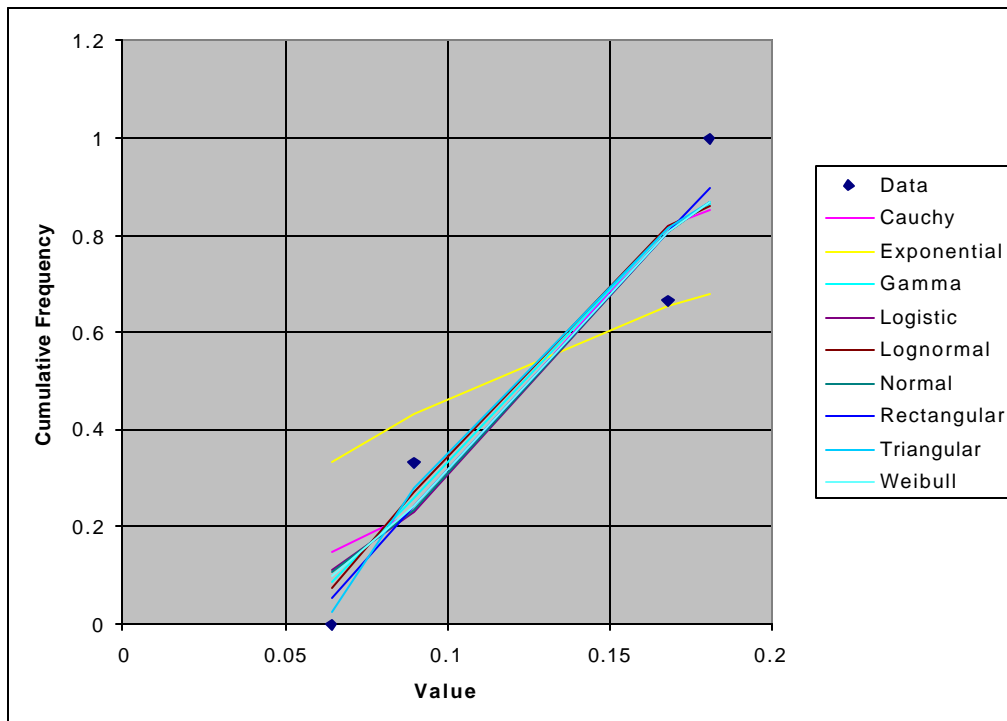| Minimum	Mode	Maximum
0.5	5 to 7	90 to 180

Figure A5.16.3. Cumulative Distribution for the Exponential Reference Growth Rate at

Table A5.16.8. Models Used to Characterize the Cumulative Exponential Growth Rate

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Rectangle	0.056	0.195		0.76
Triangle	0.059	0.064	0.248	0.16
Lognormal	-2.16	0.41		0.04
Gamma	6.19	0.020		0.03

Table A5.16.9. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 ˚C

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
0.125	0.058	4

NOTE: EGR derived using random sampling of growth data.

Table A5.16.10. Maximum Growth at Various Temperatures (log)

Temperature (^{0}C)	<5	5-7	>7
Maximum Growth	0.5	6.5	8

17. Dry/Semi-Dry Fermented Sausages Food Category

Consumption

Table A5.17.1. Foods Included in Consumption Data Set

Food Code	Food
25220120	Beef sausage, smoked, stick
25220420	Bologna, Lebanon
25221250	Pepperoni
25221500	Salami, not further specified
25221520	Salami, dry or hard
25221530	Salami, beef
25221810	Thuringer

