Relative Risk of Illness per Serving among 24 Types of Processed Meat and Poultry Products

Scores by Panelist (n = 23)

						Raw						Raw ground		
						intact			Raw ground			or		
			Raw			poultry -			or			otherwise		
			intact			no	Raw ground	Raw ground	otherwise	Raw ground	Raw ground	non-intact	Raw	Raw
	Raw	Raw	meat – no	Raw	Raw	chicken	or otherwise	or otherwise	non-intact	or otherwise	or otherwise	poultry – no	otherwise	otherwise
	intact	intact	beef or	intact	intact	or	non-intact	non-intact	meat – no	non-intact	non-intact	chicken or	processed	processed
Panelist	beef	pork	pork	chicken	turkey	turkey	beef	pork	beef or pork	chicken	turkey	turkey	meat	poultry
P1	2	2	2	5	5	5	5	5	5	10	10	10	2	3
P2	1	2	2	10	10	10	10	8	10	12	15	15	1	2
P3	400	250	1,000	600	400	1,000	6,000	3,000	30,000	25,000	20,000	30,000	30,000	30,000
P4	3,000	1,000	1,000	5,000	5,000	5,000	100,000	50,000	50,000	200,000	150,000	150,000	50,000	50,000
P5	4	4	4	4	4	4	10	10	10	10	10	10	10	10
P6	8	6	9	9	9	9	10	8	10	10	10	10	10	10
P7	2	2	3	3	3	3	3	3	3	4	4	4	2	2
P8	5	5	5	10	10	10	10	8	10	8	8	10	3	3
P10	2.1	1.9	2.1	2.2	2.2	2.4	3	2.8	2.7	3	3	2.8	1.2	1.2
P11	1	1	3	8	9	8	5	3	4	9	10	9	8	8
P12	2	2	6	8	8	8	5	4	5	10	10	10	10	10
P13	20	20	20	100	100	100	100	100	100	100	100	100	100	100
P14	5	5	5	25	25	25	15	15	15	25	25	25	10	10
P15	25	20	15	50	50	50	35	20	15	40	40	40	12	12
P16	4	4	5	7	8	6	10	9	8	9	9	8	4	4
P17	1.25	1.25	2	2	2.5	2	5	1.5	2	2	2	2.5	2	2.5
P18	5	3	5	8	8	5	10	10	10	10	10	10	4	4
P19	2	2	2	3	3	3	3.5	3.5	3.5	4.5	4.5	4.5	3.5	3.5
P20	2	3	2	5	5	5	10	3	2	3	3	3	7	5
P21	6	5	5	10	10	9	8	7	7	8	8	7	5	5
P22	12	8	10	18	14	12	20	14	14	24	22	20	20	24
P23	8	8	9	8	8	8	10	9	9	10	10	10	7	7
P24	7	6.8	6.8	9.8	9.8	9.8	9.8	9.7	9.7	10	10	9.8	8.5	8.8
minimum	1.0	1.0	2.0	2.0	2.2	2.0	3.0	1.5	2.0	2.0	2.0	2.5	1.0	1.2
maximum	3,000	1,000	1,000	5,000	5,000	5,000	100,000	50,000	50,000	200,000	150,000	150,000	50,000	50,000
median	5.0	4.0	5.0	8.0	9.0	8.0	10.0	8.0	9.7	10.0	10.0	10.0	7.0	7.0

Relative Risk of Illness per Serving among 24 Types of Processed Meat and Poultry Products

Scores by Panelist (n = 23)

								RTE meat		
								fully-cooked		
	RTE acidified /							without	RTE poultry fully	
RTE acidified /	fermented							subsequent	cooked without	
fermented meat	poultry			RTE salt -			RTE fully -	exposure to	subsequent	
(without	(without	RTE dried	RTE dried	cured	RTE salt -	RTE fully -	cooked	the	exposure to the	
cooking)	cooking)	meat	poultry	meat	cured poultry	cooked meat	poultry	environment	environment	Maximum
1.5	1.5	1.5	1.5	1.5	2	1.25	1.25	1	1	10.0
2	2	2	3	2	4	6	8	3	3	15.0
40,000,000	40,000,000	200,000,000	300,000,000	600,000	2,500,000	1	10,000	3	30,000	300,000,000
10	20	500	100	10	10	125	250	1	1	200,000
1	1	2	2	2	2	2	2	1	1	10.0
6	6	2.5	2.5	2	2	7	7	1	1	10.0
1	1	1	1	1	1	1	1	1	1	4.0
2	2	2	2	2	2	2	2	1	1	10.0
1.5	1.5	1.2	1.2	1.1	1.1	2.5	2.5	1	1	3.0
3	3	3	4	2	2	8	8	5	5	10.0
2	2	1	1	1	2	3	3	1	2	10.0
20	20	1	5	1	1	1	1	1	1	100.0
1	1	1	1	1	1	1	1	1	1	25.0
4	4	8	8	8	8	12	12	1	1	50.0
2	2	1	1	4	4	5	5	3	3	10.0
1.5	1.5	1.5	1	1.5	1.5	2	2.5	1.5	1.5	5.0
2	2	2	2	2	2	3	3	1	1	10.0
2	2	2	2	2	2	5	5	1	1	5.0
5	5	1	1	1.5	1.5	5	7	1.5	4	10.0
3	3	2	2	3	3	4	4	1	1	10.0
4	6	2	2	2	2	6	8	1	1	24.0
5	5	1	1	1	2	3	3	3	3	10.0
2.5	2.9	3	4	3	3	1.6	1.6	1	1.3	5.7
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3.0
40,000,000	40,000,000	200,000,000	300,000,000	600,000	2,500,000	125	10,000	5.0	30,000	300,000,000
2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	1.0	1.0	10.0

