

DRAFT FOR PUBLIC REVIEW**Risk Assessment for *C. perfringens* in RTE Meat and Poultry Products**

1170	58104600	Chimichanga with beef and rice	0.51	3	c
1171	41501000	Mexican dinner with fried beans, frozen	1.01	3	c
1172	58104550	Chimichanga with chicken, sour cream, lettuce and tomato, no cheese	0.33	3	c
1173	58306500	Chicken burritos (diet frozen meal)	3.94	3	c
1174	58306100	Chicken enchilada (diet frozen meal)	1.07	3	c
1175	75410530	Chiles rellenos, filled with meat and cheese (stuffed chili peppers)	0.71	3	c
1176	58100520	Enchilada with beef, beans, and cheese	0.74	3	c
1177	58104730	Quesadilla with meat and cheese	0.90	3	c
1178	58104500	Chimichanga with beef, beans, lettuce and tomato	0.50	3	c
1179	58103310	Tamale casserole with meat	0.82	3	c
1180	58104130	Nachos with beef, beans, and cheese	0.86	3	c
1181	58104530	Chimichanga with chicken and cheese	0.84	3	c
1182	58104080	Nachos with beef, beans, cheese, and sour cream	0.83	3	c
1183	58100600	Enchilada with chicken, tomato-based sauce	0.40	3	c
1184	58306010	Beef enchilada dinner, NFS (frozen meal)	1.01	3	c
1185	58104140	Nachos with beef and cheese	0.81	3	c
1186	58306020	Beef enchilada, chili gravy, rice, refried beans (frozen meal)	1.01	3	c
1187	58104180	Nachos with beef, beans, cheese, tomatoes and onions	0.74	3	c
1188	58100400	Enchilada with beef, no beans	0.41	3	c
1189	58100630	Enchilada with chicken and cheese, no beans, tomato- based sauce	0.61	3	c
1190	58100530	Enchilada with beef and cheese, no beans	0.62	3	c
1191	58100340	Burrito with eggs, sausage, cheese and vegetables	1.37	3	c
1192	58100510	Enchilada with beef and beans	0.66	3	c
1193	58104810	Taquitos	1.04	3	c
1194	58103110	Tamale with meat and/or poultry	1.53	3	c
1195	58105050	Fajita with beef and vegetables	0.86	3	c
1196	58105000	Fajita with chicken and vegetables	0.43	3	c
1197	58126140	Turnover, meat- and bean-filled, no gravy	0.99	3	d
1198	27360050	Meat pie, NFS	1.23	3	d
1199	28500020	Gravy, meat, with fruit	1.07	3	d
1200	53306070	Pie, mince, individual size or tart	1.12	3	d

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1201	77316600	Eggplant and meat casserole	0.37	3	d
1202	27313010	Beef, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce (mixture)~	0.66	3	d
1203	27320040	Pork, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce (mixture)	1.02	3	d
1204	27320150	Pork, potatoes, and vegetables (excluding carrots, broccoli, and dark-green leafy), gravy (mixture)	0.59	3	d
1205	28140150	Chicken divan (frozen meal)	0.71	3	d
1206	28120230	Pork, sliced, with gravy, mashed potatoes, vegetable, dessert (frozen meal)	0.77	3	d
1207	71508050	White potato, stuffed, baked, peel eaten, stuffed with meat in cream sauce	0.68	3	d
1208	27347220	Chicken or turkey, stuffing, and vegetables (including carrots, broccoli, and/or dark-green leafy), gravy	0.61	3	d
1209	28130000	Veal dinner, NFS (frozen meal)	1.45	3	d
1210	27313160	Beef, noodles, and vegetables (excluding carrots, broccoli, and dark-green leafy), soy-based sauce (mixtu	0.69	3	d
1211	58304030	Spaghetti and meatballs with vegetable, dessert (frozen meal)	0.73	3	d
1212	27513020	Roast beef sandwich, with gravy	1.16	3	d
1213	58305100	Macaroni or noodles, spinach, with chicken and cheese sauce (diet frozen meal)	0.59	3	d
1214	27420270	Ham and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), no sauce (mixture)~	1.52	3	d
1215	58122310	Knish, potato	1.02	3	d
1216	27510950	Reuben sandwich (corned beef sandwich with sauerkraut and cheese), with spread	1.89	3	d
1217	27450040	Shrimp chow mein or chop suey, no noodles	0.85	3	d
1218	28133410	Veal parmigiana with potatoes, vegetable (frozen meal)	1.08	3	d
1219	28110370	Salisbury steak with gravy, macaroni and cheese, vegetable (frozen meal)	1.10	3	d
1220	28140100	Chicken dinner, NFS (frozen meal)	1.22	3	d

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1221	27341020	Chicken or turkey, potatoes, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce	0.21	3	d
1222	28143050	Chicken chow mein with rice, reduced fat and sodium (diet frozen meal)	0.66	3	d
1223	27500100	Meat sandwich, NFS	1.83	3	d
1224	27242310	Chicken or turkey and noodles with cheese sauce (mixture)	0.66	3	d
1225	27445150	General Tso (General Gau) chicken	1.58	3	d
1226	27214500	Corned beef patty	1.37	3	d
1227	28110600	Beef with noodles, vegetable (frozen meal)	2.35	3	d
1228	58163110	Rice with gravy	1.19	3	d
1229	58126120	Turnover, meat-filled, with gravy	1.38	3	d
1230	28140620	Chicken, fried, with potatoes (frozen meal, large meat portion)	1.59	3	d
1231	32105210	Chicken egg foo yung (young)	0.39	3	d
1232	58304220	Rigatoni with meat sauce and cheese (diet frozen meal)	0.77	3	d
1233	28110540	Beef, sliced, with vegetable in sauce, au gratin potatoes (frozen meal)	0.85	3	d
1234	28143130	Chicken and vegetable entree with noodles (frozen meal)	0.64	3	d
1235	71507100	White potato, stuffed, baked, peel not eaten, stuffed with chicken, broccoli and cheese sauce	0.53	3	d
1236	27241000	Chicken or turkey hash	0.82	3	d
1237	27320140	Pork, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), gravy (mixture)	1.13	3	d
1238	28141610	Chicken and vegetables in cream or white sauce (diet frozen meal)	0.65	3	d
1239	28145810	Turkey breast with gravy, long-grain and wild rice, vegetable (frozen meal)	0.97	3	d
1240	28141650	Chicken and vegetables au gratin with rice-vegetable mixture (diet frozen entree)	1.10	3	d
1241	27213300	Beef and rice with cream sauce (mixture)	1.15	3	d
1242	28113150	Beef steak with rice, vegetable (diet frozen meal)	0.95	3	d
1243	27113000	Beef with cream or white sauce (mixture)	0.53	3	d

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1244	28110340	Salisbury steak with gravy, potatoes, vegetable, soup or macaroni and cheese, dessert (frozen meal)	0.99	3	d
1245	28110250	Sirloin tips with gravy, potatoes, vegetable (frozen meal)	0.67	3	d
1246	27313420	Beef, noodles, and vegetables (excluding carrots, broccoli, and dark-green leafy), gravy (mixture)	0.91	3	d
1247	28110000	Beef dinner, NFS (frozen meal)	0.66	3	d
1248	27347200	Chicken or turkey, stuffing, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sa	1.02	3	d
1249	58127270	Croissant sandwich with sausage and egg	1.57	3	d
1250	28110290	Sirloin tips and mushrooms in wine sauce with rotini (diet frozen entree)	1.07	3	d
1251	35002000	Scrambled eggs, bacon, home fried potatoes (frozen meal)	1.13	3	d
1252	58126170	Turnover, meat-and vegetable- filled (no potatoes, no gravy)	0.89	3	d
1253	27446410	Chicken or turkey and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), chees	1.12	3	d
1254	27320500	Sweet and sour pork with rice	0.94	3	d
1255	58163510	Rice dressing	1.34	3	d
1256	28143190	Chicken in mushroom sauce, white and wild rice, vegetable (frozen meal)	0.90	3	d
1257	27163010	Meat with gravy, NS as to type of meat (mixture)	0.66	3	d
1258	28113140	Beef with spaetzle or rice, vegetable (frozen meal)	0.77	3	d
1259	32105220	Pork egg foo yung (young)	0.39	3	d
1260	28145000	Turkey dinner, NFS (frozen meal)	0.52	3	d
1261	27515050	Fajita-style beef sandwich with cheese, on pita bread, with lettuce and tomato	0.95	3	d
1262	28160710	Stuffed cabbage, with meat and tomato sauce (diet frozen meal)	0.58	3	d
1263	27150160	Shrimp with lobster sauce (mixture)	1.42	3	d
1264	28143020	Chicken and vegetable entree with rice, Oriental (diet frozen meal)	0.63	3	d

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1265	28145010	Turkey with dressing, gravy, potato (frozen meal)	1.48	3	d
1266	27320030	Ham or pork, noodles and vegetables (excluding carrots, broccoli, and dark-green leafy), cheese sauce (mi	1.83	3	d
1267	27211150	Beef goulash with potatoes	0.48	3	d
1268	27416500	Beef and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), gravy (mixture)	0.86	3	d
1269	27116100	Beef curry	1.54	3	d
1270	27260110	Hash, NS as to type of meat	1.37	3	d
1271	28110220	Sirloin, chopped, with gravy, mashed potatoes, vegetable (frozen meal)	1.45	3	d
1272	27520380	Ham and cheese on English muffin	1.96	3	d
1273	27243700	Chicken in cheese sauce with Spanish rice	1.11	3	d
1274	28141210	Chicken, fried in honey sauce, with Oriental style rice and vegetables, in soy-based sauce (frozen meal)~	0.59	3	d
1275	28143030	Chicken and vegetable entree, oriental (diet frozen meal)	0.89	3	d
1276	28133340	Veal parmigiana with vegetable, fettuccine alfredo, dessert (frozen meal)	1.00	3	d
1277	27420470	Sausage and peppers, no sauce (mixture)	1.68	3	d
1278	27347210	Chicken or turkey, stuffing, and vegetables (excluding carrots, broccoli, and dark green leafy), no sauce	0.66	3	d
1279	27313020	Beef, noodles, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce (mixture)	0.66	3	d
1280	27320330	Pork, rice, and vegetables (excluding carrots, broccoli, and dark-green leafy), soy-based sauce (mixture)	0.58	3	d
1281	28143200	Chicken in soy-based sauce, rice and vegetables (frozen meal)	0.90	3	d
1282	28110520	Beef, sliced, with gravy, potatoes, vegetable, dessert (frozen meal)	1.01	3	d
1283	24208000	Turkey, nuggets	2.15	3	d
1284	28141060	Chicken patty with vegetable (diet frozen meal)	1.35	3	d

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1285	27540230	Chicken patty sandwich with cheese, on wheat bun, with lettuce, tomato and spread	1.29	3	d
1286	28101000	Frozen dinner, NFS	0.66	3	d
1287	28141600	Chicken a la king with rice (frozen meal)	1.03	3	d
1288	27460010	Chow mein or chop suey, NS as to type of meat, no noodles	1.09	3	d
1289	27313410	Beef, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), gravy (mixture)	0.80	3	d
1290	58134130	Stuffed shells, cheese-filled, with meat sauce	0.70	3	d
1291	27343960	Chicken or turkey, noodles, and vegetables (excluding carrots, broccoli, and dark-green leafy), cheese sa	0.39	3	d
1292	28141010	Chicken, fried, with potatoes, vegetable, dessert (frozen meal, large meat portion)	0.87	3	d
1293	21410110	Beef, stew meat, cooked, lean and fat eaten	0.98	3	d
1294	58113110	Dumpling, fried, pork	0.92	3	d
1295	32202110	Egg and ham on biscuit	1.83	3	d
1296	27343980	Chicken or turkey, noodles, and vegetables (excluding carrots, broccoli, and dark-green leafy), cream or	0.29	3	d
1297	28140250	Chicken, boneless, with gravy, dressing, rice, vegetable, dessert (frozen meal, large meat portion)	0.84	3	d
1298	27213400	Beef and rice with (mushroom) soup (mixture)	0.80	3	d
1299	27315410	Beef, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), gravy (mixture)	0.88	3	d
1300	28143210	Chicken in orange sauce with almond rice (diet frozen meal)	0.76	3	d
1301	58302050	Beef and noodles with meat sauce and cheese (diet frozen meal)	0.97	3	d
1302	28143010	Chicken and vegetable entree with rice, Oriental (frozen meal)	0.65	3	d
1303	71508120	White potato, stuffed with ham, broccoli and cheese sauce, baked, peel eaten	0.55	3	d
1304	58134720	Tortellini, spinach-filled, no sauce	0.52	3	d

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1305	35001000	Scrambled eggs, sausage, hash brown potatoes (frozen meal)	1.21	3	d
1306	27345210	Chicken or turkey, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), gravy (mi	0.71	3	d
1307	58126280	Turnover, chicken- or turkey-, and vegetable-filled	1.19	3	d
1308	27513060	Roast beef sandwich with bacon and cheese sauce	1.41	3	d
1309	27345320	Chicken or turkey, rice, and vegetables (excluding carrots, broccoli, and dark-green leafy), soy-based sa	1.08	3	d
1310	28142000	Chicken in cream sauce, with brown and wild rice, vegetable, and fruit dessert (diet frozen meal)	0.32	3	d
1311	32101500	Egg, Benedict	1.65	3	d
1312	27540130	Chicken barbecue sandwich	0.90	3	d
1313	28144100	Chicken and vegetable entree with noodles and cream sauce (frozen meal)	0.14	3	d
1314	58127210	Croissant sandwich, filled with ham and cheese	1.97	3	d
1315	28145110	Turkey with vegetable, stuffing (diet frozen meal)	0.48	3	d
1316	27442120	Chicken or turkey and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), gravy	0.73	3	d
1317	27420160	Moo Shu (Mu Shi) Pork, without Chinese pancake	1.81	3	d
1318	27315020	Beef, rice, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce (mixture)	0.66	3	d
1319	27220520	Ham or pork and potatoes with cheese sauce (mixture)	1.29	3	d
1320	28110650	Meatballs, Swedish, in sauce, with noodles and vegetable medley (frozen meal)	0.80	3	d
1321	58306800	Noodles and chicken with gravy, vegetable, and dessert (frozen meal)	0.80	3	d
1322	27135020	Veal scallopini	0.92	3	d