Source Survey: CSFII

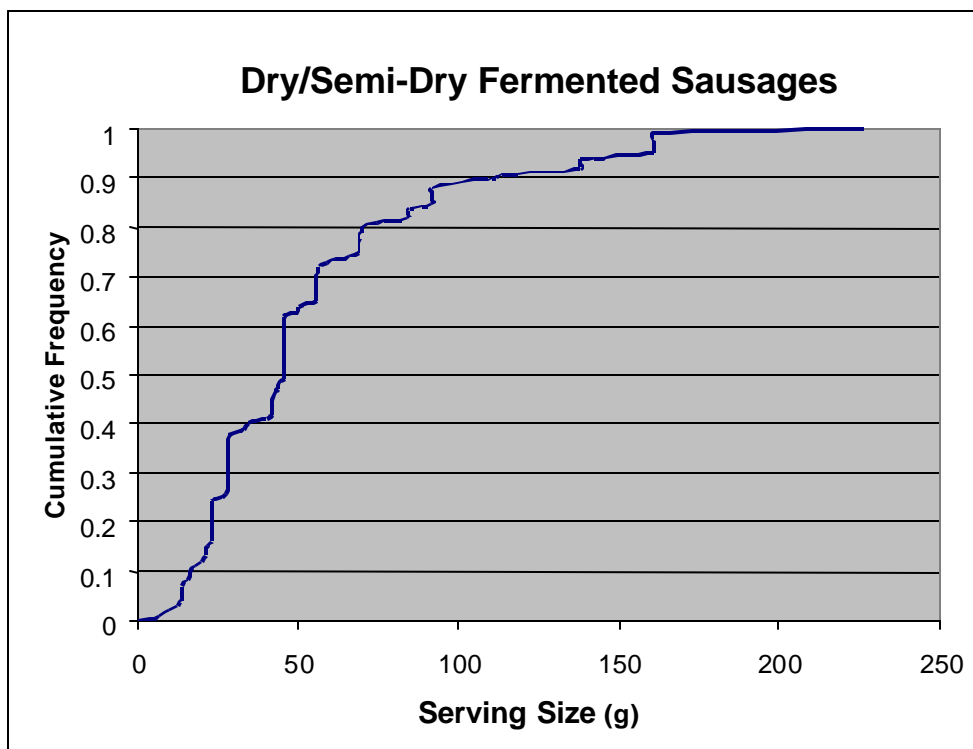**Figure A5.17.1. Empirical Cumulative Distribution For The Serving Size**

Table A5.17.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
46	69	161	161

Contamination at Retail

Table A5.17.3. Foods Included in Contamination Level Data Set

Foods	Reference
Beef, salami	Trüssel, 1989
Salami	Breer and Schopfer, 1989
Salami and pork	Cantoni *et al.*, 1988
Sausage	Teufel and Bendzulla, 1993
Sausage, smoked	Lahellec *et al.*, 1996
Sausage, cooked, cured	Teufel and Bendzulla, 1993
Sausage, fermented	Buncic, 1991
	Farber *et al.*, 1989
	Levine, 2000
	Uyttendaele *et al.*, 1999
Sausage, dried	Lahellec *et al.,* 1996

Figure A5.17.2. Cumulative Distribution for Retail Contamination
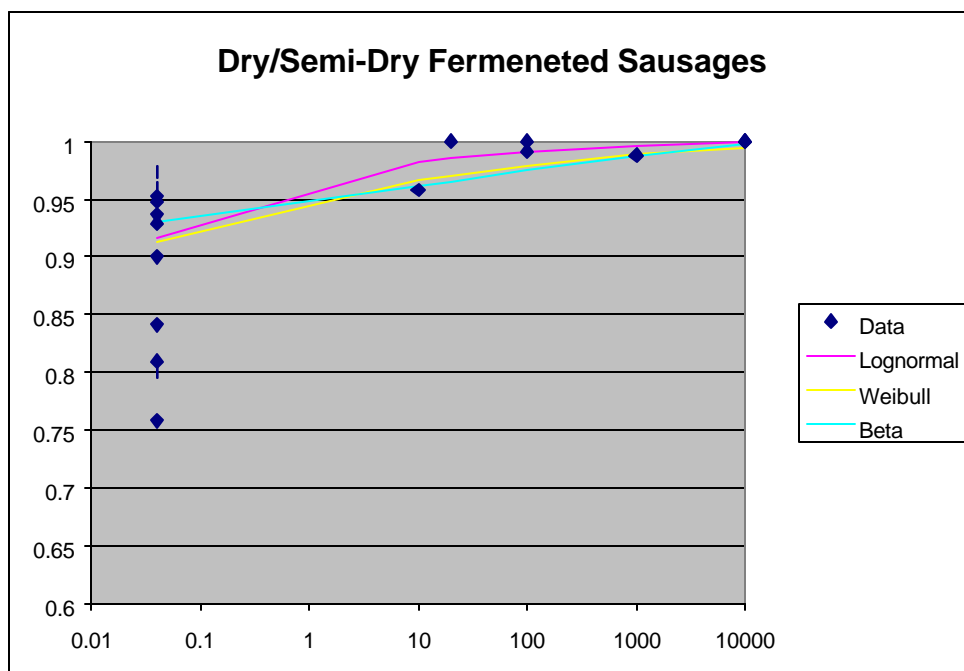

Table A5.17.4. Three Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	8.81×10^{-7}	7.769275		0.37
Weibull	5.88×10^{-2}	1.00×10^{-8}		0.33
Beta	6.08×10^{-3}	81379.7449	1.0×10^{9}	0.30