Finished Product Type Score Brief Explanation of Your Score (If Needed) Raw intact beef 2 Raw intact pork 2 Raw intact meat – other than beef or pork 2 Raw intact chicken 5 5 Raw intact turkey Raw intact poultry – other than chicken or turkey 5 Raw ground, comminuted, or otherwise non-5 intact beef Raw ground, comminuted, or otherwise non-5 intact pork Raw ground, comminuted, or otherwise non-5 intact meat - other than beef or pork Raw ground, comminuted, or otherwise non-10 intact chicken Raw ground, comminuted, or otherwise non-10 intact turkey Raw ground, comminuted, or otherwise non-10 intact poultry – other than chicken or turkey Raw otherwise processed meat 2 3 Raw otherwise processed poultry RTE acidified/fermented meat (without cooking) 1.5 RTE acidified/fermented poultry (without 1.5 <u>cooking</u>) RTE dried meat 1.5 RTE dried poultry 1.5 RTE salt - cured meat 1.5 RTE salt - cured poultry 2 RTE fully - cooked meat 1.25 RTE fully - cooked poultry 1.25 RTE meat fully-cooked without subsequent 1 exposure to the environment RTE poultry fully-cooked without subsequent 1 exposure to the environment

Finished Product Type Brief Explanation of Your Score (If Needed) Score Raw intact beef 1 Raw intact pork 2 Raw intact meat – other than beef or pork 2 Raw intact chicken 10 Raw intact turkey 10 Raw intact poultry – other than chicken or turkey 10 Raw ground, comminuted, or otherwise non-10 intact beef Raw ground, comminuted, or otherwise non-8 intact pork Raw ground, comminuted, or otherwise non-10 intact meat - other than beef or pork Raw ground, comminuted, or otherwise non-12 intact chicken Raw ground, comminuted, or otherwise non-15 intact turkey Raw ground, comminuted, or otherwise non-15 intact poultry – other than chicken or turkey Raw otherwise processed meat 1 2 Raw otherwise processed poultry RTE acidified/fermented meat (without cooking) 2 RTE acidified/fermented poultry (without 2 <u>cookin</u>a) RTE dried meat 2 RTE dried poultry 3 2 RTE salt - cured meat RTE salt - cured poultry 4 RTE fully - cooked meat 6 RTE fully - cooked poultry 8 RTE meat fully-cooked without subsequent 3 exposure to the environment RTE poultry fully-cooked without subsequent 3 exposure to the environment

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	400	45% High, using 2003 baseline, add consumer cooking, assume consumer cooking is 5 log reduction
Raw intact pork	250	25%, 2003 baseline, add consumer cooking
Raw intact meat – other than beef or pork	1,000	Assume 100% contam, add consumer cooking
Raw intact chicken	600	60% 2003 baseline, add consumer cooking
Raw intact turkey	400	40% extrapolation, 2003 baseline, add consumer cooking
Raw intact poultry – other than chicken or turkey	1,000	Assume 100% contam, add consumer cooking
Raw ground, comminuted, or otherwise non- intact beef	6,000	20% 2003 baseline, add consumer cooking
Raw ground, comminuted, or otherwise non- intact pork	3,000	12% More like beef, estimate from beef, add consumer cooking
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	30,000	Assume 100% contam, add consumer cooking
Raw ground, comminuted, or otherwise non- intact chicken	25,000	80%, add consumer cooking
Raw ground, comminuted, or otherwise non- intact turkey	20,000	60%, add consumer cooking
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	30,000	Assume 100% contam, add consumer cooking
Raw otherwise processed meat	30,000	Assume 100% contam, add consumer cooking
Raw otherwise processed poultry	30,000	Assume 100%, contam, add consumer cooking
RTE acidified/fermented meat (without cooking)	40,000,000	Acidification log reduction, paoli pg 30, 0.6
RTE acidified/fermented poultry (without cooking)	40,000,000	Acidification log reduction, paoli pg 30, 0.6
RTE dried meat	200,000,000	Drieg log red, paoli pg 30, 1.3
RTE dried poultry	300,000,000	Dried log red, paoli pg 30, 1.3*1.5
RTE salt - cured meat	600,000	Salt log red, paoli prosciutto - 1.2
RTE salt - cured poultry	2,500,000	Salt log red, paoli prosciutto - 1.2 poultry factor
RTE fully - cooked meat	1	Paoli page 30 about -7 logs
RTE fully - cooked poultry	10,000	Paoli page 30 about -3 logs
RTE meat fully-cooked without subsequent exposure to the environment	3	Subtract Listeria, minimal effect (0.5 log?)
RTE poultry fully-cooked without subsequent exposure to the environment	30,000	Subtract Listeria, minimal effect (0.5 log?)