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1323	27416450	Beef and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), gravy (mixture)	0.14	3	d
1324	27345450	Chicken or turkey, rice, and vegetables (excluding carrots, broccoli, and dark-green leafy), cheese sauce	0.79	3	d
1325	28143040	Chicken chow mein with rice (diet frozen meal)	0.85	3	d
1326	27213200	Beef and rice with gravy (mixture)	1.01	3	d
1327	27343410	Chicken or turkey, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), gravy	0.81	3	d
1328	28110660	Meatballs, Swedish, in gravy, with noodles (diet frozen meal)	0.66	3	d
1329	27320210	Pork, potatoes, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce (mixture)	0.12	3	d
1330	27311210	Corned beef, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce (m)	0.90	3	d
1331	27212300	Beef and noodles with cream or white sauce (mixture)	0.18	3	d
1332	27313150	Beef, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), soy-based sauce (mi	0.68	3	d
1333	27540110	Chicken sandwich, with spread	0.91	3	d
1334	28160650	Stuffed green pepper (frozen meal)	0.78	3	d
1335	28160300	Meat loaf dinner, NFS (frozen meal)	1.42	3	d
1336	27220210	Ham and noodles, no sauce (mixture)	1.27	3	d
1337	27540200	Fajita-style chicken sandwich with cheese, on pita bread, with lettuce and tomato	0.96	3	d
1338	28154010	Shrimp and vegetables in sauce with noodles (diet frozen meal)	0.90	3	d
1339	27350050	Shrimp chow mein or chop suey with noodles	1.15	3	d
1340	58310310	Pancakes and sausage (frozen meal)	1.79	3	d
1341	58127220	Croissant sandwich, filled with chicken, broccoli, and cheese sauce	1.24	3	d

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1342	27315010	Beef, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce (mixture)	0.66	3	d
1343	28140610	Chicken, fried, with potatoes (frozen meal)	1.40	3	d
1344	28140730	Chicken patty, breaded, with tomato sauce and cheese, fettuccine alfredo, vegetable (frozen meal)	0.70	3	d
1345	28145100	Turkey with dressing, gravy, vegetable and fruit (diet frozen meal)	0.37	3	d
1346	28143110	Chicken cacciatore with noodles (diet frozen meal)	0.77	3	d
1347	27360120	Chow mein or chop suey, various types of meat, with noodles	1.33	3	d
1348	27343020	Chicken or turkey, noodles, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce	0.66	3	d
1349	58111110	Won ton (wonton), fried, meat filled	1.47	3	d
1350	58131100	Ravioli, NS as to filling, no sauce	0.59	3	d
1351	27341010	Chicken or turkey, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sa	0.62	3	d
1352	28140720	Chicken patty, or nuggets, boneless, breaded, potatoes, vegetable (frozen meal)	1.22	3	d
1353	28145610	Turkey with gravy, dressing, potatoes, vegetable, dessert (frozen meal, large meat portion)	0.92	3	d
1354	27211190	Beef and potatoes with cream or white sauce (mixture)	0.95	3	d
1355	27345440	Chicken or turkey, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), cheese sa	0.47	3	d
1356	28522000	Mole poblano (sauce)	0.58	3	d
1357	27315510	Beef, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), soy-based sauce (mixtu	0.65	3	d
1358	58301080	Lasagna with cheese and meat sauce, reduced fat and sodium (diet frozen meal)	0.46	3	d
1359	58126000	Bierock (turnover filled with ground beef and cabbage mixture)	0.65	3	d

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1360	58127310	Croissant sandwich with ham, egg, and cheese	1.91	3	d
1361	28143170	Chicken in cream sauce with noodles and vegetable (frozen meal)	1.04	3	d
1362	27111100	Beef goulash	0.46	3	d
1363	27311120	Beef, potatoes, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce (mixture)	0.33	3	d
1364	28110330	Salisbury steak with gravy, whipped potatoes, vegetable, dessert (frozen meal)	1.51	3	d
1365	27246200	Chicken or turkey with stuffing (mixture)	0.65	3	d
1366	58135110	Chow fun noodles with meat and vegetables	0.76	3	d
1367	28143180	Chicken in butter sauce with potatoes and vegetable (diet frozen meal)	0.24	3	d
1368	27146200	Chicken or turkey with cheese sauce (mixture)	0.78	3	d
1369	28143220	Chicken in barbecue sauce, with rice, vegetable and dessert, reduced fat and sodium (diet frozen meal)	0.39	3	d
1370	58127330	Croissant sandwich with sausage, egg, and cheese	1.65	3	d
1371	27220510	Ham or pork and potatoes with gravy (mixture)	1.03	3	d
1372	27211500	Beef and potatoes with cheese sauce (mixture)	0.90	3	d
1373	27345510	Chicken or turkey, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), tomato-ba	0.45	3	d
1374	27320120	Sausage, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), gravy (mixture)	1.22	3	d
1375	28110500	Beef, sliced, with gravy, barley and wild rice, vegetables (diet frozen meal)	0.27	3	d
1376	27440120	Chicken or turkey and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), no sa	0.29	3	d
1377	58112110	Dim sum, meat filled (egg roll-type)	0.92	3	d
1378	28110510	Beef, sliced, with gravy, potatoes, vegetable (frozen meal)	0.66	3	d

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1379	28110110	Beef with potatoes (frozen meal)	0.91	3	d
1380	28110390	Salisbury steak, potatoes, vegetable, dessert (diet frozen meal)	0.35	3	d
1381	27515070	Steak and cheese submarine sandwich, with fried peppers and onions, on roll	0.77	3	d
1382	27243600	Chicken or turkey and rice with soy-based sauce (mixture)	0.75	3	d
1383	58301050	Lasagna with cheese and meat sauce (diet frozen meal)	0.63	3	d
1384	58126110	Turnover, meat-filled, no gravy	1.11	3	d
1385	27410210	Beef and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), no sauce (mixtu	0.84	3	d
1386	58126270	Turnover, chicken- or turkey-, and cheese-filled, no gravy	1.13	3	d
1387	27420080	Greens with ham or pork (mixture)	0.92	3	d
1388	27410220	Beef and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), no sauce (mixture)	0.81	3	d
1389	27345220	Chicken or turkey, rice, and vegetables (excluding carrots, broccoli, and dark-green leafy), gravy (mixtu	0.86	3	d
1390	28141250	Chicken with rice-vegetable mixture (diet frozen meal)	0.86	3	d
1391	58110170	Egg roll, with chicken or turkey	0.65	3	d
1392	27420350	Pork and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), no sauce (mixture)	0.58	3	d
1393	27347230	Chicken or turkey, stuffing, and vegetables (excluding carrots, broccoli, and dark-green leafy), gravy (m	0.87	3	d
1394	27446400	Chicken or turkey and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), ch	0.62	3	d
1395	27420170	Pork and onions with soy-based sauce (mixture)	1.13	3	d
1396	27211300	Beef (roast) hash	1.17	3	d
1397	27345020	Chicken or turkey, rice, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce (mi	0.06	3	d

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1398	28110350	Salisbury steak with gravy, potatoes, vegetable, dessert (frozen meal, large meat portion)	0.88	3	d
1399	27135110	Veal parmigiana	1.11	3	d
1400	27420510	Pork and vegetables (excluding carrots, broccoli, and dark- green leafy), soy-based sauce (mixture)	0.54	3	d
1401	58112510	Dumpling, steamed, filled with meat, poultry, or seafood	1.08	3	d
1402	27317100	Beef, dumplings, and vegetables (including carrots, broccoli, and/or dark-green leafy), gravy (mixture)~^	0.98	3	d
1403	28110230	Sirloin, chopped, or swiss steak with gravy, vegetable, potatoes, dessert or muffin (frozen meal)	0.62	3	d
1404	58134650	Tortellini, meat-filled, no sauce	1.10	3	d
1405	28141300	Chicken with rice and vegetable, reduced fat and sodium (diet frozen meal)	0.41	3	d
1406	58163130	Dirty rice	0.59	3	d
1407	28113040	Beef, oriental style, with vegetable, rice, and fruit dessert (diet frozen meal)	0.50	3	d
1408	27443150	Chicken or turkey divan	0.48	3	d
1409	27311110	Beef, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce (mixture)	0.13	3	d
1410	58128120	Cornmeal dressing with chicken or turkey and vegetables	1.47	3	d
1411	28140810	Chicken, fried, with potatoes, vegetable, dessert (frozen meal)	1.22	3	d
1412	58146130	Pasta with carbonara sauce	0.66	3	d
1413	27513070	Roast beef submarine sandwich, on roll, au jus	0.81	3	d
1414	28110260	Sirloin tips, potato, vegetable, fruit (diet frozen meal)	0.36	3	d
1415	27220020	Ham and noodles with cream or white sauce (mixture)	1.53	3	d
1416	58304050	Spaghetti with meat and mushroom sauce (diet frozen meal)	1.05	3	d
1417	58304010	Spaghetti and meatballs dinner, NFS (frozen meal)	0.75	3	d

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1418	58304060	Spaghetti with meat sauce (diet frozen meal)	0.89	3	d
1419	27343950	Chicken or turkey, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), cheese	0.76	3	d
1420	27360080	Chow mein or chop suey, NS as to type of meat, with noodles	1.11	3	d
1421	27420060	Pork and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), no sauce (mixtu	0.36	3	d
1422	27320130	Sausage, potatoes, and vegetables (excluding carrots, broccoli, and dark-green leafy), gravy (mixture)	1.45	3	d
1423	27313110	Beef chow mein or chop suey with noodles	1.10	3	d
1424	27540180	Chicken patty sandwich or biscuit	2.58	3	d
1425	28110640	Meatballs, Swedish, in sauce, with noodles (frozen meal)	0.75	3	d
1426	27415120	Beef, tofu, and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), soy-base	1.46	3	d
1427	27243300	Chicken or turkey and rice with cream sauce (mixture)	0.78	3	d
1428	58131310	Ravioli, meat-filled, no sauce	0.49	3	d
1429	58125110	Quiche with meat, poultry or fish	0.85	3	d
1430	27540140	Chicken fillet (breaded, fried) sandwich	1.06	3	d
1431	27445120	Chicken or turkey and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), soy-b	1.23	3	d
1432	27211000	Beef and potatoes, no sauce (mixture)	0.14	3	d
1433	27343480	Chicken or turkey, noodles, and vegetables (excluding carrots, broccoli, and/or dark-green leafy), cream,	0.81	3	d
1434	27415220	Beef, tofu, and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), soy-based s	1.43	3	d
1435	27540150	Chicken fillet (breaded, fried) sandwich with lettuce, tomato and spread	0.87	3	d
1436	27260080	Meat loaf made with beef and pork	0.30	3	d

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1437	27420100	Pork, tofu, and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), soy-base	1.43	3	d
1438	27213500	Beef and rice with soy-based sauce (mixture)	0.91	3	d
1439	28143080	Chicken with noodles and cheese sauce (diet frozen meal)	0.27	3	d
1440	28145310	Turkey with gravy, dressing, potatoes, vegetable, dessert (frozen meal)	1.38	3	d
1441	58128220	Dressing with chicken or turkey and vegetables	1.42	3	d
1442	27445180	Moo Goo Gai Pan	0.36	3	d
1443	58133130	Manicotti, cheese-filled, with meat sauce	1.11	3	d
1444	27120020	Ham or pork with gravy (mixture)	0.70	3	d
1445	27220310	Ham or pork and rice, no sauce (mixture)	1.56	3	d
1446	27420370	Pork, tofu, and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), soy-based s	1.55	3	d
1447	27320450	Ham, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce (mixture)~	1.69	3	d
1448	27141000	Chicken or turkey cacciatore	0.26	3	d
1449	27446100	Chicken or turkey chow mein or chop suey, no noodles	1.11	3	d
1450	27315420	Beef, rice, and vegetables (excluding carrots, broccoli, and dark-green leafy), gravy (mixture)	0.73	3	d
1451	27415150	Beef chow mein or chop suey, no noodles	1.07	3	d
1452	28143150	Chicken and vegetable entree with noodles (diet frozen meal)	0.57	3	d
1453	27315520	Beef, rice, and vegetables (excluding carrots, broccoli, and dark-green leafy), soy-based sauce (mixture)	0.69	3	d
1454	58160130	Rice with beans and chicken	0.66	3	d
1455	27320320	Pork, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), soy-based sauce (mixtu	0.60	3	d
1456	27442110	Chicken or turkey and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), gr	0.42	3	d