Post Retail Growth

Table A5.17.5. Growth Rate

Foods	Reference
No growth was modeled for this category	

Table A5.17.6. Maximum Growth at Various Temperatures

Not Relevant

18. Deli Meats Food Category

Consumption

Table A5.18.1. Foods Included in Consumption Data Set

Food Code	Food
21002000	Beef, pickled
22311210	Ham, smoked or cured, low sodium, cooked, lean and fat eaten
22311450	Ham, prosciutto
23322100	Deer bologna
25220010	Cold cut, not further specified
25220390	Bologna, beef, lowfat
25220400	Bologna, pork and beef
25220410	Bologna, not further specified
25220430	Bologna, beef
25220440	Bologna, turkey
25220450	Bologna ring, smoked
25220460	Bologna, pork
25220470	Bologna, beef, lower sodium
25220480	Bologna, chicken, beef, and pork
25220500	Bologna, beef and pork, lowfat
25220910	Head cheese
25221210	Mortadella
25221480	Mettwurst
25221710	Souse
25230210	Ham, sliced, prepackaged or deli, luncheon meat
25230220	Ham, sliced, low salt, prepackaged or deli, luncheon meat
25230230	Ham, sliced, extra lean, prepackaged or deli, luncheon meat
25230310	Chicken or turkey loaf, prepackaged or deli, luncheon meat
25230410	Ham loaf, luncheon meat
25230430	Ham and cheese loaf
25230510	Ham, luncheon meat, chopped, minced, pressed, spiced, not canned
25230520	Ham, luncheon meat, chopped, minced, pressed, spiced, lowfat, not canned
25230550	Ham, pork, and chicken, luncheon meat, chopped, minced, pressed, spiced, canned, reduced sodium
25230560	Liverwurst
25230610	Luncheon loaf (olive, pickle, or pimiento)
25230710	Sandwich loaf, luncheon meat
25230790	Turkey ham, sliced, extra lean, prepackaged or deli, luncheon meat
25230800	Turkey ham
25230810	Veal loaf
25230820	Turkey pastrami
25230840	Turkey salami
25230900	Turkey or chicken breast, prepackaged or deli, luncheon meat
25231110	Beef, sliced, prepackaged or deli, luncheon meat
25231150	Corned beef, pressed
27500100	Meat sandwich, not further specified
27510700	Meatball and spaghetti sauce submarine sandwich, on roll

27510950	Reuben sandwich (corned beef sandwich with sauerkraut and cheese), with spread
27513010	Roast beef sandwich
27513040	Roast beef submarine sandwich, on roll, with lettuce, tomato and spread
27513050	Roast beef sandwich with cheese
27513060	Roast beef sandwich with bacon and cheese sauce
27513070	Roast beef submarine sandwich, on roll, au jus
27515000	Steak submarine sandwich, on roll, with lettuce and tomato
27515010	Steak sandwich, plain, on roll
27515020	Steak and cheese submarine sandwich, on roll, with lettuce and tomato
27515030	Steak and cheese sandwich, plain, on roll
27515040	Steak and cheese submarine sandwich, plain, on roll
27515070	Steak and cheese submarine sandwich, with fried peppers and onions, on roll
27515080	Steak sandwich, plain, on biscuit
27515150	Steak patty (breaded, fried) sandwich, with mayonnaise or salad dressing, lettuce, and tomato, on bun
27516010	Gyro sandwich (pita bread, beef, lamb, onion, condiments), with tomato and spread
27520130	Bacon, chicken, and tomato club sandwich, with lettuce and spread
27520160	Bacon, chicken, and tomato club sandwich, on multigrain roll with lettuce and spread
27520250	Ham on biscuit
27520300	Ham sandwich, with spread
27520320	Ham and cheese sandwich, with lettuce and spread
27520360	Ham and cheese sandwich, on bun, with lettuce and spread
27520370	Hot ham and cheese sandwich, on bun
27520380	Ham and cheese on English muffin
27520390	Ham and cheese submarine sandwich, on multigrain roll, with lettuce, tomato and spread
27520500	Pork, barbecue sauce, onions and dill pickles on white roll
27520540	Ham and tomato club sandwich, with lettuce and spread
27540110	Chicken sandwich, with spread
27540130	Chicken barbecue sandwich
27540140	Chicken fillet (breaded, fried) sandwich
27540150	Chicken fillet (breaded, fried) sandwich with lettuce, tomato and spread
27540180	Chicken patty sandwich or biscuit
27540190	Chicken patty sandwich, with lettuce and spread
27540200	Fajita-style chicken sandwich with cheese, on pita bread, with lettuce and tomato
27540230	Chicken patty sandwich with cheese, on wheat bun, with lettuce, tomato and spread
27540240	Chicken fillet, (broiled), sandwich, on whole wheat roll, with lettuce, tomato and spread
27540260	Chicken fillet, broiled, sandwich, on oat bran bun, with lettuce, tomato and spread
27540270	Chicken fillet, broiled, sandwich, with lettuce, tomato and non-mayonnaise type spread
27540280	Chicken fillet, broiled, sandwich with cheese, on bun, with lettuce, tomato and spread

