

Processed Meats in the Diet

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In addressing the subject of the contribution of processed meats to the U.S. diet, it may be appropriate to remind ourselves of the obvious; namely their contribution to dietary variety in terms of flavor, texture, etc. Having stated the obvious, we must next recognize that processed meats face a number of significant challenges as a dietary component. Among those challenges are the oft-made criticisms that they are "fatty" foods and, of course, the additives are viewed by some as having a potentially adverse effect on their value as a food entity. Among the additives, sodium currently appears to receive the most criticism.

Specific food consumption data for the U.S. population are obviously non-existent. As a result, any general statement regarding consumption must be recognized at the outset as an estimate. Reasonably good data frequently exist with regard to food production and its disappearance into consumption channels. In the case of meat products, however, as in the case of a number of foods, the production figures do not truly represent the form in which it is consumed. Rather, it may be in the form of carcass weight or retail cut weights estimated from carcass weights. Attempts are often made to further refine consumption data to represent raw weights of the consumable portion and still further to that consumable portion in a cooked form. Needless to say, a number of assumptions and estimates are necessary to convert production weights per capita to consumed food weights per capita.

The National Live Stock and Meat Board (1982) has estimated that, in terms of carcass weight, about 65% of pork, about 12% of beef and about 15% of lamb in the United States is converted to a processed form before sale to the consumer. While such figures reflect the relative importance of processed versus fresh meats, they do not actually address the question of the contribution of processed meat to the diet.

Inasmuch as a number of assumptions are recognized to be necessary, the following is a statement of some of the key ones.

1. Edible portion consumption estimates are derivable from USDA Food Safety and Inspection Service (FSIS) production figures. (AMI 1983)
2. U.S. population estimates are suitably accurate. (U.S. Department of Commerce, 1982)
3. The potential consuming population for processed

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meats excludes 50% of the under 5 year age group, resulting in a potential consuming population of about 223.5 million.

4. In view of the absence of hard data, rational estimates can be made of:

- a. Processing yields and proportionate uptake of processing solutions by the lean, fat and bone components,
- b. Lean, fat and bone proportions in products as produced,
- c. Edible portion yields through kitchen preparation, and,
- d. Nutrient composition of consumed edible portion.

5. The total production is consumed within the same year with no provision for product losses through distribution and marketing.

The processed ham items pose a particularly difficult problem in deriving consumable product from produced weight. Each item requires a somewhat different set of assumptions. Following are the assumptions used in converting the various ham per capita weights to consumption weights.

Ham, bone in:

1. Edible portion, consisting of 90% lean and 10% extractable fat, constitutes 66.2% of uncured ham weight.
2. Yield through processing equals 100%.
3. Cooked yield of edible portion through kitchen preparation equals 90%.
4. Cooked edible portion equals 59.6% of the weight of the ham as produced for sale.

Ham, bone in, water added:

1. Edible portion consists of 91% lean and ingredients and 9% fat.
2. Yield through processing equals 112% and 90% of the curing solution is taken up by the edible portion.
3. Cooked yield of edible portion through kitchen preparation equals 80%.
4. Cooked edible portion equals 55.9% of the weight of the ham as produced for sale.

Ham, semi-boneless:

1. Converting conventional uncured hams to a semi-boneless state results in the removal of the following:

a. Skin	6.4%
b. Fat	6.0%
c. Bone	5.2%
d. Trimmings (90% lean)	15.8%
Total Removed	33.4%

2. Edible portion consists of 90% lean and 10% extractable fat and constitutes 75.7% of the weight of the ready-to-cure ham entity.
3. Yield through processing equals 100% of ready-to-cure ham weight.
4. Cooked edible portion yield through kitchen preparation equals 90%.
5. Cooked edible portion equals 68.1% of the weight of the ham as produced for sale.

Ham, semi-boneless, water added:

Assumptions 1 and 2 above apply.

3. Yield through processing equals 115% of ready-to-cure weight and 90% of the curing solution is taken up by the edible portion.
4. Cooked edible portion yield through kitchen preparation equals 80%.
5. Cooked edible portion equals 62.05% of the weight of the ham as produced for sale.

Ham, boneless and Ham, sectioned and formed:

1. Processed ham entity contains 90% lean and 10% fat.
2. Cooked edible portion yield through kitchen preparation equals 90%.