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1457	28110310	Salisbury steak with gravy, potatoes, vegetable (frozen meal)	0.71	3	d
1458	27540270	Chicken fillet, broiled, sandwich, with lettuce, tomato, and non-mayonnaise type spread	0.65	3	d
1459	58131530	Ravioli, cheese-filled, with meat sauce	1.56	3	d
1460	28145210	Turkey with gravy, dressing, potatoes, vegetable (frozen meal)	0.99	3	d
1461	27420500	Pork and vegetables (including carrots, broccoli, and/or dark-green leafy), soy-based sauce (mixture)	0.87	3	d
1462	27415200	Beef and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), soy-based sauce (mixture)	0.54	3	d
1463	27146250	Chicken or turkey cordon bleu	0.74	3	d
1464	27146350	Lemon chicken, Chinese style	1.92	3	d
1465	27115000	Beef with soy-based sauce (mixture)	0.90	3	d
1466	32202030	Egg, cheese, and sausage on English muffin	1.63	3	d
1467	27212200	Beef and noodles with gravy (mixture)	0.79	3	d
1468	28140710	Chicken, fried, with potatoes, vegetable (frozen meal)	1.28	3	d
1469	27540240	Chicken fillet, (broiled), sandwich, on whole wheat roll, with lettuce, tomato and spread	1.03	3	d
1470	27212000	Beef and noodles, no sauce (mixture)	0.11	3	d
1471	27146300	Chicken or turkey parmigiana	1.10	3	d
1472	71305110	White potato, scalloped, with ham	1.23	3	d
1473	27211400	Corned beef hash	1.37	3	d
1474	27540260	Chicken fillet, broiled, sandwich, on oat bran bun, with lettuce, tomato, spread	0.95	3	d
1475	27243000	Chicken or turkey and rice, no sauce (mixture)	0.92	3	d
1476	27320310	Pork chow mein or chop suey with noodles	0.98	3	d
1477	58108010	Calzone, with meat and cheese	1.08	3	d
1478	27445220	Kung pao chicken	1.42	3	d
1479	27445250	Almond chicken	0.55	3	d
1480	27146150	Chicken curry	1.18	3	d
1481	27420390	Pork chow mein or chop suey, no noodles	1.07	3	d

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1482	27343470	Chicken or turkey, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), cream,	0.38	3	d
1483	27343010	Chicken or turkey, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sau	0.34	3	d
1484	58126130	Turnover, meat- and cheese-filled, no gravy	1.12	3	d
1485	27343970	Chicken or turkey, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), cream	0.29	3	d
1486	58128000	Biscuit with gravy	1.58	3	d
1487	27315250	Stuffed cabbage rolls with beef and rice	0.74	3	d
1488	27242000	Chicken or turkey and noodles, no sauce (mixture)	0.30	3	d
1489	27345010	Chicken or turkey, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce	0.09	3	d
1490	58145150	Macaroni or noodles with cheese and pork or ham	1.52	3	d
1491	27440110	Chicken or turkey and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), no	0.66	3	d
1492	27343910	Chicken or turkey chow mein or chop suey with noodles	1.22	3	d
1493	32202010	Egg, cheese, and ham on English muffin	1.83	3	d
1494	58136110	Lo mein, NFS	0.50	3	d
1495	27345310	Chicken or turkey, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), soy-based	0.83	3	d
1496	58110130	Egg roll, with beef and/or pork	1.09	3	d
1497	58163610	Rice-vegetable medley	1.48	3	d
1498	27540190	Chicken patty sandwich, with lettuce and spread	1.29	3	d
1499	32202060	Egg and sausage on biscuit	1.61	3	d
1500	27146100	Sweet and sour chicken or turkey	1.42	3	d
1501	27540280	Chicken fillet, broiled, sandwich with cheese, on bun, with lettuce, tomato and spread	0.99	3	d
1502	58145130	Macaroni or noodles with cheese and beef	0.77	3	d

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1503	27212050	Beef and macaroni with cheese sauce (mixture)	0.73	3	d
1504	27560300	Corn dog (frankfurter or hot dog with cornbread coating)	2.03	3	d
1505	27415100	Beef and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), soy-based sauce	0.40	3	d
1506	58162110	Stuffed pepper, with rice and meat	0.76	3	d
1507	27212150	Beef goulash with noodles	0.44	3	d
1508	27445110	Chicken or turkey and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), so	1.13	3	d
1509	28500000	Gravy, poultry	1.47	3	d
1510	13412000	Milk gravy, quick gravy	0.59	3	d
1511	24198740	Chicken nuggets	1.35	3	d
1512	58150310	Rice, fried, NFS	1.05	3	d
1513	27311410	Beef stew with potatoes and vegetables (including carrots, broccoli, and/or dark-green leafy), gravy	0.56	3	d
1514	28500040	Gravy, beef or meat	1.43	3	d
1515	27540170	Chicken patty sandwich, miniature, with spread	1.39	3	d
1516	14620330	Pizza topping from meat and vegetable pizza	2.03	4	a
1517	58130150	Lasagna, with chicken or turkey, and spinach	0.45	4	a
1518	27121410	Chili con carne with beans, made with pork	1.20	4	a
1519	58106740	Pizza with meat and fruit, NS as to type of crust	1.56	4	a
1520	27510130	Beef barbecue submarine sandwich, on bun	0.94	4	a
1521	58106780	Pizza with meat and vegetables, lowfat, thin crust	1.33	4	a
1522	58162090	Stuffed pepper, with meat	0.47	4	a
1523	27520500	Pork, barbecue sauce, onions and dill pickles on white roll	1.20	4	a
1524	58108050	Pizza rolls	1.93	4	a
1525	27160010	Meat with barbecue sauce, NS as to type of meat (mixture)	0.60	4	a
1526	58130020	Lasagna with meat and spinach	0.77	4	a

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1527	58106710	Pizza with meat and vegetables, NS as to type of crust	1.64	4	a
1528	58130610	Lasagna with meat, whole wheat noodles	0.81	4	a
1529	27520510	Pork barbecue or Sloppy Joe, on bun	1.29	4	a
1530	27510700	Meatball and spaghetti sauce submarine sandwich, on roll	0.79	4	a
1531	58100120	Burrito with beef, beans, and cheese	1.04	4	a
1532	58106760	Pizza with meat and fruit, thick crust	1.47	4	a
1533	27146050	Chicken wing with hot pepper sauce	0.52	4	a
1534	58132910	Spaghetti with tomato sauce and chicken or turkey	0.53	4	a
1535	27113100	Beef stroganoff	0.67	4	a
1536	27510110	Beef barbecue or Sloppy Joe, on bun	1.62	4	a
1537	27211100	Beef stew with potatoes, tomato-based sauce (mixture)	0.38	4	a
1538	27111500	Beef sloppy joe (no bun)	1.30	4	a
1539	27116200	Beef with barbecue sauce (mixture)	0.61	4	a
1540	27212350	Beef stroganoff with noodles	0.81	4	a
1541	58106730	Pizza with meat and vegetables, thick crust	1.53	4	a
1542	58106720	Pizza with meat and vegetables, thin crust	1.64	4	a
1543	58130010	Lasagna with meat and/or poultry	0.81	4	a
1544	58106530	Pizza with meat, thick crust	1.73	4	a
1545	58106520	Pizza with meat, thin crust	1.95	4	a
1546	58100220	Burrito with chicken, beans, and cheese	1.05	4	c
1547	58100210	Burrito with chicken and beans	0.86	4	c
1548	58100150	Burrito with beef and potato, no beans	0.65	4	c
1549	58101510	Taco or tostada with chicken or turkey, lettuce, tomato and salsa	1.01	4	c
1550	58100180	Burrito with pork and beans	0.86	4	c
1551	58101520	Taco or tostada with chicken, cheese, lettuce, tomato and salsa	1.06	4	c
1552	58100240	Burrito with chicken, NFS	1.11	4	c
1553	27416300	Beef taco filling: beef, cheese, tomato, taco sauce	1.18	4	c
1554	58100100	Burrito with beef, no beans	1.22	4	c
1555	58100200	Burrito with chicken, no beans	1.00	4	c
1556	58101310	Taco or tostada with beef, lettuce, tomato and salsa	0.67	4	c
1557	58106750	Pizza with meat and fruit, thin crust	1.55	4	c

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1558	58101450	Soft taco with chicken, cheese, and lettuce	1.10	4	c
1559	58101350	Soft taco with beef, cheese, lettuce, tomato and sour cream	1.24	4	c
1560	58101730	Taco or tostada with beans, cheese, meat, lettuce, tomato and salsa	1.20	4	c
1561	27212120	Chili con carne with beans and macaroni	1.04	4	c
1562	58101930	Taco or tostada salad with beef and cheese, fried flour tortilla	1.01	4	c
1563	58100230	Burrito with chicken and cheese	1.23	4	c
1564	58100140	Burrito with beef, beans, cheese, and sour cream	0.88	4	c
1565	58100130	Burrito with beef and cheese, no beans	1.37	4	c
1566	58101910	Taco or tostada salad with beef and cheese, corn chips	0.74	4	c
1567	58101300	Taco or tostada with beef, cheese and lettuce	1.50	4	c
1568	58100110	Burrito with beef and beans	0.91	4	c
1569	58101400	Soft taco with beef, cheese, and lettuce	1.64	4	c
1570	58101320	Taco or tostada with beef, cheese, lettuce, tomato and salsa	1.11	4	c
1571	25220360	Bratwurst, with cheese	1.64	4	d
1572	25210510	Frankfurter or hot dog, low salt	0.80	4	d
1573	27520520	Pork sandwich	1.18	4	d
1574	27260050	Meatballs, with breading, NS as to type of meat, with gravy	1.07	4	d
1575	27343420	Chicken or turkey, noodles, and vegetables (excluding carrots, broccoli, and dark-green leafy), gravy (mi	1.06	4	d
1576	21417110	Beef brisket, cooked, lean and fat eaten	0.32	4	d
1577	27142000	Chicken with gravy (mixture)	0.86	4	d
1578	27311220	Corned beef, potatoes, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce (mixt	0.77	4	d
1579	27111430	Chili con carne, NS as to beans, with cheese	0.97	4	d
1580	27443120	Chicken or turkey a la king with vegetables (excluding carrots, broccoli, and dark-green leafy (no potato	1.07	4	d
1581	27320020	Ham pot pie	1.55	4	d
1582	25231150	Corned beef, pressed	2.56	4	d

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1583	27120210	Frankfurter or hot dog, with chili, no bun	1.96	4	d
1584	58145160	Macaroni or noodles with cheese and frankfurters or hot dogs	1.31	4	d
1585	21417100	Beef brisket, cooked, NS as to fat eaten	0.16	4	d
1586	58145190	Macaroni or noodles with cheese and chicken or turkey	0.64	4	d
1587	27241010	Chicken or turkey and potatoes with gravy (mixture)	1.17	4	d
1588	58121510	Dumpling, meat-filled	1.33	4	d
1589	27142200	Turkey with gravy (mixture)	0.84	4	d
1590	27160100	Meatballs, NS as to type of meat, with sauce (mixture)	1.64	4	d
1591	27540330	Turkey sandwich, with gravy	1.14	4	d
1592	21417120	Beef brisket, cooked, lean only eaten	0.18	4	d
1593	71602010	Potato salad, German style	0.64	4	d
1594	41205030	Refried beans with meat	1.11	4	d
1595	21407110	Beef, pot roast, braised or boiled, lean and fat eaten	0.16	4	d
1596	27347250	Chicken or turkey, dumplings, and vegetables (excluding carrots, broccoli, and dark green leafy), gravy (0.75	4	d
1597	25221840	Turkey breakfast sausage, bulk	1.75	4	d
1598	27420040	Frankfurters or hot dogs and sauerkraut (mixture)	1.99	4	d
1599	27242350	Chicken or turkey tetrazzini	0.73	4	d
1600	41204020	Boston baked beans	0.24	4	d
1601	27143000	Chicken or turkey with cream sauce (mixture)	0.32	4	d
1602	27113300	Swedish meatballs with cream or white sauce (mixture)	1.29	4	d
1603	27317010	Beef pot pie	1.04	4	d
1604	27347240	Chicken or turkey, dumplings, and vegetables (including carrots, broccoli, and/or dark green leafy), grav	0.43	4	d
1605	27560360	Frankfurter or hot dog, with chili, on bun	1.88	4	d
1606	27242200	Chicken or turkey and noodles with gravy (mixture)	1.15	4	d
1607	27111440	Chili con carne with beans and cheese	1.11	4	d
1608	27112010	Salisbury steak with gravy (mixture)	1.01	4	d
1609	58106510	Pizza with meat, NS as to type of crust	1.95	4	d

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1610	27443110	Chicken or turkey a la king with vegetables (including carrots, broccoli, and/or dark-green leafy (no pot	0.69	4	d
1611	27560320	Frankfurter or hot dog, plain, on bun	2.11	4	d
1612	27311510	Shepherd's pie with beef	0.69	4	d
1613	27112000	Beef with gravy (mixture)	0.27	4	d
1614	27141500	Chili con carne with chicken or turkey and beans	1.31	4	d
1615	27242300	Chicken or turkey and noodles with cream or white sauce (mixture)	0.63	4	d
1616	41206030	Beans and franks	1.09	4	d
1617	41201040	Baked beans, with pork and sweet sauce	0.85	4	d
1618	27111420	Chili con carne without beans	1.72	4	d
1619	27120120	Sausage gravy	0.75	4	d
1620	27246100	Chicken or turkey with dumplings (mixture)	0.96	4	d
1621	27111400	Chili con carne, NS as to beans	1.31	4	d
1622	41201010	Baked beans, NFS	0.24	4	d
1623	41208030	Pork and beans	1.12	4	d
1624	27347100	Chicken or turkey pot pie	0.66	4	d
1625	27111410	Chili con carne with beans	1.31	4	d

Appendix C Foods commonly hot-held

The following list of foods was supplied by US Foodservice, and used to assist selection of foods in CSFII that should be placed in Category 4.