Finished Product Type Score Brief Explanation of Your Score (If Needed) Assume not infected or "made tenderized" Raw intact beef 3,000 Raw intact pork 1,000 Raw intact meat - other than beef or pork 1,000 Raw intact chicken 5,000 Raw intact turkey 5,000 Raw intact poultry – other than chicken or turkey 5,000 Raw ground, comminuted, or otherwise non-Because of risk of 0157 or MDR SalmoInella 100,000 intact beef Raw ground, comminuted, or otherwise non-50,000 intact pork Raw ground, comminuted, or otherwise non-50,000 intact meat - other than beef or pork Raw ground, comminuted, or otherwise non-200,000 intact chicken Raw ground, comminuted, or otherwise non-150,000 intact turkey Raw ground, comminuted, or otherwise non-150,000 intact poultry – other than chicken or turkey Raw otherwise processed meat 50,000 50,000 Raw otherwise processed poultry RTE acidified/fermented meat (without cooking) 10 RTE acidified/fermented poultry (without 20 <u>cookin</u>a) Principally Salmonella RTE dried meat 500 RTE dried poultry 100 RTE salt - cured meat 10 RTE salt - cured poultry 10 Principally Listeria RTE fully - cooked meat 125 Principally Listeria RTE fully - cooked poultry 250 RTE meat fully-cooked without subsequent Presume no customer mishandling 1 exposure to the environment RTE poultry fully-cooked without subsequent Presume no customer mishandling 1 exposure to the environment

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	4	
Raw intact pork	4	
Raw intact meat – other than beef or pork	4	
Raw intact chicken	4	
Raw intact turkey	4	
Raw intact poultry – other than chicken or turkey	4	
Raw ground, comminuted, or otherwise non- intact beef	10	
Raw ground, comminuted, or otherwise non- intact pork	10	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	10	
Raw ground, comminuted, or otherwise non- intact chicken	10	
Raw ground, comminuted, or otherwise non- intact turkey	10	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	10	
Raw otherwise processed meat	10	
Raw otherwise processed poultry	10	
RTE acidified/fermented meat (without cooking)	1	
RTE acidified/fermented poultry (without cooking)	1	
RTE dried meat	2	
RTE dried poultry	2	
RTE salt - cured meat	2	
RTE salt - cured poultry	2	
RTE fully - cooked meat	2	
RTE fully - cooked poultry	2	
RTE meat fully-cooked without subsequent exposure to the environment	1	
RTE poultry fully-cooked without subsequent exposure to the environment	1	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	8	
Raw intact pork	6	
Raw intact meat – other than beef or pork	9	
Raw intact chicken	9	
Raw intact turkey	9	
Raw intact poultry – other than chicken or turkey	9	
Raw ground, comminuted, or otherwise non- intact beef	10	
Raw ground, comminuted, or otherwise non- intact pork	8	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	10	
Raw ground, comminuted, or otherwise non- intact chicken	10	
Raw ground, comminuted, or otherwise non- intact turkey	10	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	10	
Raw otherwise processed meat	10	
Raw otherwise processed poultry	10	
RTE acidified/fermented meat (without cooking)	6	
RTE acidified/fermented poultry (without cooking)	6	
RTE dried meat	2.5	
RTE dried poultry	2.5	
RTE salt - cured meat	2	
RTE salt - cured poultry	2	
RTE fully - cooked meat	7	
RTE fully - cooked poultry	7	
RTE meat fully-cooked without subsequent exposure to the environment	1	
RTE poultry fully-cooked without subsequent exposure to the environment	1	

Finished Product Type Score Brief Explanation of Your Score (If Needed) Raw intact beef 2 Raw intact pork 2 Raw intact meat – other than beef or pork 3 Raw intact chicken 3 3 Raw intact turkey Raw intact poultry – other than chicken or turkey 3 Raw ground, comminuted, or otherwise non-3 intact beef Raw ground, comminuted, or otherwise non-3 intact pork Raw ground, comminuted, or otherwise non-3 intact meat - other than beef or pork Raw ground, comminuted, or otherwise non-4 intact chicken Raw ground, comminuted, or otherwise non-4 intact turkey Raw ground, comminuted, or otherwise non-4 intact poultry – other than chicken or turkey Raw otherwise processed meat 2 2 Raw otherwise processed poultry RTE acidified/fermented meat (without cooking) 1 RTE acidified/fermented poultry (without 1 <u>cooking</u>) RTE dried meat 1 RTE dried poultry 1 RTE salt - cured meat 1 RTE salt - cured poultry 1 RTE fully - cooked meat 1 RTE fully - cooked poultry 1 RTE meat fully-cooked without subsequent 1 exposure to the environment RTE poultry fully-cooked without subsequent 1 exposure to the environment