27540310	Turkey sandwich, with spread
27540350	Turkey submarine sandwich, on roll, with cheese, lettuce, tomato and spread
27560110	Bologna sandwich, with spread
27560120	Bologna and cheese sandwich, with spread
27560910	Submarine, cold cut sandwich, on bun, with lettuce

Source Survey: CSFII

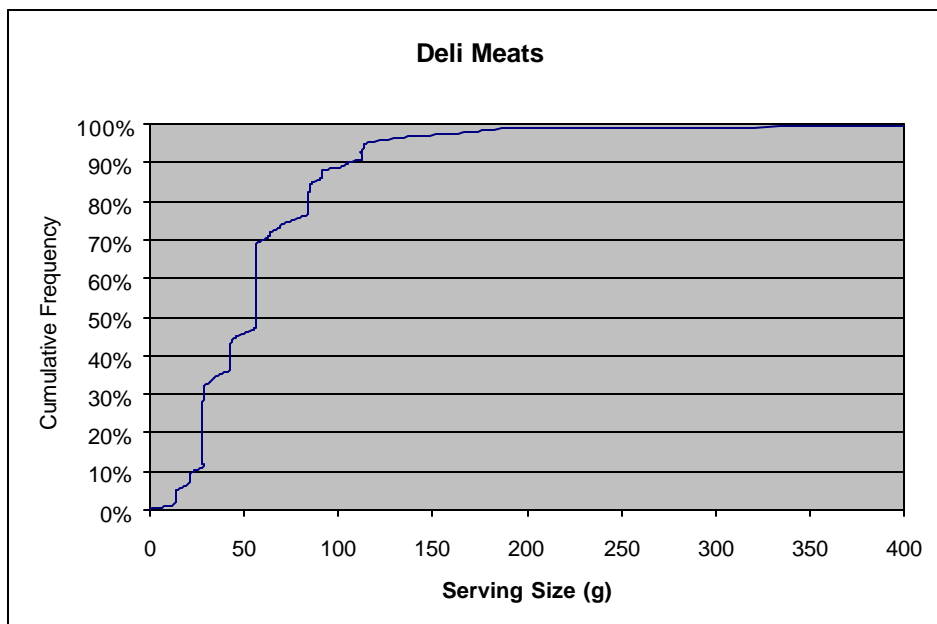**Figure A5.18.1. Empirical Cumulative Distribution for Serving Size**

Table A5.18.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
56	75	113	196

Contamination at Retail

Table A5.18.3. Foods Included in Contamination Level Data Set

Foods	Reference
Ham, cooked/sliced	Uyttendaele *et al.*, 1999
Ham , luncheon means, sliced	Lahellec *et al.*, 1996 Levine, 2000 Ng and Seah, 1995
Poultry, cooked	Levine, 2000
Roast, cooked	Levine, 2000
Corned Beef, cooked	Levine, 2000
Large diameter, cooked sausage	Levine, 2000

Table A5.18.4. Parameters for pre-retail growth for FSIS data sets

	Distribution	Parameter 1	Parameter 2	Parameter 3
Temperature (EC)	Uniform	2.0	5.0	
time (days)	Triangle	10	20	30

Figure A5.18.2. Cumulative Distribution for Contamination at Retail

Table A5.18.5. Three Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	1.95×10^{-7}	8.839461549		0.34
Weibull	6.44×10^{-2}	1.00×10^{-8}		0.29
Beta	1.09×10^{-2}	7101658.11	1.00×10^{9}	0.37

Post Retail Growth

Table A5.18.6. Foods Included in Post Retail Growth Data Set

Foods	Reference
Bologna	Glass and Doyle, 1989
Chicken, fillets/breaded	Siragusa and Johnson, 1988a
Chicken, homogenate	Siragusa and Johnson, 1988a
Chicken, sliced/vacuum packed	Glass and Doyle, 1989
Corned beef	Grau and Vanderline, 1992
Ham, cooked	Beumer *et al.,*1996 Glass and Doyle, 1989
Ham, vacuum packed	Grau and Vanderline, 1992
Roast beef	Grant *et al.,*1993
Turkey loaf, cooked, uncured, vacuum packed	Ingham and Tautorus, 1991
Turkey, sliced	Glass and Doyle, 1989
Turkey, sliced, vacuum packed	Glass and Doyle, 1989