Precooked Bacon	Beef and Bean Chili	Cooked Turkey Meatballs
Beef Barbeque	Hot Dog Chili	Sausage Lasagna
Chicken Barbeque	4 Piece Cooked Breaded	Chicken Gyro Cone
Pork Barbeque	Chicken	Loaf Lamb Gryo
Turkey Barbeque	8 Piece Cooked Breaded	Honey Baked Bavarian
Beef Brisket	Chicken	Ham
Beef Burgandy with	Chicken and Dumplings	Cooked Ham in Natural
Mushrooms and Onions	Chicken Fettucci with	Juice
Cream Chipped Beef	Vegetables	Black Forest Ham
Cooked Breaded Beef	ChIcken Fricasses	Canned Ham
Fingers	Chicken with Mushrooms	Black Pepper Ham, Water
Cooked Breaded Beef	and Sausage	Added
Patty Nuggets	Chicken Parmigiana	Maple and Brown Sugar
Cooked Beef Patty	Chicken Primavera	Cooked Ham
Beef Pot Roast	Roasted Chicken with	Cured Ham
Beef Pot Roast with	Glaze Sauce	Half Ham
Vegetables	Shredded Chicken with	Honey Roasted Ham
Cooked Beef Prime Rib	Vegetables and Sauce	Tavern Honey Ham
Roast Beef	Sweet and Sour Chicken	Precooked Ham Patty
Cooked Shredded Roast	Cooked Buffalo Wings	Smoked Pit Ham
Beeg	Cooked Teriyaki Chicken	Prosciuto Ham
Cooked Beef Steakexe	Wings	Smoked Ham
Stew Beef	Corned Beef	Spiral Ham
Cooked Beef Steak	Honey Chicken Drummies	Ham Steaks
breaded	Chicken Egg Rolls	Breakfast Turkey Ham
Salisbury Beef Steak	Turkey Vegetable Egg	Smoked Turkey Ham
Cooked Sirloin Strip Steak	Rolls	Virginia Ham
Beef Taco Fillings	Beef and Beef Enchalada	Beef and Cheddar Cheese
Beef Tips	Chicken Enchalada	Hot Pockets
Beef Steak Biscuit	Beef Fajitas	Ham and Cheese Hot
Ham Biscuit	Chicken Fajitas	Pockets
Sausage and Cheese	Chicken Pot Pie Filing	Jalapeno and Cheese Hot
Biscuit	Frank in a Blanket	Pockets
Sausage Biscuit	Sausage Gravy	Pepperoni Hot Pockets
Beef Burrito	Sliced Chicken Gyron	Pizza Stick Hot Pockets
Beef and Bean Burrito	Beef Gyro Cone	Classic Lasagna
Stuffed Cabbage Rolls	Beef and Lamb Gyro Cone	Meat Lasagna

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Meat and Cheese Lasagna
Macaroni and Beef
Meatballs with Sauce
Beef Meatballs
Cooked Italian Meatballs
Swedish Meatballs
Meatloaf
Pastrami Brisket
Cooked Pastrami
Flat Pastrami
Pastrami

Stuffed Peppers
Pepperoni Pizza Pockets
Ham and Cheese Pockets
Roast Beef
Eye of Round Roast Beef
Top Round Roast Beef
Prime Rib Roast Beef
Pork Rib Barbeque
Sandwich
Flame Broiled
Cheeseburger Sandwich

Ham and Turkey Club
Sandwich
Turkey, Bologna and
Cheese Sandwich
Beef Stroganoff
Spicy Beef Taco
Pulled Turkey with Gravy
Turkey Tetrazzini
Turkey and Dumplings
Turkey Breast

Appendix D Meat content of servings

The meat content of each selected serving in the CSFII was estimated by using the ingredient database component of the CSFII (USDA, 2000). Each serving in the CSFII has an associated food code¹⁰³ (see Appendix B) and mass for that serving, and each food code has an associated ingredient list in the CSFII recipe database. The recipe database includes the masses of each ingredient in a recipe, allowing the calculation of the mass fraction of each ingredient associated with each food code, hence the the mass of that ingredient in each serving. We classified ingredients as to whether they contain meat products. Because there is no information within the CSFII database concerning the fraction of meat in the listed ingredients, we assumed that each ingredient that we classified as containing meat is 100% meat. This potentially overestimates the meat content of many ingredients. The ingredients that are associated with the food codes included in the Risk Assessment (Appendix B) are listed below, sorted by meat classification and then by CSFII ingredient code.

CSFII ingredient code	CSFII ingredient description	Classified as a meat ingredient
4001	FAT,BF TALLOW	yes
4002	FAT,LARD	yes
4542	FAT,CHICKEN	yes
5004	CHICK,WHL,RSTD	yes
5006	CHICK,MEAT&SKIN,RAW	yes
5007	CHICK,MEAT&SKIN,FRIED,BATTER	yes
5008	CHICK,MEAT&SKIN,FRIED,FLR	yes
5009	CHICK,MEAT&SKIN,RSTD	yes
5010	CHICK,MEAT&SKIN,STWD	yes
5011	CHICK,MEAT,RAW	yes
5013	CHICK,MEAT,RSTD	yes
5014	CHICK,MEAT,STWD	yes
5018	CHICK,SKIN,RSTD	yes
5020	CHICK,GIBLETS,RAW	yes
5022	CHICK,GIBLETS,SIMMRD	yes
5031	CHICK,LT MEAT&SKIN,FRIED,FLR	yes
5041	CHICK,LT MEAT,RSTD	yes
5042	CHICK,LT MEAT,STWD	yes
5045	CHICK,DK MEAT,RSTD	yes
5047	CHICK,SEPARABLE FAT,RAW	yes
5058	CHICK,BREAST,MEAT&SKIN,FRIED,BATTER	yes
5060	CHICK,BREAST,MEAT&SKIN,RSTD	yes
5062	CHICK,BREAST MEAT,RAW	yes
5063	CHICK,BREAST MEAT,FRIED	yes

¹⁰³ We used only the FOODCODE entry of record type rt30 in CSFII. The MODTYPE code was ignored. The documented recipe modifications should have a negligible effect on estimated meat fractions.

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5064	CHICK,BREAST MEAT,RSTD	yes
5065	CHICK,BREAST MEAT,STWD	yes
5078	CHICK,LEG,MEAT&SKIN,RSTD	yes
5103	CHICK,WING,MEAT&SKIN,RSTD	yes
5118	CHICK,ROASTING,LT MEAT,RSTD	yes
5122	CHICK,STEWING,WHL,STWD	yes
5166	TURKEY,MEAT&SKIN,RSTD	yes
5168	TURKEY,MEAT ONLY,RSTD	yes
5174	TURKEY,GIZZARD,SIMMRD	yes
5182	TURKEY,LT MEAT&SKIN,RSTD	yes
5186	TURKEY,LT MEAT,RSTD	yes
5200	TURKEY,FRYER-ROASTERS,MEAT&SKIN,RSTD	yes
5220	TURKEY,BREAST,MEAT,RSTD	yes
5277	CHICK,CND,BONED,W/BROTH	yes
5296	TURKEY ROAST,BNLESS,FRZ,LT&DK MEAT,RSTD	yes
5306	TURKEY,GROUND,CKD	yes
6008	SOUP,BF BROTH OR BOUILLON CND,RTS	yes
6013	SOUP,CHICK BROTH,COND,COMM	yes
6016	SOUP,CRM OF CHICK,COND,COMM	yes
6075	SOUP,BF BROTH/BOUILLON,PDR,DRY	yes
6076	SOUP,BF BROTH,CUBED,DRY	yes
6116	GRAVY,BF,CND	yes
6119	GRAVY,CHICK,CND	yes
6125	GRAVY,TURKEY,CND	yes
6413	SOUP,CHICK BROTH,PREP W/H2O,COMM	yes
6475	SOUP,BF BROTH/BOUILLON,PDR,PREP W/H2O	yes
6480	SOUP,CHICK BROTH,DEHYD,PREP W/H2O	yes
6524	GRAVY,PORK,DEHYD,PREP W/H2O	yes
7007	BOLOGNA,BF	yes
7008	BOLOGNA,BF&PORK	yes
7011	Turkey sausage,smkd	yes
7013	BRATWURST	yes
7014	BRAUNSCHWEIGER,PORK	yes
7016	CHEESEFURTER,BF&PORK	yes
7017	CHICK ROLL,LT MEAT	yes
7021	DUTCH BRAND LOAF,BF&PORK	yes
7022	FRANKFURTER,BF	yes
7023	FRANKFURTER,BF&PORK	yes
7024	FRANKFURTER,CHICK	yes
7029	HAM,SLICED,11% FAT,REG	yes
7031	HAM SALAD SPRD	yes
7034	HEADCHEESE,PORK	yes
7037	METTWURST	yes
7038	KNACKWURST,KNOCKWURST,PORK,BF	yes
7043	LUNCH MEAT,BF,THIN SLICED	yes
7050	MORTADELLA,BF,PORK	yes

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7052	PASTRAMI,TURKEY	yes
7056	PEPPERED LOAF,PORK,BF	yes
7057	PEPPERONI,PORK,BF	yes
7064	SAUSAGE,PORK,FRESH,CKD	yes
7065	SAUSAGE,PORK&BF,FRESH,CKD	yes
7068	SALAMI,CKD,BF	yes
7069	SALAMI,CKD,BF&PORK	yes
7070	SALAMI,CKD,TURKEY	yes
7074	SMOKED LINK SAUSAGE,PORK	yes
7075	SMOKED LINK SAUSAGE,PORK&BF	yes
7076	SMOKED LINK SAUSAGE,PORK &BF, W/FLOUR & NFDM	yes
7079	TURKEY BREAST MEAT	yes
7080	TURKEY HAM,CURED THIGH MEAT	yes
7081	TURKEY ROLL,LT MEAT	yes
7082	TURKEY ROLL,LT & DK MEAT	yes
7089	SAUSAGE,ITALIAN,CKD,PORK	yes
7905	FRANKFURTER,BF,PORK,&TURKEY,FAT FREE	yes
10002	PORK,FRSH,COMP,LN,RAW	yes
10003	PORK,FRSH,COMP,LN&FAT,RAW	yes
10011	PORK,FRSH,LEG,WHL,LN,RSTD	yes
10020	PORK,FRSH,LOIN,WHL,LN&FAT,RAW	yes
10021	PORK,FRSH,LOIN,WHL,LN&FAT,BRSD	yes
10022	PORK,FRSH,LOIN,WHL,LN&FAT,BRLD	yes
10023	PORK,FRSH,LOIN,WHL,LN&FAT,RSTD	yes
10024	PORK,FRSH,LOIN,WHL,LN,RAW	yes
10025	PORK,FRSH,LOIN,WHL,LN,BRSD	yes
10027	PORK,FRSH,LOIN,WHL,LN,RSTD	yes
10036	PORK,FRSH,CNTR LOIN,LN&FAT,RAW	yes
10060	PORK,FRSH,TENDERLOIN,LN,RAW	yes
10078	PORK,FRSH,ARM PICNIC,LN,BRSD	yes
10085	PORK,FRSH,BLADE,BOSTON,LN,BRSD	yes
10086	PORK,FRSH,BLADE,BOSTON,LN,BRLD	yes
10093	PORK,FRSH,COMPOSITE,LN,CKD	yes
10124	PORK,CURED,BACON,BRLD/PAN-FRIED/RSTD	yes
10134	PORK,CURED,HAM,BNLESS,EX LN,RSTD	yes
10136	PORK,CURED,HAM,BNLESS,REG,RSTD	yes
10141	PORK,CNTR SLICE,COUNTRY-STYLE,LN,RAW	yes
10147	Pork roll,cured,fried	yes
10151	PORK,CURED,HAM,WHL,LN&FAT,RSTD	yes
10152	PORK,CURED,HAM,WHL,LN,UNHTD	yes
10153	PORK,CURED,HAM,WHL,LN,RSTD	yes
10165	PORK,CURED,SALT PORK,RAW	yes
10182	PORK,CURED,HAM,BNLESS,UNHTD	yes
10183	PORK,CURED,HAM,BNLESS,RSTD	yes
10184	PORK,CURED,HAM,CND,UNHTD	yes

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10185	PORK,CURED,HAM,CND,RSTD	yes
10220	PORK,FRSH,GROUND,CKD	yes
10226	PORK,FRSH,COMP LOIN&SHOULDER,LN&FAT,RAW	yes
10227	PORK,FRSH,COMP LOIN&SHOULDER,LN&FAT,CKD	yes
13020	BF,RETAIL CUTS,FAT,CKD	yes
13022	BF,BRISKET,WHL,LN+FT,1/4",ALL,BRSD	yes
13024	BF,BRISKET,WHL,LN,1/4",ALL,BRSD	yes
13034	BF,ARM POT RST,LN+FT,1/4",ALL,BRSD	yes
13036	BF,ARM POT RST,LN+FT,1/4",CHOIC,BRSD	yes
13038	BF,ARM POT RST,LN+FT,1/4",SEL,BRSD	yes
13043	BF,ARM POT RST,LN,CHOIC,RAW	yes
13044	BF,ARM POT RST,LN,1/4",CHOIC,BRSD	yes
13046	BF,ARM POT RST,LN,1/4",SEL,BRSD	yes
13050	BF,BLADE RST,LN+FT,1/4",ALL,BRSD	yes
13061	BF,BLADE RST,LN,SEL,RAW	yes
13062	BF,BLADE RST,LN,1/4",SEL,BRSD	yes
13065	BF,FLANK,LN+FT,CHOIC,0",RAW	yes
13068	BF,FLANK,LN,ALL,RAW	yes
13088	BF,RIB,WHL,LN,1/4",CHOIC,RSTD	yes
13143	BF,RIB,SML END,LN,1/4",SEL,RSTD	yes
13150	BF,SHORTTRIBS,LN,CHOIC,BRSD	yes
13151	BF,RND,FULL,LN+FT,1/4",CHOIC,RAW	yes
13152	BF,RND,FULL,LN+FT,1/4",CHOIC,BRLD	yes
13155	BF,RND,FULL,LN,CHOIC,RAW	yes
13156	BF,RND,FULL,LN,1/4",CHOIC,BRLD	yes
13160	BF,BTTM RND,LN+FT,1/4",ALL,BRSD	yes
13162	BF,BTTM RND,LN+FT,1/4",CHOIC,BRSD	yes
13168	BF,BTTM RND,LN,1/4",ALL,BRSD	yes
13194	BF,TIP RND,LN+FT,1/4",CHOIC,RSTD	yes
13202	BF,TIP RND,LN,1/4",CHOIC,RSTD	yes
13204	BF,TIP RND,LN,1/4",SEL,RSTD	yes
13281	BF,TOP SIRLOIN,LN+FT,1/4",CHOIC,PAN-FRIED	yes
13288	BF,TOP SIRLOIN,LN,CHOIC,RAW	yes
13289	BF,TOP SIRLOIN,LN,1/4",CHOIC,BRLD	yes
13291	BF,TOP SIRLOIN,SEL,LN,RAW	yes
13292	BF,TOP SIRLOIN,SEL,LN,1/4",BRLD	yes
13295	BF,GROUND,EX LN,RAW	yes
13298	BF,GROUND,EX LN,BRLD,MED	yes
13299	BF,GROUND,EX LN,BRLD,WELL DONE	yes
13302	BF,GROUND,LN,RAW	yes
13306	BF,GROUND,LN,BRLD,WELL DONE	yes
13312	BF,GROUND,REG,BRLD,MED	yes
13313	BF,GROUND,REG,BRLD,WELL DONE	yes
13314	BF,GROUND,REG,PAN-FRIED,MED	yes
13347	BF,CURED,CORNED,BRISKET,CKD	yes
13348	BF,CURED,CORNED,BRISKET,CND	yes