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	5	
Raw intact pork	5	
Raw intact meat – other than beef or pork	5	
Raw intact chicken	10	Risk is high because stuffed chicken is included
Raw intact turkey	10	Risk is high because stuffed turkey is included
Raw intact poultry – other than chicken or turkey	10	Risk is high because stuffed product is included
Raw ground, comminuted, or otherwise non- intact beef	10	
Raw ground, comminuted, or otherwise non- intact pork	8	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	10	
Raw ground, comminuted, or otherwise non- intact chicken	8	
Raw ground, comminuted, or otherwise non- intact turkey	8	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	10	
Raw otherwise processed meat	3	
Raw otherwise processed poultry	3	
RTE acidified/fermented meat (without cooking)	2	
RTE acidified/fermented poultry (without cooking)	2	
RTE dried meat	2	
RTE dried poultry	2	
RTE salt - cured meat	2	
RTE salt - cured poultry	2	
RTE fully - cooked meat	2	
RTE fully - cooked poultry	2	
RTE meat fully-cooked without subsequent exposure to the environment	1	
RTE poultry fully-cooked without subsequent exposure to the environment	1	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	2.1	
Raw intact pork	1.9	
Raw intact meat – other than beef or pork	2.1	
Raw intact chicken	2.2	
Raw intact turkey	2.2	
Raw intact poultry – other than chicken or turkey	2.4	
Raw ground, comminuted, or otherwise non- intact beef	3	
Raw ground, comminuted, or otherwise non- intact pork	2.8	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	2.7	
Raw ground, comminuted, or otherwise non- intact chicken	3	
Raw ground, comminuted, or otherwise non- intact turkey	3	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	2.8	
Raw otherwise processed meat	1.2	
Raw otherwise processed poultry	1.2	
RTE acidified/fermented meat (without cooking)	1.5	
RTE acidified/fermented poultry (without cooking)	1.5	
RTE dried meat	1.2	
RTE dried poultry	1.2	
RTE salt - cured meat	1.1	
RTE salt - cured poultry	1.1	
RTE fully - cooked meat	2.5	
RTE fully - cooked poultry	2.5	
RTE meat fully-cooked without subsequent exposure to the environment	1	
RTE poultry fully-cooked without subsequent exposure to the environment	1	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	1	
Raw intact pork	1	
Raw intact meat – other than beef or pork	3	cultural preparations.
Raw intact chicken	8	
Raw intact turkey	9	
Raw intact poultry – other than chicken or turkey	8	
Raw ground, comminuted, or otherwise non- intact beef	5	
Raw ground, comminuted, or otherwise non- intact pork	3	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	4	
Raw ground, comminuted, or otherwise non- intact chicken	9	
Raw ground, comminuted, or otherwise non- intact turkey	10	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	9	
Raw otherwise processed meat	8	
Raw otherwise processed poultry	8	Microwave cooking by consumers
RTE acidified/fermented meat (without cooking)	3	
RTE acidified/fermented poultry (without cooking)	3	
RTE dried meat	3	
RTE dried poultry	4	
RTE salt - cured meat	2	
RTE salt - cured poultry	2	
RTE fully - cooked meat	8	
RTE fully - cooked poultry	8	
RTE meat fully-cooked without subsequent exposure to the environment	5	
RTE poultry fully-cooked without subsequent exposure to the environment	5	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	2	
Raw intact pork	2	
Raw intact meat – other than beef or pork	6	
Raw intact chicken	8	
Raw intact turkey	8	
Raw intact poultry – other than chicken or turkey	8	
Raw ground, comminuted, or otherwise non- intact beef	5	
Raw ground, comminuted, or otherwise non- intact pork	4	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	5	
Raw ground, comminuted, or otherwise non- intact chicken	10	
Raw ground, comminuted, or otherwise non- intact turkey	10	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	10	
Raw otherwise processed meat	10	
Raw otherwise processed poultry	10	
RTE acidified/fermented meat (without cooking)	2	
RTE acidified/fermented poultry (without cooking)	2	
RTE dried meat	1	
RTE dried poultry	1	
RTE salt - cured meat	1	
RTE salt - cured poultry	2	
RTE fully - cooked meat	3	
RTE fully - cooked poultry	3	
RTE meat fully-cooked without subsequent exposure to the environment	1	
RTE poultry fully-cooked without subsequent exposure to the environment	2	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	20	
Raw intact pork	20	
Raw intact meat – other than beef or pork	20	
Raw intact chicken	100	
Raw intact turkey	100	
Raw intact poultry – other than chicken or turkey	100	
Raw ground, comminuted, or otherwise non- intact beef	100	
Raw ground, comminuted, or otherwise non- intact pork	100	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	100	
Raw ground, comminuted, or otherwise non- intact chicken	100	
Raw ground, comminuted, or otherwise non- intact turkey	100	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	100	
Raw otherwise processed meat	100	
Raw otherwise processed poultry	100	
RTE acidified/fermented meat (without cooking)	20	
RTE acidified/fermented poultry (without cooking)	20	
RTE dried meat	1	
RTE dried poultry	5	
RTE salt - cured meat	1	
RTE salt - cured poultry	1	
RTE fully - cooked meat	1	
RTE fully - cooked poultry	1	
RTE meat fully-cooked without subsequent exposure to the environment	1	
RTE poultry fully-cooked without subsequent exposure to the environment	1	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	5	Enteric pathogens primarily at surface and destroyed by
Raw intact pork	5	cooking.
Raw intact meat – other than beef or pork	5	
Raw intact chicken	25	Epidemiologic history for higher risk due to higher prevalence
Raw intact turkey	25	of enterics plus cross-contaimation and or undercooking
Raw intact poultry – other than chicken or turkey	25	
Raw ground, comminuted, or otherwise non- intact beef	15	Lower prevalence of enterics compared with poultry.
Raw ground, comminuted, or otherwise non- intact pork	15	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	15	
Raw ground, comminuted, or otherwise non- intact chicken	25	Same as raw intact chicken, turkey, etc. above.
Raw ground, comminuted, or otherwise non- intact turkey	25	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	25	
Raw otherwise processed meat	10	Potential for confusion by consumer and undercooking in
Raw otherwise processed poultry	10	home.
RTE acidified/fermented meat (without cooking)	1	Assumed these processes have been validated as per HACCP plan etc.
RTE acidified/fermented poultry (without cooking)	1	
RTE dried meat	1	
RTE dried poultry	1	
RTE salt - cured meat	1	
RTE salt - cured poultry	1	Assumed that if such products exist, they are processed as in "salt-cured meat".
RTE fully - cooked meat	1	
RTE fully - cooked poultry	1	
RTE meat fully-cooked without subsequent exposure to the environment	1	
RTE poultry fully-cooked without subsequent exposure to the environment	1	
General Comment		 Chemical hazards - all categories are comparable. Physical hazards - bone fragments can occur in certain coarse ground products, otherwise all categories are comparable. Biological hazards - the pathogens of concern to "healthy adults" are Salmonella, Campylobacters and in pork, Y.ecterocolitica. These are of concern in raw products to varying degrees as