Figure A5.18.3. Cumulative Distribution for the Exponential Reference Growth Rate (5 ° C).
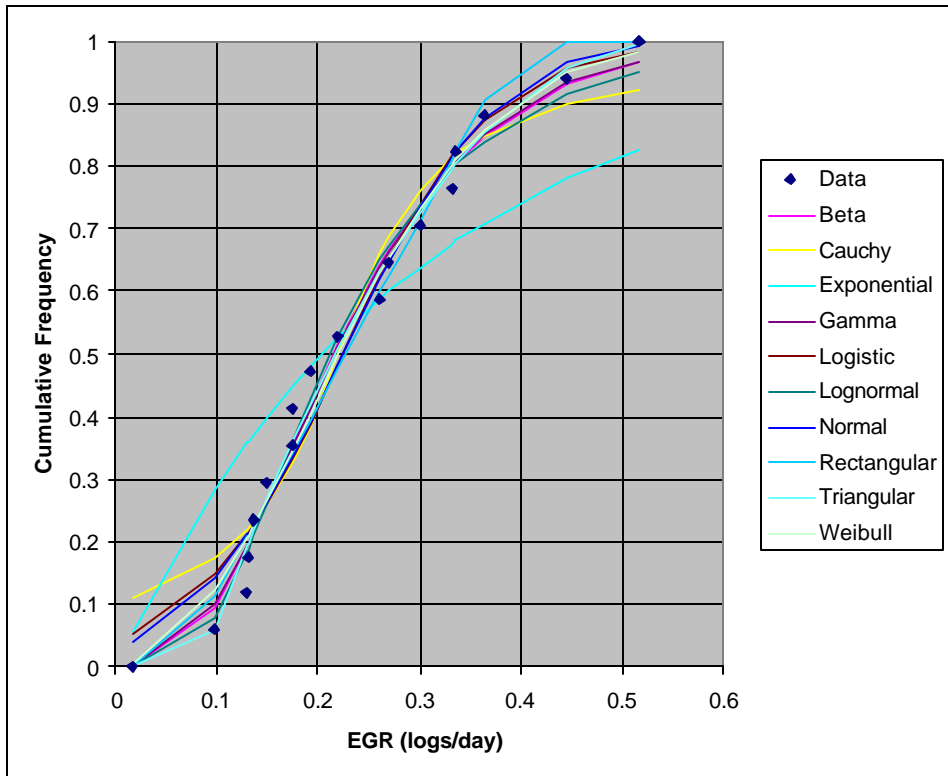

Table A5.18.7. Four Models Used to Characterize the Cumulative Distribution for Exponential Growth Rates

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Rectangle	0.0412	0.437		0.62
Triangular	0.037	0.096	0.608	0.23
Beta	1.365	1.687	0.0158	0.09
Weibull	1.82	0.281		0.06

Table A5.18.8. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	5 to 7	20 to 30

Table A5.18.9. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 ° C

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
0.244	0.137	17

NOTE: EGR derived using random sampling of growth data.

Table A5.18.10. Maximum Growth at Various Temperatures

Temperature (5 °C)	<5	5-7	>7
Maximum Growth (log $_{10}$ cfu/g)	5	6.5	8

19. Pâté and Meat Spreads Food Category

Consumption

Table A5.19.1. Foods Included in Consumption Data Set

Food Code	Food
25112200	Liver paste or pâté, chicken
25240000	Meat spread or potted meat
25240110	Chicken salad spread
25240210	Ham, deviled or potted
25240220	Ham salad spread
25240310	Roast beef spread
27563010	Meatspread or potted meat sandwich