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13367	BF,BRISKET,WHL,LN+FT,0",ALL,BRSD	yes
13368	BF,BRISKET,WHL,LN,0",ALL,BRSD	yes
13373	BF,ARM POT RST,LN+FT,0",ALL,BRSD	yes
13376	BF,ARM POT RST,LN,0",ALL,BRSD	yes
13379	BF,BLADE RST,LN+FT,0",ALL,BRSD	yes
13398	BF,BTTM RND,LN+FT,0",ALL,BRSD	yes
13454	BF, TOP SIRLOIN,ALL,LN,0",BRLD	yes
16008	BNS,BKD,CND,W/FRANKS	yes
16010	BNS,BKD,CND,W/PORK&SWT SAU	yes
16011	BNS,BKD,CND,W/PORK&TOMATO SAU	yes
17042	LAMB,US,SHOULDER,WHL,LN,CHOIC,RSTD	yes
17089	VEAL,LN&FAT,CKD	yes
17104	VEAL,LOIN,LN&FAT,RAW	yes
17117	VEAL,SHOULDER,WHL,LN&FAT,BRSD	yes
17134	VEAL,SIRLOIN,LN&FAT,RAW	yes
17136	VEAL,SIRLOIN,LN&FAT,RSTD	yes
21004	BISCUIT W/EGG & HAM	yes
21005	BISCUIT W/EGG & SAUSAGE	yes
21008	BISCUIT W/HAM	yes
21009	BISCUIT, W/SAUSAGE	yes
21020	ENGLISH MUFFIN W/CHS & SAUSAGE	yes
21037	CHICK,BREADED,FRIED,BNLESS	yes
22401	HEALTHY CHOIC SPAGHETTI BOLOGNESE,FRZ ENTREE	yes
22402	HEALTHY CHOIC BF MACARONI,FRZ ENTREE	yes
42004	CHICK,BREAST,MEAT,FRIED W/O ABSORB FAT	yes
42128	TURKEY,HAM,EX LN,PREPACK/DELI	yes
42129	BOLOGNA,BF&PORK,LO FAT	yes
42161	BOLOGNA,BF,LO FAT	yes
42179	FRANKFURTER,BF,LO FAT	yes
42241	SAUSAGE,TURKEY,PORK&BF,RED FAT,SMOKED	yes
42262	CHICK &BF SAUSAGE,SMOKED	yes
42280	FRANKFURTER,MEAT& POULTRY,LOFAT	yes
43325	HAM,SMOKED/CURED,LO NA,CKD,NS FAT	yes
43378	BACON,SMOKED/CURED,RED NA	yes
43384	BOLOGNA,BF,RED NA	yes
43507	FRANKFURTER,LO SALT	yes
73790	BF,CORNED BF HASH,CND,W/POTATO	yes
21540100	GROUND BEEF W/ TEXTURED VEGETABLE PROTEIN, COOKED	yes
24198740	CHICKEN NUGGETS	yes
25220710	CHORIZOS	yes
27111400	CHILI CON CARNE, NS AS TO BEANS	yes
27111410	CHILI CON CARNE W/ BEANS	yes
27112000	BEEF W/ GRAVY (MIXTURE) (INCLUDE COUNTRY STYLE)	yes

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27112010	SALISBURY STEAK W/ GRAVY (MIXTURE)	yes
27113100	BEEF STROGANOFF	yes
27116200	BEEF W/ BARBECUE SAUCE (MIXTURE)	yes
27120020	HAM/PORK W/ GRAVY (MIXTURE)	yes
27135110	VEAL PARMIGIANA	yes
27260010	MEATLOAF, NS AS TO TYPE OF MEAT	yes
27443120	CHICKEN A LA KING W/ VEG(NO CAR/DK GRN),WHITE SAUCE	yes
58104500	CHIMICHANGA W/ BEEF, BEANS, LETTUCE AND TOMATO	yes
58104530	CHIMICHANGA W/ CHICKEN & CHEESE	yes
58112510	DUMPLING, STEAMED, FILLED W/ MEAT OR SEAFOOD	yes
1001	BUTTER, W/SALT	no
1009	CHEESE,CHEDDAR,AMERICAN	no
1012	CHEESE,COTTAGE,CRMD	no
1014	CHEESE,COTTAGE,NONFAT,UNCRMD,DRY,LRG OR SML CURD	no
1016	CHEESE,COTTAGE,LOWFAT,1% MILKFAT	no
1025	CHEESE,MONTEREY	no
1026	CHEESE,MOZZARELLA, WHL	no
1027	CHEESE,MOZZARELLA, WHL,LO MOIST	no
1028	CHEESE,MOZZARELLA,PART SKIM	no
1029	CHEESE,MOZZARELLA,PART SKIM,LO MOIST	no
1032	CHEESE,PARMESAN,GRATED	no
1033	CHEESE,PARMESAN,PIECE	no
1035	CHEESE,PROVOLONE	no
1036	CHEESE,RICOTTA, WHL	no
1037	CHEESE,RICOTTA,PART SKIM	no
1038	CHEESE,ROMANO	no
1040	CHEESE,SWISS	no
1042	CHEESE,PAST PROC,AMERICAN	no
1044	CHEESE,PAST PROC,SWISS	no
1046	CHEESE FOOD,PAST PROC,AMERICAN	no
1048	CHEESE SAUCE	no
1049	HALF&HALF,CRM&MILK	no
1050	CREAM,FLUID,LT (COFFEE CRM OR TABLE CRM)	no
1053	CREAM,HVY WHIPPING	no
1056	SOUR CREAM	no
1077	MILK,FLUID,3.25% MILKFAT	no
1085	MILK,NONFAT,FLUID,W/ VIT A (FAT FREE OR SKIM)	no
1088	MILK,BTTRMLK,FLUID,CULTURED,LOWFAT	no
1090	MILK,DRY, WHL	no
1091	MILK,DRY,NONFAT,REG,WO/ VIT A	no
1092	MILK,DRY,NONFAT,INST,W/ VIT A	no
1094	BTTRMLK,DRIED,SWT CRM	no

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1113	WHEY,ACID,DRIED	no
1115	WHEY,SWEET,DRIED	no
1123	EGGS,CHICK,WHL,RAW/FRZ	no
1124	EGGS,CHICK,WHITE,RAW/FRZ	no
1125	EGGS,CHICK,YOLK,RAW	no
1128	EGGS,CHICK,WHL,FRIED	no
1129	EGGS,CHICK,WHL,HARD-BLD	no
1131	EGGS,CHICK,WHL,POACHED	no
1132	EGGS,CHICK,WHL,SCRMBLD	no
1154	MILK,DRY,NONFAT,REG,W/ VIT A	no
1168	CHEESE,CHEDDAR,LOFAT	no
2001	ALLSPICE,GROUND	no
2002	ANISE SEED	no
2003	BASIL,GROUND	no
2009	CHILI PDR	no
2010	CINNAMON,GROUND	no
2011	CLOVES,GROUND	no
2014	CUMIN SEED	no
2015	CURRY PDR	no
2020	GARLIC PDR	no
2021	GINGER,GROUND	no
2024	MUSTARD SEED,YEL	no
2025	NUTMEG,GROUND	no
2026	ONION PDR	no
2027	OREGANO,GROUND	no
2028	PAPRIKA	no
2029	PARSLEY,DRIED	no
2030	PEPPER,BLACK	no
2031	PEPPER,RED/CAYENNE	no
2034	POULTRY SEASONING	no
2038	SAGE,GROUND	no
2042	THYME,GROUND	no
2046	DIJON MUSTARD	no
2047	SALT,TABLE	no
2048	VINEGAR,CIDER	no
2053	VINEGAR,DISTILLED	no
2054	CAPERS,CND,DRND	no
4017	SALAD DRSNG,THOUSAND ISLAND,COMM,REG	no
4018	SALAD DRSNG,MAYO TYPE,REG	no
4025	SALAD DRSNG,MAYO,SOYBN	no
4027	honey mustard sauce	no
4031	SHORTENING,HOUSEHOLD,SOYBN,CTTNSD,HYDR	no
4034	OIL,SOYBN,HYDR	no
4042	OIL,PNUT	no
4044	OIL,SOYBN	no
4053	OIL,OLIVE	no

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4058	OIL,SESAME	no
4105	MARGARINE,LIQ,SOYBN(HYDR®)&CTTNSD	no
4120	SALAD DRSNG,FRENCH,COMM,REG	no
4131	MARGARINE,REG,UNSPEC OILS,WO/SALT	no
4132	MARGARINE,REG,UNSPEC OILS,W/SALT	no
4502	OIL,COTTONSEED	no
4518	OIL,CORN	no
4521	MARGARINE,REG,SUNFLOWER,SOYBN&CTTNSD(H YDR)	no
4531	OIL,SOYBN LECITHIN	no
4543	OIL,SOYBN,HYDR&CTTNSD	no
4610	MARGARINE,REG,STICK,COMP,80%FAT	no
4615	SHORTENING,HOUSEHOLD,COMP	no
4616	SHORTENING,INSTITUTIONAL,COMP	no
6043	SOUP,CRM OF MUSHROOM,COND,COMM	no
6134	SAUCE,SOY	no
6150	SAUCE,BARBECUE	no
6164	SALSA,COMMERCIAL	no
6165	SAUCE,HOME-PREP,WHITE,THIN	no
6166	SAUCE,HOME-PREP,WHITE,MED	no
6303	SAUCE,CHEESE,DEHYD,PREP W/MILK	no
6313	SAUCE,WHITE,DEHYD,PREP W/MILK	no
6555	SAUCE,HOLLANDAISE,DEHYD,PREP W/H2O	no
6931	SAUCE,PASTA,SPAGHETTI/MARINARA,RTS	no
8120	CEREAL,OATS,WO/FORT,DRY	no
9005	APPLES,RAW,WO/SKIN,BLD	no
9006	APPLES,RAW,WO/SKIN,MICROWAVE	no
9007	APPLES,CND,SWTND,DRND	no
9009	APPLS,DEHYD,SULFURED	no
9016	APPL JUC,CND,UNSWTND,WO/+VIT C	no
9019	APPLSAUC,CND,UNSWTND,WO/+VIT C	no
9020	APPLSAUC,CND,SWTND,WO/SALT	no
9036	APRICOT NECTAR,CND,WO/+VIT C	no
9037	AVOCADOS,RAW,ALL VAR	no
9063	CHERRIES,SOUR,RED,RAW	no
9066	CHERRIES,SOUR,RED,CND,HVY SYRUP	no
9071	CHERRIES,SWT,CND,H2O PK	no
9072	CHERRIES,SWT,CND,JUC PK	no
9078	CRANBERRIES,RAW	no
9150	LEMONS,RAW,WO/PEEL	no
9152	LEMON JUC,RAW	no
9153	LEMON JUC,CND/BTLD	no
9156	LEMON PEEL,RAW	no
9193	OLIVES,RIPE,CND(SML-EX LRG)	no
9206	ORANGE JUC,RAW	no
9214	ORANGE JUC,FRZ,UNSWTND,UNDIL	no

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9215	ORANGE JUC,FRZ,UNSWTND,DIL	no
9216	ORANGE PEEL,RAW	no
9232	PASSION-FRUIT JUC,PURPLE,RAW	no
9237	PEACHES,CND,H2O PK	no
9238	PEACHES,CND,JUC PK	no
9266	PNAPPL,RAW	no
9267	PNAPPL,CND,H2O PK	no
9268	PNAPPL,CND,JUC PK	no
9270	PNAPPL,CND,HVY SYRUP	no
9273	PNAPPL JUC,CND,UNSWTND	no
9279	PLUMS,RAW	no
9298	RAISINS,SEEDLESS	no
9299	RAISINS,SEEDED	no
9354	PNAPPL,CND,JUC PK,DRND	no
11026	BAMBOO SHOOTS,RAW	no
11028	BAMBOO SHOOTS,CND,DRND	no
11032	BNS,LIMA,IMMAT,BLD,DRND	no
11037	BNS,LIMA,IMMAT,FORDHOOK,FRZ	no
11038	BNS,LIMA,IMMAT,FORDHOOK,FRZ,BLD,DRND	no
11043	BNS,MUNG,MATURE,SPROUTED,RAW	no
11044	BNS,MUNG,MATURE,SPROUTED,BLD,DRND	no
11052	BNS,SNAP,GRN,RAW	no
11053	BNS,SNAP,GRN,BLD,DRND	no
11061	BNS,SNAP,GRN,FRZ,BLD,DRND	no
11090	BROCCOLI,RAW	no
11091	BROCCOLI,BLD,DRND	no
11092	BROCCOLI,FRZ,CHOPD	no
11093	BROCCOLI,FRZ,CHOPD,BLD,DRND	no
11095	BROCCOLI,FRZ,SPEARS,BLD,DRND	no
11109	CABBAGE,RAW	no
11110	CABBAGE,BLD,DRND	no
11112	CABBAGE,RED,RAW	no
11116	CABBAGE,PAK-CHOI,RAW	no
11117	CABBAGE,PAK-CHOI,BLD,DRND	no
11119	CABBAGE,PE-TSAI,RAW	no
11124	CARROTS,RAW	no
11125	CARROTS,BLD,DRND	no
11130	CARROTS,FRZ	no
11131	CARROTS,FRZ,BLD,DRND	no
11136	CAULIFLOWER,BLD,DRND	no
11138	CAULIFLOWER,FRZ,BLD,DRND	no
11143	CELERY,RAW	no
11144	CELERY,BLD,DRND	no
11156	CHIVES,RAW	no
11162	COLLARDS,BLD,DRND	no
11165	CORIANDER,RAW	no