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	25	E. coli 0157:H7 is more of an issue with beef and Salmonella
Raw intact pork	20	Less Salmonella than beef, but small risk of Yersinia
Raw intact meat – other than beef or pork	15	Hard to call - game meat is probably much riskier than horse meat, but lamb is less risky than beef. There are so many fewer servings of these foods that we do not get a feel for the magnitude of the problem
Raw intact chicken	50	These products are often handled more by the consumer - e.g. cutting board
Raw intact turkey	50	These products are often handled more by the consumer - e.g. cutting board
Raw intact poultry – other than chicken or turkey	50	These products are often handled more by the consumer - e.g. cutting board
Raw ground, comminuted, or otherwise non- intact beef	35	Pathogens present on intact meat tend to be spread throughout the meat and ground beef has a significant risk of undercooking
Raw ground, comminuted, or otherwise non- intact pork	20	Most consumers are careful not to undercook pork, so risk is essentially the same as for intact meat
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	15	Again, hard to know what meat we are talking about here, ground lamb, horse?, but simiilar to situation with pork, most consumers may take extra care in cooking
Raw ground, comminuted, or otherwise non- intact chicken	40	I think that consumers have a greater appreciation of the risks of ground product, reduced risk of cross contamination
Raw ground, comminuted, or otherwise non- intact turkey	40	I think that consumers have a greater appreciation of the risks of ground product, reduced risk of cross contamination
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	40	I think that consumers have a greater appreciation of the risks of ground product, reduced risk of cross contamination
Raw otherwise processed meat	12	Hard to know what process is being used here. High Pressure or irradiation might make the food as safe as cooking - essentially like any other processed product
Raw otherwise processed poultry	12	Hard to know what process is being used here. High Pressure or irradiation might make the food as safe as cooking - essentially like any other processed product
RTE acidified/fermented meat (without cooking)	4	Fermented products tend to be bactericidal, but do get more handling than in pack processed meats
RTE acidified/fermented poultry (without cooking)	4	Fermented products tend to be bactericidal, but do get more handling than in pack processed meats
RTE dried meat	8	Quite a bit of handling, not much risk of growth
RTE dried poultry	8	Quite a bit of handling, not much risk of growth
RTE salt - cured meat	8	Quite a bit of handling, not much risk of growth
RTE salt - cured poultry	8	Quite a bit of handling, not much risk of growth
RTE fully - cooked meat	12	Often the vehicle in Listeria outbreaks, often sliced or peeled before packaging
RTE fully - cooked poultry	12	Often the vehicle in Listeria outbreaks, often sliced or peeled before packaging
RTE meat fully-cooked without subsequent	1	
exposure to the environment RTE poultry fully-cooked without subsequent	1	
exposure to the environment General Comments	'	E.coli 017: Hy is more of an issue with beef and Salmonella seems to be more common on beef