Source Survey: CSFII

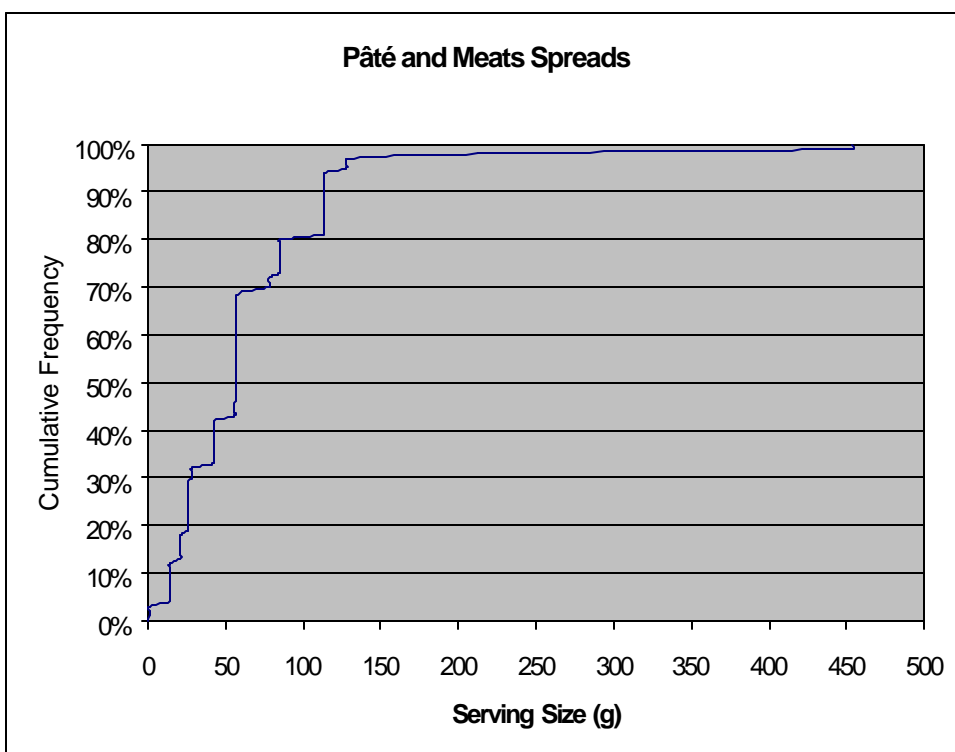**Figure A5.19.1. Cumulative Distribution for Serving Size**

Pâté and Meats Spreads

Table A5.19.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
57	85	128	454

Contamination at Retail

Table A5.19.3. Foods Included in Contamination Level Data Set

Foods	Reference
Aspic, mince	Uyttendaele *et al.,* 1999
Meat spreads	Levine, 2000
Pâté	Anderson and Nørrung, 1995 Lahellec *et al.*, 1996 Levine, 2000 Morris and Ribeiro, 1989 McLauchlin and Gilbert, 1990
Pâté mince	Uyttendaele *et al.*, 1999
Pâté, fish and seafood	Nichols *et al.*, 1998
Pâté, meat based	Nichols *et al.*, 1998
Pâté, poultry based	Nichols *et al.*, 1998
Pâté, undefined	Nichols *et al.*, 1998

Figure A5.19.2. Cumulative Distribution for Retail Contamination
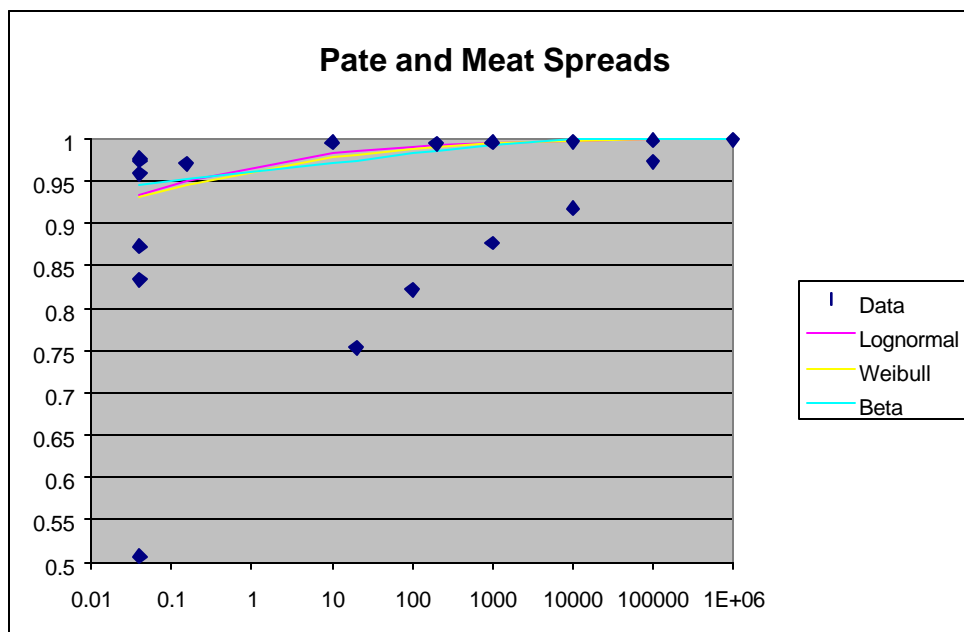

Table A5.19.4. Three Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	5.32×10^{-8}	9		0.33
Weibull	6.48×10^{-2}	1.00×10^{-8}		0.34
Beta	4.80×10^{-3}	1.40×10^{5}	1.0×10^{9}	0.33

Post Retail Growth

Table A5.19.5. Foods Included in Post Retail Growth Data Set

Foods	Reference
Pâté	Farber *et al.,*1995 Hudson and Mott, 1993a

Table A5.19.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	6 to 10	15 to 45

Table A5.19.7. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 °C

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
0.250	0.156	2

A rectangular distribution was used to model the exponential reference growth rate (the growth rate at 5 °C) for hot dogs. The parameters corresponded to the two data points: 0.143 and 0.361 logs/day.