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11168	CORN,SWT,YEL,BLD,DRND	no
11172	CORN,SWT,YEL,CND,BRINE,DRND	no
11174	CORN,SWT,YEL,CND,CRM,REG PK	no
11178	CORN,SWT,YEL,FRZ,KRNLS	no
11179	CORN,SWT,YEL,FRZ,KRNLS,BLD,DRND	no
11205	CUCUMBER,RAW	no
11209	EGGPLANT,RAW	no
11215	GARLIC,RAW	no
11216	GINGER ROOT,RAW	no
11234	KALE,BLD,DRND	no
11246	LEEKs,RAW	no
11252	LETTUCE,ICEBERG,RAW	no
11260	MUSHROOMS,RAW	no
11261	MUSHROOMS,BLD,DRND	no
11264	MUSHROOMS,CND,DRND	no
11269	MUSHROOMS,SHIITAKE,CKD	no
11282	ONIONS,RAW	no
11283	ONIONS,BLD,DRND	no
11284	ONIONS,DEHYD FLAKES	no
11288	ONIONS,FRZ,CHOPD,BLD,DRND	no
11291	ONIONS,SPRING OR SCALLIONS (INCL TOPS&BULB),RAW	no
11297	PARSLEY,RAW	no
11300	PEAS,EDIBLE-PODDED,RAW	no
11301	PEAS,EDIBLE-PODDED,BLD,DRND	no
11304	PEAS,GRN,RAW	no
11305	PEAS,GRN,BLD,DRND	no
11308	PEAS,GRN,CND,REG,DRND	no
11312	PEAS,GRN,FRZ	no
11313	PEAS,GRN,FRZ,BLD,DRND	no
11327	PEAS&ONIONS,FRZ,BLD,DRND	no
11329	PEPPERS,HOT CHILI,GRN,CND	no
11333	PEPPERS,SWT,GRN,RAW	no
11334	PEPPERS,SWT,GRN,BLD,DRND	no
11352	POTATOES,RAW,FLESH	no
11363	POTATOES,BKD,FLESH	no
11365	POTATOES,BLD,CKD W/SKIN,FLESH	no
11367	POTATOES,BLD,CKD WO/SKIN,FLESH	no
11371	POTATO,MSHD,HOMEMADE W/MILK&MARGARINE	no
11378	POTATOES,MSHD,DEHYD,FLAKES WO/MILK	no
11379	POTATO,MSHD,FLAKES,PREP W/MILK&BUTTER	no
11391	POTATOES,HASH BROWN,FRZ,PREP	no
11403	POTATO,FRZ,FRENCH-FR,PART-FRIED,OVEN HTD	no
11429	RADISHES,RAW	no
11439	SAUERKRAUT,DRAINED	no
11457	SPINACH,RAW	no

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11458	SPINACH,BLD,DRND	no
11468	SQUASH,SMMR,CROOK&STR NECK,BLD,DRND	no
11478	SQUASH,SMMR,ZUCCHINI,BLD,DRND	no
11529	TOMATOES,RED,RIPE,RAW	no
11530	TOMATOES,RED,RIPE,BLD	no
11531	TOMATOES,RED,CND,WHL,REG PK	no
11540	TOMATO JUC,CND,W/SALT	no
11546	TOMATO PASTE,CND	no
11547	TOMATO PUREE,CND	no
11549	TOMATO SAUCE,CND	no
11584	VEG,MXD,FRZ,BLD,DRND	no
11588	WATERCHESTNUTS,CHINESE,RAW	no
11590	WATERCHESTNUTS,CHINESE,CND	no
11642	SQUASH,SMMR,ALL VAR,BLD,DRND	no
11660	TOMATOES,RED,STWD	no
11670	PEPPERS,HOT CHILI,GRN,RAW	no
11674	POTATOES,BKD,FLESH&SKIN	no
11718	BNS,MUNG SPROUT,BLD,DRND,W/SALT	no
11724	BNS,SNAP,YEL,BLD,DRND	no
11820	PEPPERS,HOT CHILI,RED,CND	no
11821	PEPPERS,SWT,RED,RAW	no
11823	PEPPERS,SWT,RED,BLD,DRND	no
11831	POTATOES,BLD W/SKIN,FLESH,W/SALT	no
11833	POTATOES,BLD WO/SKIN,FLESH,W/SALT	no
11887	TOMATO PASTE,CND,W/SALT	no
11888	TOMATO PUREE,CND,W/SALT	no
11935	CATSUP	no
11937	PICKLES,CUCUMBER,DILL	no
11940	PICKLE,CUCUMBER,SWEET	no
11941	PICKLE,CUCUMBER,SOUR	no
11943	PIMIENTO,CND	no
11962	PEPPERS,HOT CHILI,SUN-DRIED	no
11979	PEPPERS,JALAPENO,RAW	no
12014	PUMPKIN&SQUASH SD KRNLs,DRIED	no
12061	ALMONDS,DRIED,UNBLANCHED	no
12062	ALMONDS,DRIED,BLANCHED	no
12063	ALMONDS,DRY RSTD	no
12067	ALMONDS,TSTD	no
12085	CASHEW NUTS,DRY RSTD	no
12201	SESAME SD KERNELS,DRIED	no
14057	WINE,DSSRT,SWEET	no
14175	CHOC FLAV BEV MIX	no
14429	WATER,MUNICIPAL	no
15002	ANCHOVY,EUROPEAN,CND,OIL,DRND	no
15149	SHRIMP,MXD SP,RAW	no
15152	SHRIMP,MXD SP,CND	no

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16033	BNS,KIDNEY,RED,MATURE,BLD	no
16034	BNS,KIDNEY,RED,MATURE,CND	no
16049	BNS,WHITE,MATURE,RAW	no
16050	BNS,WHITE,MATURE,BLD	no
16059	CHILI W/BNS,CND	no
16080	BNS,MUNG,MATURE,RAW	no
16103	REFRIED BEANS,CANNED (INCL USDA COMMODITY)	no
16115	SOY FLR,FULL-FAT,RAW	no
16117	SOY FLR,DEFATTED	no
16118	SOY FLR,LO FAT	no
16122	SOY PROT ISOLATE	no
16123	SOY SAUCE,FROM SOY&WHEAT (SHOYU)	no
16124	SOY SAUCE,FROM SOY (TAMARI)	no
16125	SOY SAUCE,FROM HYDROLYZED VEG PROT	no
16127	TOFU,SOFT,PREP W/CA SULFATE&MAGNESIUM CHLORIDE (NIGARI)	no
16390	PNUTS,ALL TYPES,DRY-RSTD	no
18009	BISCUITS,PLN/BTTRMLK,COMM BKD	no
18060	BREAD,RYE	no
18069	BREAD,WHITE,COMM PREP(INCL SOFT BREAD CRUMBS)	no
18070	BREAD,WHITE,COMM PREP,TSTD	no
18075	BREAD,WHL-WHEAT,COMM PREP	no
18079	BREAD CRUMBS,DRY,GRATED,PLN	no
18081	BREAD STUFFING,DRY MIX	no
18173	GRAHAM CRACKERS,PLN/HONEY/CINN	no
18229	CRACKERS,STD SNACK-TYPE,REG	no
18239	CROISSANTS,BUTTER	no
18243	CROUTONS,SEASONED	no
18259	ENG MUFFINS,PLN,TSTD,ENR(INCL SOURDOUGH)	no
18335	PIE CRUST,STD-TYPE,FRZ,RTB,BKD	no
18350	ROLLS,HAMBURGER/HOTDOG,PLN	no
18360	TACO SHELLS,BKD	no
18363	TORTILLAS,RTB/RTF,CORN	no
18364	TORTILLAS,RTB/RTF,FLOUR	no
18369	BAKING PDR,DOUBLE-ACTING,NaAlSO4	no
18370	BAKING PDR,DOUBLE-ACTING,PHOSPHATE	no
18372	BAKING SODA	no
18374	YEAST,BAKER'S,COMPRESSED	no
18375	YEAST,BAKER'S,ACTIVE DRY	no
19003	CORN CHIPS,PLAIN	no
19056	TORTILLA CHIPS,PLAIN	no
19078	CANDIES,BAKING CHOC,UNSWTND	no
19177	GELATINS,DRY,UNSWTND	no
19296	HONEY,STR/EXTRACTED	no

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19304	MOLASSES	no
19334	SUGARS,BROWN	no
19335	SUGARS,GRANULATED	no
19350	SYRUP,CORN,LT	no
19719	JAMS&PRESERVES,APRICOT	no
20005	BARLEY,PEARLED,RAW	no
20016	CORN FLR,WHL,YEL	no
20017	CORN FLR,MASA,ENR	no
20022	CORNMEAL,DEGERMED,ENR,YEL	no
20027	Modified food starch	no
20037	RICE,BROWN,LONG,CKD	no
20044	RICE,WHITE,LONG,REG,RAW,ENR	no
20045	RICE,WHITE,LONG,REG,CKD,ENR	no
20047	RICE,WHITE,LONG,PARBLD,CKD,ENR	no
20048	RICE,WHITE,LONG,PRECKD/INST,ENR,DRY	no
20061	RICE FLR,WHITE	no
20081	WHEAT FLR,WHITE,ALLPURP,ENR,BLEACH	no
20088	WILD RICE,RAW	no
20099	MACARONI,DRY,ENR	no
20100	MACARONI,CKD,ENR	no
20108	MACARONI,WHL-WHEAT,CKD	no
20110	NOODLES,EGG,CKD,ENR	no
20112	NOODLES,EGG,SPINACH,CKD,ENR	no
20113	NOODLES,CHINESE,CHOW MEIN	no
20121	SPAGHETTI,ENR,CKD,WO/SALT	no
20345	RICE,WHITE,LONG,ENR,CKD,W/SALT	no
20400	MACARONI,CKD,UNENR	no
20410	NOODLES,EGG,UNENR,CKD,WO/SALT	no
20445	RICE,WHITE,LONG,UNENR,CKD,WO/SALT	no
20481	WHEAT FLR,WHITE,ALLPURP,UNENR	no
21018	FAST FD,EGG, SCRMBLD	no
21138	POTATO,FRENCH FRIED,IN VEG OIL	no
42011	BREADING FOR BAKED/FRIED CHICK	no
42061	WINE,NON-ALCOHOLIC	no
42213	TABLE WINE,ALL,BKD/SIMMRD 1-59MIN	no
42214	TABLE WINE,ALL,BKD/SIMMRD 2HR-2HR29MIN	no
42215	TABLE WINE,ALL,BKD/SIMMRD 1HR-1HR29MIN	no
42216	TABLE WINE,ALL,STIRRED INTO HOT LIQ	no
42218	WINE,DSSRT,DRY,STIRRED INTO HOT LIQ	no
42219	WINE,DSSRT,DRY,BKD/SIMMRD 1-29 MIN	no
42221	WINE,DSSRT,DRY,BKD/SIMMRD 46-60MIN	no
43212	BACON BITS,MEATLESS	no
43216	FRUCTOSE SWEETENER	no
43374	SAUCE,WORCESTERSHIRE	no
44005	OIL,CORN,PEANUT&OLIVE	no
44051	RICE MIX,W/OR W/O VERMICELLI&OTHER	no

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	PASTA, DRY VEG, ENR	
78862	CORNMEAL, YEL, CKD, DEGERMED, ENR, WO/SALT	no
84060	OLIVES, PICKLED, CND/BTLD, GRN	no
85390	PEPPERS, HOT, CHILI, GRN, CND, CHILI SAUCE	no
85420	PEPPERS, HOT, CHILI, RED, CND, CHILI SAUCE	no
92320	SUGARS, DEXTROSE, ANHYDROUS	no
92330	SUGARS, DEXTROSE, CRYSTAL	no
92871	SAUCE, TOMATO CHILI, BTLD, W/SALT	no
92872	SAUCE, TOMATO CHILI, BTLD, WO/SALT	no
11100000	MILK, NFS	no
11112000	MILK, COW'S, FLUID, NOT WHOLE, NS AS TO % FAT	no
14410200	CHEESE, PROCESSED, AMERICAN/CHEDDAR TYPE	no
41205010	REFRIED BEANS	no
41205100	fermented black beans	no
51109100	BREAD, PITA	no
51150000	ROLL, WHITE, SOFT	no
51157000	ROLL, HOAGIE, SUBMARINE,	no
51182010	BREAD, STUFFING (INCLUDE HOMEMADE; STUFFING, NFS)	no
51186010	MUFFIN, ENGLISH (INCLUDE SOUR DOUGH)	no
51300110	BREAD, WHOLE WHEAT, OTHER THAN 100%/NS AS TO 100%	no
51502100	ROLL, OAT BRAN	no
51620000	ROLL, MULTIGRAIN	no
52202060	CORNBREAD, HOMEMADE	no
52215100	TORTILLA, CORN	no
52215200	TORTILLA, FLOUR (WHEAT)	no
53204010	COOKIE, BROWNIE, W/O ICING	no
53410100	COBBLER, APPLE (INCLUDE FRUIT COBBLER)	no
56117100	CHOW FUN RICE NOODLES, COOKED, NO FAT ADDED	no
56205210	RICE, WILD, 100%, COOKED, NO FAT ADDED	no
58121410	DUMPLING, PLAIN	no
58132110	SPAGHETTI W/ TOMATO SAUCE, MEATLESS	no
58145110	MACARONI OR NOODLES W/ CHEESE	no
63409010	GUACAMOLE, NFS	no
72201230	BROCCOLI, COOKED, NS AS TO FORM, W/ CHEESE SAUCE	no
74404010	SPAGHETTI SAUCE	no
75121400	PEPPER, POBLANO, RAW	no
75510030	OLIVES, GREEN, STUFFED	no
82101000	VEGETABLE OIL, NFS (INCLUDE OIL, NFS)	no

Appendix E Using the program

This section describes how to set up and run the program, what and where the output is, and how to change the sensitivity inputs, in that order.