Ham, boneless, water added and Ham, sectioned and formed, water added:

1. Processed ham entity contains 91% lean and ingredients and 9% fat.
2. Cooked edible portion yield through kitchen preparation equals 80%.

Ham, dry cured:

1. Edible portion, consisting of 90% lean and 10% extractable fat, constitutes 66.2% of uncured ham weight.
2. Yield through processing equals 80%.
3. Weight loss (water) from the edible portion equals 30.3% of the edible portion weight.
4. Cooked yield of edible portion through kitchen preparation equals 95%.
5. Cooked edible portion equals 54.9% of the weight of the ham as produced for sale.

Table 1 reflects the daily per capita weight contribution to the diet of hams processed under federal inspection based upon previously defined potential consumers.

Other non-committed processed meats are grouped together solely for convenience. Following are the assumptions used in converting production weight of those products to per capita consumption weights:

Pork, regular:

1. Consists of a variety of bone-in and boneless cuts.
2. Edible portion, consisting of 90% lean and 10% extractable fat, represents 67.5% of the weight of the products as produced for sale.
3. Cooked yield of edible portion through kitchen preparation equals 90%.
4. Cooked edible portion equals 60.75% of the weight of the products as produced for sale.

Pork, water added:

- Assumptions 1 and 2 from Pork, regular apply.
3. Cooked yield of edible portion through kitchen preparation equals 80%.

4. Cooked edible portion equals 54% of the weight of the products as produced for sale.

Bacon:

Cooked yield through kitchen preparation equals 31.9% (USDA 1975b).

Cooked beef and Dried beef:

Assumed to be consumed as produced.

Other Meats:

1. Consist of a variety of products.
2. Cooked edible portion equals 65% of the weight of the products as produced for sale.

Table 2 reflects the daily per capita weight contribution to the diet of non-committed smoked, dried or cooked meat products, other than ham, processed under federal inspection based upon previously defined potential consumers.

In the case of frankfurters, wieners and bologna, they are assumed to be consumed as produced. Table 3 reflects the contribution of these products to the diet.

The assumption is made that all fresh and cured sausages will lose the same amount of weight through kitchen preparation as reported for fresh pork sausage (USDA 1975b). Table 4 reflects the contribution of these products to the diet.

Dried and semi-dried sausages are presumed to be consumed as produced and their contribution to the diet is reflected in Table 5.

Cured products are all assumed to have a yield through kitchen preparation as reported for corned beef (USDA 1975a). Their contribution to the diet is reflected in Table 6.

The remainder of sausage-type products and canned products are assumed to be 100% consumable as produced and their contribution to the diet is reflected in Tables 7 & 8.

Table 9 reflects the weight contribution to the U.S. diet of the various groups of processed products, given all the assumptions previously stated. It is of interest to note that four clearly identifiable groups of formulated products constitute about 60% of the consumption of processed meats. Consumers of processed muscle cuts have the option of reducing dietary fat by removal of trimmable fat. Such an

Table 1. Daily U.S. Per Capita Consumption of Smoked, Dried or Cooked Hams Processed Under Federal Inspection

	Production g	Portion of Production Consumed	Consume- tion g
Bone In	.594	.596	.354
Bone In, W.A.*	1.746	.559	.976
Semi-Boneless	.057	.681	.039
Semi-Boneless, W.A.*	.493	.621	.306
Boneless	.541	.900	.487
Boneless, W.A.*	3.140	.800	2.512
Sectioned & Formed	.491	.900	.442
Sectioned & Formed, W.A.*	1.700	.800	1.360
Dry Cured	.462	.549	.254
Total Hams	9.224	.730	6.730

*Water added

Table 2. Daily U.S. Per Capita Consumption of Non-Comminuted Processed Products Other Than Ham Processed Under Federal Inspection

	<i>Production g</i>	<i>Portion of Production Consumed</i>	<i>Consump- tion g</i>
Pork, regular	1.056	.608	.642
Pork, W.A.*	1.326	.540	.716
Bacon	6.434	.319	2.052
Cooked beef	1.409	1.000	1.409
Dried beef	.137	1.000	.137
Other meats	1.611	.650	1.047
TOTAL	11.973	.501	6.003

*Water added

Table 3. Daily U.S. Per Capita Consumption of Frankfurters, Wieners & Bologna, Processed Under Federal Inspection