Table A5.19.8. Maximum Growth at Various Temperatures

Temperature (5 °C)	<5	5-7	>7
Maximum Growth (log$_{10}$ cfu/g)	5	6.5	8

20. Deli Salads Food Category

Consumption

Table A5.20.1. Foods Included in Consumption Data Set

Food Code	Food
27416250	Beef salad
27420020	Ham or pork salad
27446200	Chicken or turkey salad
27446220	Chicken or turkey salad with egg
27446300	Chicken or turkey garden salad (chicken and/or turkey, tomato and/or carrots, other vegetables), no dressing
27446310	Chicken or turkey garden salad (chicken and/or turkey, other vegetables excluding tomato and carrots), no dressing
27446350	Oriental chicken or turkey garden salad (chicken and/or turkey, lettuce, fruit, nuts) no dressing
27450010	Crab salad
27450020	Lobster salad
27450030	Salmon salad
27450060	Tuna salad
27450070	Shrimp salad
27450080	Seafood salad
27450090	Tuna salad with cheese
27450100	Tuna salad with egg
27450110	Shrimp garden salad (shrimp, eggs, tomato and/or carrots, other vegetables), no dressing
27450120	Shrimp garden salad (shrimp, eggs, vegetables excluding tomato and carrots), no dressing
27450130	Crab salad made with imitation crab
27450180	Seafood garden salad with seafood, vegetables excluding tomato and carrots, no dressing
27450190	Seafood garden salad with seafood, tomato and/or carrots, other vegetables, no dressing
27460490	Julienne salad (meat, cheese, eggs, vegetables), no dressing
27460510	Antipasto with ham, fish, cheese, vegetables
27520340	Ham salad sandwich
27540120	Chicken salad or chicken spread sandwich
27540320	Turkey salad or turkey spread sandwich
27550710	Tuna salad sandwich, with lettuce
27550720	Tuna salad sandwich
27550750	Tuna salad submarine sandwich, on roll, with lettuce
32103000	Egg salad
32203010	Egg salad sandwich
58101930	Taco or tostada salad with beef and cheese, fried flour tortilla
58148110	Macaroni salad
58148120	Macaroni salad with egg
58148130	Macaroni salad with tuna
58148140	Macaroni salad with crab meat
58148150	Macaroni salad with shrimp
58148160	Macaroni salad with tuna and egg

58148170	Macaroni salad with chicken
58148180	Macaroni salad with cheese
58148500	Pasta salad (macaroni or noodles, vegetables, dressing)
58148550	Pasta salad with meat (macaroni or noodles, vegetables, meat, dressing)

Source Survey:　　CSFII

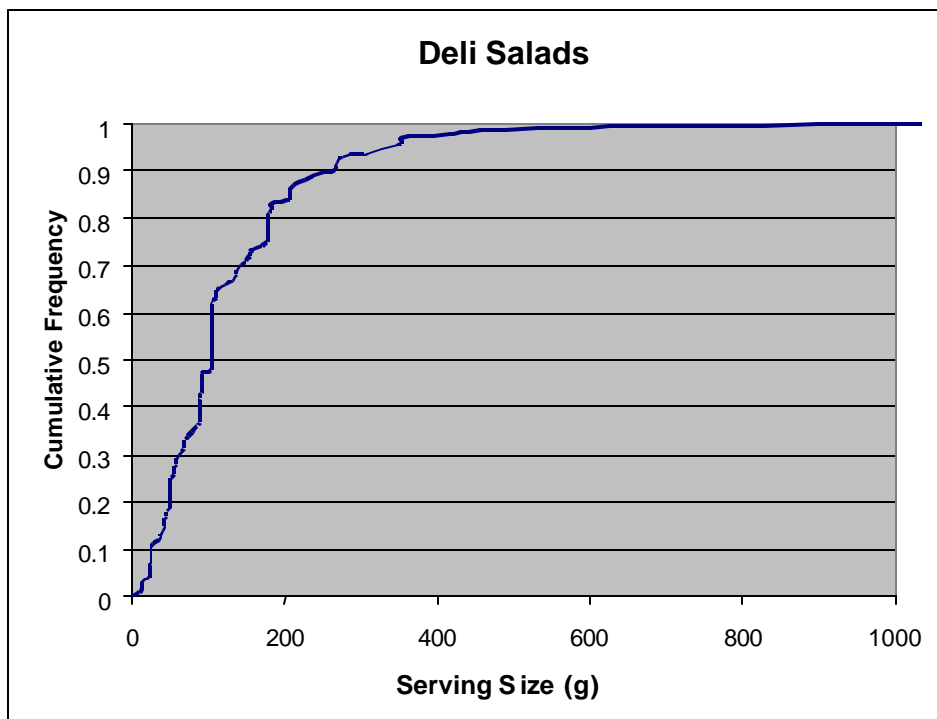**Figure A5.20.1. Empirical Cumulative Distribution for Serving Size**