E.1 Setup and running the program

This program is a “console” application that runs in a Command Box under Windows[®] (it has been tested only in Windows[®] XP[®]). It consists of a single program file, C_perfringens.exe, and the following ASCII text data files:

Basic_growth.dat
Category_12_temps.dat
Category_34_a_temps.dat
Category_34_temps.dat
Cold_storage.dat
Cooking.dat
dose_response.dat
D_values_high.dat
D_values_low.dat
Food_samples.dat
garlic.dat
Growth_corrections.dat
Home_empirical.dat
Home_intra_var.dat
hot_holding.dat
misc_spice.dat
mustard.dat
oregano.dat
Raw_meat.dat
RTE_meat.dat
Type_A_Plus.dat

These data files must all have the given names and be placed in the same (“data”) sub-directory (which may be the same sub-directory containing the program file, or not, at user preference). In addition, in that same data sub-directory there must be two further files with arbitrary names that specify variability distributions for parameters that could not be adequately evaluated from available data, and that are treated in sensitivity analyses. In the following explanation, these files will have the names:

Sensitivity.dat
Init_Germ_frac.dat

Finally, a control file (an example called “control.dat” is provided) may be placed in any convenient sub-directory and given any name.

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The program is invoked with a command line like:

```
>C_perfringens.exe ["][directory\]controlfile["]
```

where [] indicates an optionally allowed value, “directory” specifies a directory path (relative to the current directory, or absolute), and “controlfile” is the file name of a control file that provides information equivalent to the “control.dat” example file. If the control file name or directory path includes spaces, surround the whole string with quotes.

Example setup: You have a default directory called Root\ (on my machine, Root\ is “C:\Documents and Settings\Edmund\My Documents\PROJECT\B-1640 C Perfringens\”, so it is much easier to use relative references).

Create a directory Root\progs and place C_perfringens.exe in it.

Create a directory Root\progdata and place all the data files in it, including the control.dat file. To run the program, open a Command Box (in Windows XP by selecting Start, then Run, and specifying cmd as the command to run), change directory to Root\progs, and enter

```
>C_perfringens ..\progdata\control.dat
```

or

```
>C_perfringens Root\progdata\control.dat
```

[The program can be run from within Windows — it will create its own command box, and a shortcut or PIF file can be set up that automatically provides the name of the control file as a parameter; but it is easier to do it all in a Command Box].

E.2 Structure of the control file

The basic Monte Carlo parameters for the program run are set according to what is specified in the control file (and various further modifications are possible by modifying the sensitivity parameters, see below). The control file format is:

```
# Any number of comment and/or blank lines, indicated by # as  
# the first character of the line. Comment lines and blank  
# lines may be interspersed anywhere.  
! ! can also be used as a comment delimiter,  
{ as can { (curly left brace}
```

```
Data_directory      ..\progdata\  
Output_file         output.txt  
Sensitivity_file    sensitivity.dat  
Init_germ_file      Init_Germ_fracs.dat  
Variability_loops   10000000  
Uncertainty_loops   1
```

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There are six keyword-value pairs. The first entry shown on each of the six non-comment lines are the keywords. The second entries are their values, which may be changed to change the running of the program. Each keyword must occur on a separate line as the first value on that line, they can occur in any order, and are not case-sensitive. Values for each keyword must be on the same line separated by an arbitrary number of spaces from the keyword. If you repeat the same keyword within the file, the last occurrence overrides earlier ones.

Data_directory tells the program where to find the data files and where to put the output. It is the directory path (absolute or relative to the program) where the data files may be found. Note the terminating \, which must be present on the directory path. The example shown corresponds to the example setup described above.

Output_file is the name of the file where output will be placed by the program. It will be created in the Data_directory directory if it does not already exist, and overwritten if it already does exist. Its value must be a valid file name.

Sensitivity_file is the name of the file that corresponds to Sensitivity.dat in the description that follows. For sensitivity analyses, where multiple runs are performed using different values for parameters in the Sensitivity_file, it is convenient to have multiple files of the same format as Sensitivity.dat, each one with a single parameter value changed. Different control files can then be used for each sensitivity run, with each control file specifying a different Sensitivity_file.

Init_germ_file is the name of the file that corresponds to Init_Germ_fracs.dat in the description that follows. For sensitivity analyses, where multiple runs are performed using different values for parameters in the Init_germ_file, it is convenient to have multiple files of the same format as Init_Germ_fracs.dat, each one with a single parameter value changed. Different control files can then be used for each sensitivity run, with each control file specifying a different Init_germ_file.

Variability_loops is the number of variability loops (*i.e.* servings) to run for each value of growth during stabilization and each uncertainty loop. This must be a positive number, less than or equal to 2147483647 (*i.e.* roughly 2 billion). Note: do NOT include commas. A real number in this range (with decimal point or exponential notation) will also work — it will be truncated to the next lowest integer.

Uncertainty_loops is the number of uncertainty loops to run. This must be a positive number, less than or equal to 2147483647 (*i.e.* roughly 2 billion). Note: do NOT include commas. A real number (with decimal point or exponential notation) will also work — it will be truncated to the next lowest integer.

Warning: the total number of servings calculated is (number of growth distributions) × Variability_loops × Uncertainty_loops (see the Growth sensitivity parameter, below, for the number of growth distributions). The program runs at about 400,000 servings per second on a 2.6 GHz Pentium 4 with plenty of memory (512 MByte or more). The factor (distributions of growth steps) occurs because each Monte Carlo run is repeated for each value of growth during

stabilization specified in the sensitivity parameter file (see below). To obtain an appropriate number of illnesses requires at least 10 million servings in each variability loop.

E.3 Output file, and structure of the output

While running, the program produces output to the Command Box (screen) to indicate what is going on, and saves output in the output file (all output is saved immediately, so a power failure will only stop the program, not lose what has been done so far). The saved output file differs for the case Uncertainty_loops=1 versus Uncertainty_loops>1, but what appears on the screen is the same.

E.3.1 Command Box (screen) output.

Example (with Uncertainty_loops=1, Variability_loops=10000000)

```
Creation took 1.08 secs
..... 0.50 1 397563 11 0 1 29.22
..... 1.00 1 407090 18 0 1 57.50
..... 1.50 1 411722 24 0 0 85.59
..... 2.00 1 415962 34 0 1 113.80
..... 2.50 1 414950 27 0 2 141.89
..... 3.00 1 417296 32 0 0 170.67
..... 3.50 1 416444 28 0 1 198.69
Done.
```

Creation refers to setting up the required structures in memory, and reading all the data files. This line appears on screen after these initial procedures have been completed. Each of the dots then appears slowly as the program runs, and indicates continued progress. Each dot corresponds to 500,000 servings (so they appear about 1.6 seconds apart on the machine described, giving feedback that the program is running). After each uncertainty loop for a given growth, and on the same line as the last dot for that uncertainty loop, a summary of seven numbers is given. In order these are:

1. Growth during stabilization, (this is the summary growth value specified in the sensitivity parameter file, see below),
2. Uncertainty loop number,
3. number of servings with non-zero vegetative cells at the time of being eaten (out of the total servings = variability_loops for this uncertainty loop),
4. number of illnesses occurring for this uncertainty loop,
5. number of cases for this uncertainty loop where contamination was detected (and the food thrown out); this occurs only in “what if” situations (see below),
6. number of illnesses in hot-held food in this uncertainty loop,
7. difference in time counter value from the beginning of the program to the time this line was output, in seconds (note: the time counter increments for a maximum of one day, then starts over, so runs over 1 day can give negative numbers here; you would have to add the number of days to get the correct time).

If Uncertainty_loops had been set to more than 1, the above output would have continued with the further uncertainty loops showing an uncertainty loop number larger than 1, before final termination is indicated with the word Done.

E.3.2 Output file, Uncertainty_loops=1

This is an ASCII text file containing tab-delimited values on each line, with each line separated by a carriage-return, line-feed pair. For each uncertainty loop and value of growth during stabilization, first a line is output with the following five numbers:

Growth	Growth during stabilization, (this is the summary growth number specified in the sensitivity parameter file, see below),
Non-zero	Number of servings in this uncertainty loop that had non-zero veg. cells at the time of being eaten
# cutoff	Number of servings with detected contamination (and the serving discarded); this occurs only in “what if” situations (see below),
# ill	Number of illnesses
# hot_hold	Number of illnesses for hot-held servings

Subsequently a line of header information is output, then a line of information for each illness occurring in that uncertainty loop. The header line is a set of key values (separated by tabs). On each output line (one line for each illness occurring), the following information is recorded about the serving causing that illness (the key on the left of this list corresponds to the header value output for that entry on the line):

Randkey	Random key. A integer (currently in the range 0 to $2^{64}-1$, so out of the range of most spreadsheet cells to record exactly). This can be used to reproduce this particular entry (to do so would require modification and re-compilation of the program).
Category	Food category
No_spice	Food serving had no spice in it (True/false)
Veg/meat	Serving initially contained vegetative cells derived from meat (True/false). [Initially, here and below, means after any production heat steps and before stabilization].
Spore/meat	Serving initially contained spores derived from meat (True/false)
Veg/spice	Serving initially contained vegetative cells derived from spices (True/false)
Spore/spice	Serving initially contained spores derived from spices (True/false)
Init veg	Initial number of vegetative cells in serving, before growth during stabilization in production
Init spores	Initial number of spores in serving, before stabilization (same as after stabilization)
Veg growth	Number of veg. cells in the serving after stabilization
retail temp	Temperature of retail storage (°C)
veg retail	Number of veg. cells in the serving after retail storage
sp retail	Number of spores in the serving after retail storage

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home temp	Temperature of home storage (°C)
veg home	Number of veg. cells in the serving after home storage
sp home	Number of spores in the serving after home storage
hold_hot	True if hot held, false otherwise
oven	True if heated in an oven, false otherwise
cold eat	True if eaten cold, false otherwise
veg eat	Number of veg. cells in serving at time of eating
sp eat	Number of spores in serving at time of eating

E.3.3 Output file, Uncertainty_loops>1

This is an ASCII text file containing tab-delimited values on each line, with each line separated by a carriage-return, line-feed pair. For each uncertainty loop and value of growth during stabilization, first a line is output with the following five numbers:

Growth	Growth during stabilization, (this is the summary growth number specified in the sensitivity parameter file, see below),
Non-zero	Number of servings in this uncertainty loop that had non-zero veg. cells at the time of being eaten
# cutoff	Number of servings with detected contamination (and the food thrown out); this occurs only in “what if” situations (see below),
# ill	Number of illnesses
# hot_hold	Number of illnesses for hot-held servings

E.3.4 Both output files

The output files may be readily imported into spreadsheets. For Excel, accepting the default values (using Data/Get External Data/Import Text File) works well, except that to retain the complete Randkey value that field should be explicitly imported as text, since it contains more digits than are retained by numbers imported into typical spreadsheets. Failure to explicitly import this field as text is unimportant if it is not necessary to retain the capability of exactly reproducing each line in the output file. Importing into other applications should be just as straightforward; specify a tab-delimited file and, if desired (and possible), set the field type of the Randkey field to be text.

E.4 Modifying input values — Sensitivity parameters

The sensitivity parameters described in the description of the exposure assessment are encoded in the two ASCII text files (as described in Section E.2, these files can have any name, and the names are provided in the control file; for convenience, they are given specific names here corresponding to the example control file):

Init_Germ_fracs.dat
Sensitivity.dat

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(Two files were used because, for technical reasons, it increased the speed of the program). Both these files have the same structure, of the form:

```
# Comment lines begin with #. Comment and blank lines are ignored.
# Comment and blank lines may be interspersed throughout the file.
# The essential part of the file occurs in keyword-value lines.
# There are as many such keyword-value lines as necessary.
# Keywords can occur in any order.
```

```
keyword values # comments after the first # are ignored
keyword values
keyword values
```

The keyword must occur first on the line (*exception* — see the description of vector parameters for the growth keyword below). The rest of the line consists of values associated with that keyword, terminating at the end of the line (*exception* — for keywords specifying vectors, the next few lines contain values associated with that keyword) or at a comment delimiter (anything after the first comment delimiter, any one of #, !, or {, is ignored). Values are separated, and separated from the keyword, by an arbitrary number of spaces.

E.4.1 Init_Germ_fracs.dat

This contains three keywords, all of which must be present:

```
Max_germ_frac
First_heat_frac
No_heat_frac
```

Max_germ_frac is a constant, and the default value (in the current control.dat file) is 0.75. It is the maximum fraction of spores that may ever germinate in two heat steps. A single value between 0 and 1 should be entered here in any numerical format. It is up to the user to ensure that it lies in the range 0 to 1.

First_heat_frac and No_heat_frac are variability distributions. The default entries are:

```
First_heat_frac triangular 0.05 0.50 0.75 0.50
No_heat_frac triangular 0.01 0.05 0.10 0.05
```

(see below for how to specify distributions).

First_heat_frac is the fraction of spores that are activated during production heating (lethality step or steps) of RTE foods. Warning: *it is up to the user to ensure that values returned from any distribution entered for this fraction lie within the range [0, Max_germ_frac]*.

No_heat_frac is the distribution of the fraction of spores that will germinate under mild conditions. Warning: *it is up to the user to ensure that the values returned from any distribution entered for this fraction lie within the range [0,1]*.