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	4	
Raw intact pork	4	
Raw intact meat – other than beef or pork	5	
Raw intact chicken	7	
Raw intact turkey	8	
Raw intact poultry – other than chicken or turkey	6	Higher likelihood of undercooking.
Raw ground, comminuted, or otherwise non- intact beef	10	
Raw ground, comminuted, or otherwise non- intact pork	9	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	8	
Raw ground, comminuted, or otherwise non- intact chicken	9	
Raw ground, comminuted, or otherwise non- intact turkey	9	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	8	
Raw otherwise processed meat	4	
Raw otherwise processed poultry	4	
RTE acidified/fermented meat (without cooking)	2	
RTE acidified/fermented poultry (without cooking)	2	
RTE dried meat	1	
RTE dried poultry	1	
RTE salt - cured meat	4	
RTE salt - cured poultry	4	
RTE fully - cooked meat	5	
RTE fully - cooked poultry	5	
RTE meat fully-cooked without subsequent exposure to the environment	3	
RTE poultry fully-cooked without subsequent exposure to the environment	3	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	1.25	
Raw intact pork	1.25	
Raw intact meat – other than beef or pork	2	Excludes wild game
Raw intact chicken	2	X-contamination - campylobacter
Raw intact turkey	2.5	X-contamination/undercooking of stuffing
Raw intact poultry – other than chicken or turkey	2	excludes wild game
Raw ground, comminuted, or otherwise non- intact beef	5	E.coli 0157:H7
Raw ground, comminuted, or otherwise non- intact pork	1.5	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	2	excludes wild game
Raw ground, comminuted, or otherwise non- intact chicken	2	
Raw ground, comminuted, or otherwise non- intact turkey	2	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	2.5	excludes wild game
Raw otherwise processed meat	2	
Raw otherwise processed poultry	2.5	strong potential for consumer undercooking
RTE acidified/fermented meat (without cooking)	1.5	
RTE acidified/fermented poultry (without cooking)	1.5	
RTE dried meat	1.5	E.coli 0157:H7 dried jerky (beef)
RTE dried poultry	1	
RTE salt - cured meat	1.5	
RTE salt - cured poultry	1.5	
RTE fully - cooked meat	2	L.monocytogenes
RTE fully - cooked poultry	2.5	L.monocytogenes
RTE meat fully-cooked without subsequent exposure to the environment	1.5	
RTE poultry fully-cooked without subsequent exposure to the environment	1.5	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	5	
Raw intact pork	3	
Raw intact meat – other than beef or pork	5	
Raw intact chicken	8	
Raw intact turkey	8	
Raw intact poultry – other than chicken or turkey	5	
Raw ground, comminuted, or otherwise non- intact beef	10	
Raw ground, comminuted, or otherwise non- intact pork	10	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	10	
Raw ground, comminuted, or otherwise non- intact chicken	10	
Raw ground, comminuted, or otherwise non- intact turkey	10	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	10	
Raw otherwise processed meat	4	
Raw otherwise processed poultry	4	
RTE acidified/fermented meat (without cooking)	2	
RTE acidified/fermented poultry (without cooking)	2	
RTE dried meat	2	
RTE dried poultry	2	
RTE salt - cured meat	2	
RTE salt - cured poultry	2	
RTE fully - cooked meat	3	
RTE fully - cooked poultry	3	
RTE meat fully-cooked without subsequent exposure to the environment	1	
RTE poultry fully-cooked without subsequent exposure to the environment	1	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	2	
Raw intact pork	2	
Raw intact meat – other than beef or pork	2	
Raw intact chicken	3	
Raw intact turkey	3	
Raw intact poultry – other than chicken or turkey	3	
Raw ground, comminuted, or otherwise non- intact beef	3.5	
Raw ground, comminuted, or otherwise non- intact pork	3.5	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	3.5	
Raw ground, comminuted, or otherwise non- intact chicken	4.5	
Raw ground, comminuted, or otherwise non- intact turkey	4.5	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	4.5	
Raw otherwise processed meat	3.5	
Raw otherwise processed poultry	3.5	
RTE acidified/fermented meat (without cooking)	2	
RTE acidified/fermented poultry (without cooking)	2	
RTE dried meat	2	
RTE dried poultry	2	
RTE salt - cured meat	2	
RTE salt - cured poultry	2	
RTE fully - cooked meat	5	
RTE fully - cooked poultry	5	
RTE meat fully-cooked without subsequent exposure to the environment	1	
RTE poultry fully-cooked without subsequent exposure to the environment	1	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	2	Since these projects (products?) are not injected the only contaminating organisms will be on the surface and easy to destroy. Surface contamination is destroyed during cooking-even rare or medium rare cooking
Raw intact pork	3	Pork is generally well cooked but there is still a low risk with Trichinosis if not cooked thoroughly.
Raw intact meat – other than beef or pork	2	Only surface contamination that should be easy to destroy
Raw intact chicken	5	The risk in this category is stuffed chicken that is not thoroughly cooked.
Raw intact turkey	5	The risk in this category is stuffed turkey that is not thoroughly cooked.
Raw intact poultry – other than chicken or turkey	5	The risk in this category is a stuffed bird that is not thoroughly cooked.
Raw ground, comminuted, or otherwise non- intact beef	10	Potential problem with E. coli 0157:H7 in raw ground beef and to a lesser degree in tenderized or injected beef.
Raw ground, comminuted, or otherwise non- intact pork	3	Potential for Trichinosis in undercooked pork.
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	2	Consumer have tendency to medium or well cook sheep (lamb) and goat. This heating process should destroy pathogens.
Raw ground, comminuted, or otherwise non- intact chicken	3	Chicken is commonly cooked to well done. Undercooked chicken showing red juice is unacceptable and could be a public health risk.
Raw ground, comminuted, or otherwise non- intact turkey	3	Turkey is commonly cooked to well done but under cooking could be a risk.
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	3	
Raw otherwise processed meat	7	If beef is used in these products, there is a potential for undercooking and a subsequent problem with E. coli 0157:H7.
Raw otherwise processed poultry	5	If under cooked, both Salmonella and Campylobacter could be a problem
RTE acidified/fermented meat (without cooking)	5	Both Listeria and E coli 0157:H7 can survive proper fermentation and drying. (Product in this category is not heated after fermentation.) Salmonella and Staphylococcus aureus can also grow in product not fermented properly.
RTE acidified/fermented poultry (without cooking)	5	E. coli 0157:H7 is not a concern in these products but I would expect both L. monocytogenes and Salmonella to survive in low numbers after the fermentation and drying procedures. If the products are not fermented properly, there could be a problem with either pathogen plus Staphylococcus aureus.
RTE dried meat	1	If processed properly during the drying and heating procedures, there should not be a problem with either E. coli 0157:H7 or Salmonella.
RTE dried poultry	1	If processed properly drying and heating procedures, there should not be a problem in these products.
RTE salt - cured meat	1.5	While pathogens cannot grow in these products, they may survive in low numbers. I am not aware of any illness connected with these products.
RTE salt - cured poultry	1.5	
RTE fully - cooked meat	5	In cured product, Listeria monocytogenes and Salmonella are risks to a healthy population.
RTE fully - cooked poultry	7	The risk in the healthy population is greater in uncured poultry products because these generally have lower salt.
RTE meat fully-cooked without subsequent exposure to the environment	1.5	I am not aware of any canned ham or hot packed chili, sauces or soups to be a risk. Many of the sauces and chili will have a protective pH.
RTE poultry fully-cooked without subsequent exposure to the environment	4	Uncured cook-in-bag turkey with low salt-nothing to prevent growth of C. botulinum or C. perfringenes.