Table A5.20.2. Frequency Distribution of Amount Consumed per Serving

Percentiles (grams per serving)			
50th	75th	95th	99th
104	177	338	531

Contamination at Retail

Table A5.20.3. Foods Included in Contamination Level Data Set

Foods	Reference
Salad, seafood	Buchanan *et al.*, 1989 Hartemink and Georgsson, 1991
Salad, meat/egg	Teufel and Bendzulla 1993
Salad, chicken	Uyttendaele *et al.*, 1999
Salad, fish/shrimp	Uyttendaele *et al.*, 1999
Salad, ham	Uyttendaele *et al.*, 1999
Salad, egg	West and North Yorkshire Joint Working Group, 1991
Salad, with fish	West and North Yorkshire Joint Working Group, 1991
Salad, with meat/egg	West and North Yorkshire Joint Working Group, 1991
Salads, various meat and poultry	Levine, 2000
Salads, various	Wilson, 1996

Figure A5.20.2. Cumulative Distribution for Retail Contamination
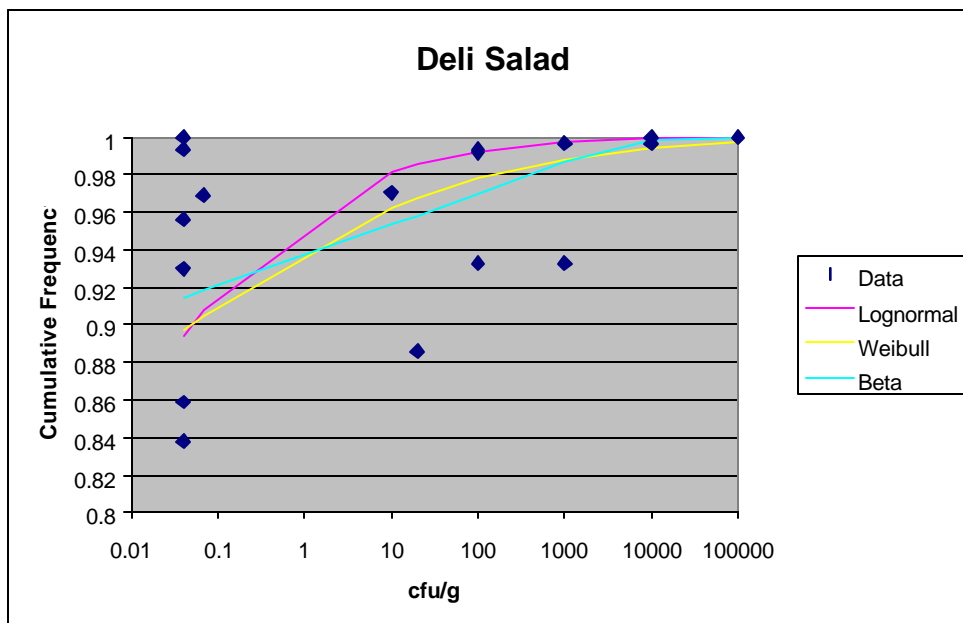

Table A5.20.4. Three Models Used to Characterize the Cumulative Distribution for Contamination at Retail

Model	Parameter 1	Parameter 2	Parameter 3	Probability
Lognormal	1.04×10^{-5}	6.61195		0.34
Weibull	6.61×10^{-2}	1.59×10^{-7}		0.39
Beta	7.50×10^{-3}	98427.5752	1.00×10^{9}	0.26

Post Retail Growth

Table A5.20.5. Foods Included in Post Retail Growth Data Set

Foods	Reference
No data	

Table A5.21.6. Consumer Storage Times Used in this Risk Assessment (days)

Minimum	Mode	Maximum
0.5	3 to 4	8 to 12

Table A5.20.7. Mean, Standard Deviation and Number of Samples (N) for Exponential Growth Rate (EGR) at 5 ˚C

The growth rate for deli meats was used as an analog for deli salads.

Mean (log$_{10}$ cfu/g/day)	Std. Dev.	N
0.296	0.220	17

NOTE: EGR derived using random sampling of growth data.

Table A5.20.8. Maximum Growth at Various Temperatures

Temperature (5 ˚C)	<5	5-7	>7
Maximum Growth (log $_{10}$ cfu/g)	5	6.5	8