E.4.2 Sensitivity.dat

This file contains the following keywords, all of which must be present:

```
Growth
Second_heat_frac
Storage_frac
Pre_retail_time
Category_1_cold
Oven_fraction
Microwave_heat_time
Oven_heat_time
Hot_holding_fraction
Hot_hold_time triangular
Max_Cell_Density
Max_Allowed_conc Point 1e15 1/g ! Units needed
OverGrowthFraction 0.0 ! Constant
OverGrowthTemp Point 12 K ! Variability distribution. Units needed
SpoiledMinConc 1e9 1/g ! Units needed; constant
SpoiledConc90 1e8 1/g ! Units needed; constant
```

The keywords, and the values associated with them in the supplied default file, are as follows.

```
Growth vector 7
Point 0.5
Point 1.0
Point 1.5
Point 2.0
Point 2.5
Point 3.0
Point 3.5
```

The keyword `growth` is associated with a vector (list) of variability distributions, typically set to be seven point distributions of 0.5 through 3.5 by steps of 0.5. During execution of the program, the uncertainty and variability loops are repeated for each entry in this list of growths during stabilization. The keyword `vector` must appear after the keyword `growth`, and be followed by the number of growth variability distributions to be modeled in this run (this can be any number from 1 upwards). Following the `growth` keyword line must be one line for each variability distribution. Each such line describes the variability distribution for \log_{10} growth during stabilization required. The “preferred” value of the distribution (*see below for specification of distributions* — the preferred value for a point distribution is the single point value) is the value that is printed on the screen and in the output file for this growth during stabilization.

```
Second_heat_frac triangular 0.0 0.5 1.0 0.5
```

The fraction of heat-activatable spores remaining after RTE production that are activated by a second heating step. A variability distribution.

```
Storage_frac triangular 0.0 0.025 0.05 0.025
```

The fraction of spores that germinate during storage and transport. A variability distribution.

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Pre_retail_time uniform 10 30 20 d ! Note that units are required.

Pre-retail storage time for all categories. *Units are required as the last value provided.*

Allowable units are abbreviations of standard time units (s, with any standard MKS multiplier prefix,¹⁰⁴ and min, h, d for minute, hour, day, with no prefixes allowed).

Category_1_cold 0.2 ! a constant

Fraction of category 1 foods that are eaten cold. A constant.

Oven_fraction 0.5 ! a constant

Fraction of RTE & partially cooked foods that are heated in an oven, assuming they are heated at all. A constant.

Microwave_heat_time uniform 1 10 5.5 min ! units needed

Variability distribution for times of heating in a microwave oven. *Units are required.*

Allowable units are abbreviations of standard time units (s, with any MKS multiplier prefix, and min, h, d for minute, hour, day, with no prefixes allowed).

Oven_heat_time uniform 10 30 20 min ! units needed

Variability distribution for times of heating in a standard oven. *Units are required.* Allowable units are abbreviations of standard time units (s, with any MKS multiplier prefix, and min, h, d for minute, hour, day, with no prefixes allowed).

Hot_holding_fraction 0.01 ! a constant

Fraction that is hot held, applied to Categories 1 & 4 servings. A constant.

Hot_hold_time triangular 0.5 2 8 3 h ! Units needed

The variability distribution for hot-holding times. *Units are required.* Allowable units are abbreviations of standard time units (s, with any MKS multiplier prefix, and min, h, d for minute, hour, day, with no prefixes allowed).

Max_Cell_Density lognormal 18.42 1.151 1e8 1/g

The variability distribution for maximum cell density in cfu/g. *Units required.* This default value is 8 log10 with SD 0.5 on log10 scale. Note that “lognormal” requires entries using natural logarithms =2.303*log10. Acceptable units are the inverse of any mass unit (e.g. 1/g, 1/kg, 1/lb, etc. for cfu/g, cfu/kg, cfu/lb).

The final set of keywords specify “what if” scenarios.

Max_Allowed_conc Point 1e15 1/g ! Units needed

“What if” the manufacturer could detect *C. perfringens* (all types, not just type A, and CPE+ or CPE-) and throw out servings with more than some concentration of *C. perfringens* in them. This keyword defines the variability distribution for the concentration that can be detected and eliminated. This “what if” can be ignored by setting a large enough value (e.g. 10¹⁵ cfu/g, as specified here)

OverGrowthFraction 0.0 ! Constant

¹⁰⁴ μ is represented by u, but in this application there would be no call to use microseconds

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OverGrowthTemp Point 12 K ! Variability distribution. Units needed
“What if” at low enough temperatures some other organism would outgrow *C. perfringens*, preventing growth of *C. perfringens*. These two parameters specify the fraction of servings in which *C. perfringens* could grow that are overgrown instead by some other organism (OverGrowthFraction) and the temperature below which this might happen (OverGrowthTemp). This “what if” is ignored if the OverGrowthFraction is set to zero. (It is up to the user to ensure that the fraction is less than unity).

SpoiledMinConc 1e9 1/g ! Units needed; constant
SpoiledConc90 1e8 1/g ! Units needed; constant
“What if” the consumer can detect spoiled servings and throw them out. These two parameters specify the minimum *C. perfringens* concentration necessary for detection (SpoiledMinConc) and the concentration at which the detection probability has increased to 90% (SpoiledConc90). The detection probability is assumed to be zero below SpoiledMinConc, and to increase as

$$p = 1 - \exp\left(-\ln(10) \frac{\ln(C/C_{\min})}{\ln(C_{90}/C_{\min})}\right)$$

above $C_{\min} = \text{SpoiledMinConc}$, where C is the concentration of *C. perfringens* in the serving, $C_{90} = \text{SpoiledConc90}$, and p is the probability for detecting the serving as spoiled and throwing it out. To ignore this “what if,” set SpoiledConc90 less than or equal to SpoiledMinConc.

E.5 Specification of distributions.

The specification of distributions is again by keyword-value pairs, where the keyword is the name of the distribution, and the “value” is a sequence of numbers, followed if necessary by a unit, needed as parameters for the distribution. The following keyword-value sets are available at the moment for distributions. The value of “units” in the following should be left blank in this file except where explicitly needed (the value “nunit” could also be used), as specified in the description of keywords above. Further explanation follows this table.

Point value units
Normal mean sd preferred units
Truncnormalabove mean sd upper preferred units
Truncnormalbelow mean sd lower preferred units
Truncnormalboth mean sd lower upper preferred units
Lognormal median sd preferred units
Lognormal2 mean arithsd preferred units
Trunclognormalabove median sd upper preferred units
Trunclognormalbelow median sd lower preferred units
Trunclognormalboth median sd lower upper preferred units
Uniform lower upper preferred units
Loguniform lower upper preferred units
Triangular lower break upper preferred units
Exponential decayconst preferred units
Gamma parmA parmB preferred units
Chisquared nu parmB preferred units

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Beta parmA parmB parmC preferred units
Logistic A B preferred units
Weibull alpha beta preferred units
Pareto theta alpha preferred units
Geometric probability preferred
Poisson lambda preferred
Pert minimum mode maximum preferred units
Mass_point filename
Piecewise_linear filename

There **MUST** be values for each of the value entries in the lines defining distributions, except for the “units” value. That is, all values up to and including the “preferred” entry must have a corresponding number in the data file.

“Preferred” always corresponds to a “preferred” value for the output from the distribution. This entry is used in this application to reference the MLE value of uncertainty distributions, so should be set to the MLE value for any distributions specifying uncertainties. For distributions specifying variabilities, this value is generally not used (*exception; it is used to describe the distribution of growth during stabilization on the screen and in the output file*), but some entry should be provided in the input file. Only variability distributions are included in the sensitivity parameter files — the uncertainty distributions for these parameters are not known.

“Units” indicate the units of (one or more of) the values given. Units are specified as a character string specifying MKS or British units (*e.g.* m/s, kg, km-s/Mg-mol). Unit specifiers (like m, kg, mol) are separated by hyphens, and a single / may occur to indicate division. All unit specifiers occurring before any / are multiplied, and all those following any / are applied with inverse power. Any unit specifier may optionally be followed immediately with a single digit to indicate a power of that unit. MKS unit specifiers may be preceded immediately with any of the standard MKS multiplier characters (a, f, p, n, u, m, c, d, h, k, M, G, T, P, E for atto, femto, pico, nano, micro, milli, centi, deci, hecto, kilo, mega, giga, tera, peta, and exa, indicating powers of -18 , -15 , -12 , -9 , -6 , -3 , -1 , $+2$, $+3$, $+6$, $+9$, $+12$, $+15$, and $+18$ respectively; u for micro is non-standard but is the closest available for the Greek μ). All seven dimensions (mass, length, time, current, temperature, amount of substance, and luminous intensity) are handled; the base MKS units are, respectively, the meter [m], kilogram [kg], ampere (A), kelvin (K), mole (mol), and candela (cd). Unit specifiers are case-sensitive (capital letters often mean something other than the lower-case letter).

All inputs requiring dimensional values must be accompanied by a units string to indicate the units of the values supplied. Conversion to standard units is automatic.

Other than for units, keywords are not case-sensitive.

Mass_point and Piecewise_linear are special cases described below.

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The other value entries are parameters of the distributions. Most are fairly self-explanatory, and are indicated further in the following summaries.

Point value units

value = single value of the point distribution. Note that this is strictly distinct from a constant — an input that is specified to be a constant can only accept a constant input, not a point distribution. An input specified to be a distribution can accept a point distribution to mimic a constant value. The preferred value of a point distribution is the single value of it.

Normal mean sd preferred units

mean = mean

sd = standard deviation

Truncnormalabove mean sd upper preferred units

This is a normal truncated above at the value “upper”

mean = mean of underlying normal

sd = standard deviation of underlying normal

upper = truncation point

Truncnormalbelow mean sd lower preferred units

This is a normal truncated below at the value “lower”

mean = mean of underlying normal

sd = standard deviation of underlying normal

lower = truncation point

Truncnormalboth mean sd lower upper preferred units

This is a normal truncated both above and below. See above for meanings.

Lognormal median sd preferred units

Median = mean value of the logarithmically transformed values

sd = standard deviation of the logarithmically transformed values

Lognormal2 mean arithsd preferred units

Lognormal distribution, as above, but initialized differently:

mean = arithmetic mean of the distribution

arithsd = arithmetic standard deviation of the distribution

Truncated lognormals. The truncation points are in the arithmetic space, NOT the logarithmically transformed space, even though the median and sd are in the transformed space.

Trunclognormalabove median sd upper preferred units

Trunclognormalbelow median sd lower preferred units

Trunclognormalboth median sd lower upper preferred units

Uniform lower upper preferred units

Lower and upper bounds of a uniform distribution.

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Loguniform lower upper preferred units
Lower and upper bounds of a log-uniform distribution.

Triangular lower break upper preferred units
Lower, upper and break point (=mode) of a triangular distribution

Exponential decayconst preferred units
decayconst is the decay constant of the exponential. The units are those of “preferred”, that is the units of 1/decayconst.

Gamma parmA parmB preferred units
Gamma distribution, with two parameters. parmA is the shape parameter, parmB the scale parameter. units are those of the scale parameter.

Chisquared nu parmB preferred units
Chisquared, nu=degrees of freedom, parmB =scale parameter. units are those of the scale parameter.

Beta parmA parmB parmC preferred units
Beta distribution. parmC scales the output from [0,1] to [0,parmC], and the units are those of the scale parameter.

Logistic A B preferred units
Logistic distribution. A is the location parameter, and B the scale. units are those of the scale parameter.

Weibull alpha beta preferred units
alpha is the shape parameter, beta the scale. units are those of the scale parameter.

Pareto theta alpha preferred units
theta is the shape, alpha the scale (least possible value). units are those of the scale parameter.

Geometric probability preferred
No scaling possible, and no units. Integer values returned. probability is the probability associated with this geometric distribution.

Poisson lambda preferred
No scaling is possible, and no units. Integer values are returned. lambda is the expected value of the value returned.

Pert minimum mode maximum preferred units
The Pert is a special case of a shifted beta distribution. units are those of the minimum, mode, and maximum.

Mass_point filename

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The Mass_point distribution consists of an arbitrary number of values, each associated with a probability (and the sum of the probabilities is unity). This keyword requires that the name of a file defining the distribution be specified as the value associated with the keyword. That file must be in the same directory as the file containing the keyword. The file defining the distribution is laid out as follows:

```
n      units          # first line
p1     v1             # first pair (second line)
p2     v2             # second pair
# etc. etc.
.....
# up to:
pn     vn             # nth pair (line n+1)
preferred      # preferred value (line n+2)
```

Any line can have a comment (preceded by #, !, or {) on it, as shown; comment lines can be interspersed throughout; and comment lines are ignored completely. n is the number of (value, probability) pairs, and (p1,v1), (p2, v2) are (probability, value) pairs. “Units” are the units of the values specified, and may be blank if the values are dimensionless. “preferred” is the preferred value for the distribution return value (and in this application should be set to the MLE value). The sum of the probabilities should be unity, within 1 part in 1000 (otherwise an error is generated, terminating the program; in any case the probabilities are re-normalized to sum to unity within machine rounding error). Entries on individual lines within the file are separated by arbitrary numbers of spaces.

Piecewise_linear filename

The Piecewise_linear distribution consists of a cumulative distribution that is piecewise linear between an arbitrary number of values, and continuous everywhere. The density function is uniform between each pair of values. This keyword requires that the name of a file defining the distribution be specified as the value associated with the keyword. That file must be in the same directory as the file containing the keyword. The file defining the distribution is laid out exactly as for the Mass_point distribution, but the entries differ in meaning. n is again the number of points specified, but (p1,v1), (p2, v2) etc. are pairs of (probability, value) pairs defining the cumulative distribution. The probabilities specified are cumulative probabilities, so $0=p_1 \leq p_2 \leq p_3 \leq \dots \leq p_n=1$ necessarily (it is an error if this is not true), and the values must be strictly increasing, so $v_1 < v_2 < v_3 < v_4 < \dots < v_n$ (again, it is an error if this is not true).