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	6	
Raw intact pork	5	
Raw intact meat – other than beef or pork	5	
Raw intact chicken	10	
Raw intact turkey	10	
Raw intact poultry – other than chicken or turkey	9	
Raw ground, comminuted, or otherwise non- intact beef	8	
Raw ground, comminuted, or otherwise non- intact pork	7	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	7	
Raw ground, comminuted, or otherwise non- intact chicken	8	
Raw ground, comminuted, or otherwise non- intact turkey	8	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	7	
Raw otherwise processed meat	5	
Raw otherwise processed poultry	5	
RTE acidified/fermented meat (without cooking)	3	
RTE acidified/fermented poultry (without cooking)	3	
RTE dried meat	2	
RTE dried poultry	2	
RTE salt - cured meat	3	
RTE salt - cured poultry	3	
RTE fully - cooked meat	4	
RTE fully - cooked poultry	4	
RTE meat fully-cooked without subsequent exposure to the environment	1	
RTE poultry fully-cooked without subsequent exposure to the environment	1	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	12	
Raw intact pork	8	
Raw intact meat – other than beef or pork	10	
Raw intact chicken	18	
Raw intact turkey	14	
Raw intact poultry – other than chicken or turkey	12	
Raw ground, comminuted, or otherwise non- intact beef	20	
Raw ground, comminuted, or otherwise non- intact pork	14	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	14	
Raw ground, comminuted, or otherwise non- intact chicken	24	
Raw ground, comminuted, or otherwise non- intact turkey	22	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	20	
Raw otherwise processed meat	20	
Raw otherwise processed poultry	24	
RTE acidified/fermented meat (without cooking)	4	
RTE acidified/fermented poultry (without cooking)	6	
RTE dried meat	2	
RTE dried poultry	2	
RTE salt - cured meat	2	
RTE salt - cured poultry	2	
RTE fully - cooked meat	6	
RTE fully - cooked poultry	8	
RTE meat fully-cooked without subsequent exposure to the environment	1	As safe as it gets.
RTE poultry fully-cooked without subsequent exposure to the environment	1	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	8	
Raw intact pork	8	
Raw intact meat – other than beef or pork	9	
Raw intact chicken	8	
Raw intact turkey	8	
Raw intact poultry – other than chicken or turkey	8	
Raw ground, comminuted, or otherwise non- intact beef	10	
Raw ground, comminuted, or otherwise non- intact pork	9	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	9	
Raw ground, comminuted, or otherwise non- intact chicken	10	
Raw ground, comminuted, or otherwise non- intact turkey	10	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	10	
Raw otherwise processed meat	7	
Raw otherwise processed poultry	7	
RTE acidified/fermented meat (without cooking)	5	
RTE acidified/fermented poultry (without cooking)	5	
RTE dried meat	1	
RTE dried poultry	1	
RTE salt - cured meat	1	
RTE salt - cured poultry	2	
RTE fully - cooked meat	3	
RTE fully - cooked poultry	3	
RTE meat fully-cooked without subsequent exposure to the environment	3	
RTE poultry fully-cooked without subsequent exposure to the environment	3	

Finished Product Type	Score	Brief Explanation of Your Score (If Needed)
Raw intact beef	7	
Raw intact pork	6.8	Pork slightly less than beef
Raw intact meat – other than beef or pork	6.8	
Raw intact chicken	9.8	Raw poultry has a greatest risk than beef due to initial
Raw intact turkey	9.8	
Raw intact poultry – other than chicken or turkey	9.8	
Raw ground, comminuted, or otherwise non- intact beef	9.8	Grinding of the meat increases the risk over intact products
Raw ground, comminuted, or otherwise non- intact pork	9.7	
Raw ground, comminuted, or otherwise non- intact meat – other than beef or pork	9.7	
Raw ground, comminuted, or otherwise non- intact chicken	10	
Raw ground, comminuted, or otherwise non- intact turkey	10	
Raw ground, comminuted, or otherwise non- intact poultry – other than chicken or turkey	9.8	
Raw otherwise processed meat	8.5	
Raw otherwise processed poultry	8.8	
RTE acidified/fermented meat (without cooking)	2.5	Historically lower than raw meats
RTE acidified/fermented poultry (without cooking)	2.9	
RTE dried meat	3	
RTE dried poultry	4	
RTE salt - cured meat	3	
RTE salt - cured poultry	3	
RTE fully - cooked meat	1.6	Cooking reduces the risk significantly; recontamination is the
RTE fully - cooked poultry	1.6	
RTE meat fully-cooked without subsequent exposure to the environment	1	Least risk.
RTE poultry fully-cooked without subsequent exposure to the environment	1.3	

Relative Risk of Illness per Serving among 24 Types of Processed Meat and Poultry Products Product Category Ranking by Panelist (n = 23)

									Raw					
									ground or			Raw ground		
								Raw	otherwise			or otherwise		
			Raw intact			Raw intact	Raw ground	-	non-intact	Raw ground	Raw ground	non-intact	Raw	Raw
	Raw		meat – no	Raw	Raw	poultry – no	or otherwise	U		or otherwise	U U	poultry – no	otherwise	otherwise
	intact	Raw intact	beef or	intact	intact	chicken or		non-intact	beef or	non-intact	non-intact	chicken or	processed	processed
Panelist	beef	pork	pork	chicken	turkey	turkey	beef	pork	pork	chicken	turkey	turkey	meat	poultry
P1	10	10	10	16	16	16	16	16	16	22	22	22	10	15
P2	1	3	3	17	17	17	17	15	17	22	23	23	1	3
P3	4	3	7	6	4	7	10	9	14	13	12	14	14	14
P4	13	11	11	14	14	14	21	17	17	24	22	22	17	17
P5	11	11	11	11	11	11	17	17	17	17	17	17	17	17
P6	12	7	14	14	14	14	18	12	18	18	18	18	18	18
P7	11	11	15	15	15	15	15	15	15	22	22	22	11	11
P8	13	13	13	19	19	19	19	16	19	16	16	19	11	11
P10	12	11	12	14	14	16	22	20	19	22	22	20	5	5
P11	1	1	5	15	21	15	12	5	10	21	24	21	15	15
P12	5	5	16	17	17	17	14	13	14	20	20	20	20	20
P13	9	9	9	14	14	14	14	14	14	14	14	14	14	14
P14	11	11	11	19	19	19	16	16	16	19	19	19	14	14
P15	17	15	13	22	22	22	18	15	13	19	19	19	9	9
P16	7	7	13	17	18	16	24	21	18	21	21	18	7	7
P17	2	2	12	12	20	12	24	4	12	12	12	20	12	20
P18	14	9	14	17	17	14	19	19	19	19	19	19	12	12
P19	3	3	3	12	12	12	15	15	15	20	20	20	15	15
P20	6	9	6	15	15	15	24	9	6	9	9	9	22	15
P21	15	11	11	23	23	22	19	16	16	19	19	16	11	11
P22	13	10	12	18	15	13	19	15	15	23	22	19	19	23
P23	13	13	18	13	13	13	21	18	18	21	21	21	11	11
P24	13	11	11	18	18	18	18	16	16	23	23	18	14	15
Average	9.4	8.5	10.9	15.6	16.0	15.3	17.9	14.5	15.4	19.0	19.0	18.7	13.0	13.6
Rank	11	9	13	19	20	17	21	16	18	23	23	22	14	15

Relative Risk of Illness per Serving among 24 Types of Processed Meat and Poultry Products Product Category Ranking by Panelist (n = 23)

								RTE meat fully-	RTE poultry fully-
RTE acidified /								cooked without	cooked without
fermented meat	RTE acidified /				RTE salt -			subsequent	subsequent
(without	fermented poultry	RTE dried	RTE dried	RTE salt -	cured	RTE fully -	RTE fully -	exposure to the	exposure to the
cooking)	(without cooking)	meat	poultry	cured meat	poultry	cooked meat	cooked poultry	environment	environment
5	5	5	5	5	10	3	3	1	1
3	3	3	10	3	13	14	15	10	10
21	21	23	24	19	20	1	11	2	14
3	6	10	7	3	3	8	9	1	1
1	1	5	5	5	5	5	5	1	1
7	7	5	5	3	3	10	10	1	1
1	1	1	1	1	1	1	1	1	1
3	3	3	3	3	3	3	3	1	1
9	9	5	5	3	3	17	17	1	1
5	5	5	10	3	3	15	15	12	12
5	5	1	1	1	5	11	11	1	5
9	9	1	8	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1
3	3	5	5	5	5	9	9	1	1
3	3	1	1	7	7	13	13	5	5
4	4	4	1	4	4	12	20	4	4
3	3	3	3	3	3	9	9	1	1
3	3	3	3	3	3	23	23	1	1
15	15	1	1	3	3	15	22	3	14
5	5	3	3	5	5	9	9	1	1
7	8	3	3	3	3	8	10	1	1
9	9	1	1	1	4	5	5	5	5
5	6	7	10	7	7	3	3	1	2
5.7	5.9	4.3	5.0	4.0	5.0	8.5	9.8	2.5	3.7
7	8	4	6	3	5	9	12	1	2