	<i>Consumption-g</i>		
	<i>Franks & Wieners</i>	<i>Bologna</i>	<i>Total</i>
Regular	6.282	3.018	9.300
With Extenders	.721	.213	.934
With Variety Meats	.281	.492	.773
With Extenders & Variety Meats	.448	.332	.780
TOTAL	7.732	4.055	11.787

Table 4. Daily U.S. Per Capita Consumption of Fresh & Cured Sausages Processed Under Federal Inspection

	<i>Production g</i>	<i>Portion of Production Consumed</i>	<i>Consump- tion g</i>
Fresh Beef	.077	.565	.044
Fresh Pork	4.718	.565	2.666
Fresh-Other	1.315	.565	.743
Uncooked Cured	.118	.565	.067
TOTAL	6.228	.565	3.520

Table 5. Daily U.S. Per Capita Consumption of Dried and Semi-Dried Sausages Produced Under Federal Inspection

	<i>Consumption-g</i>
Dried	1.464
Semi-dried	.514
TOTAL	1.978

Table 6. Daily U.S. Per Capita Consumption of Cured Products Produced Under Federal Inspection

	<i>Production g</i>	<i>Portion of Production Consumed</i>	<i>Consump- tion g</i>
Cured Beef	1.554	.67	1.041
Cured, Excl. Beef & Pork	.215	.67	.144
TOTAL	1.769	.67	1.185

Table 7. Daily U.S. Per Capita Consumption of Other Meats Processed Under Federal Inspection

	<i>Consumption-g</i>
Liver Sausage	.601
Cured Meat Loaves	.525
Nonspecific Loaves	.899
Other Cooked Items	4.626
Other Formulated Products	1.312
TOTAL	7.963

Table 8. Daily U.S. Per Capita Consumption of Canned Meats Processed Under Federal Inspection

	<i>Consumption-g</i>
Canned Hams	1.079
Luncheon Meats	1.232
Pork Picnics & Loins	.045
Vienna Sausage	.472
Franks & Wieners	.010
Misc. Sausage Products	.122
Deviled Ham	.060
Sliced Dried Beef	.018
Chopped Beef-Hamburger	.066
Corned Beef	.044
TOTAL	3.108

option does not exist for comminuted products although cooking can reduce the fat content of some of them.

Inasmuch as nutrient composition data are not available for all categories of products offered for sale, additional assumptions must be made. Following are the sources of nutrient composition information which were applied to the various groups of products.

Smoked, dried or cooked.

Hams & Pork USDA (1980) NDB No. 07029

Smoked, dried or cooked

Hams & Pork, W.A. USDA (1980) NDB No. 07029 (+ 1.10)

Hams, dry cured USDA (1975a) 1767 (adjusted to 10% fat)

Table 9. Summary of Daily U.S. Per Capita Consumption of Processed Meats

<i>Domestic Production</i>	<i>Portion of Production g</i>	<i>Production Consumed</i>	<i>Consumed g</i>	<i>Percent of Consumed Processed Products</i>
Smoked, Dried or Cooked Hams	9.224	.730	6.730	15.92
Non-Comminuted Products Other Than Ham	11.973	.501	6.003	14.20
Franks, Wieners & Bologna	11.787	1.000	11.787	27.88
Fresh & Cured Sausage	6.228	.565	3.520	8.33
Dried & Semi-Dried Sausage	1.978	1.000	1.978	4.68
Cured Products	1.769	.670	1.185	2.80
Other Processed Products	7.963	1.000	7.963	18.84
Canned Products	3.108	1.000	3.108	7.35
Sub-Total	54.030	.782	42.274	100.00
Imported:				
Canned Hams & Corned Beef			1.476	
Other			.120	
GRAND TOTAL			43.870	

Bacon	USDA (1975b) item 1266
Cooked beef	USDA (1975a) item 355 (sodium estimated at protein x3.5)
Dried beef	USDA (1975a) item 380
Other meats	USDA (1980) NDB No. 07029
Frankfurters	USDA (1980) NDB No. 07023
Bologna	USDA (1980) NDB No. 07008
Fresh beef & other sausage	USDA (1980) NDB No. 07065
Fresh pork sausage	USDA (1980) NDB No. 07064
Uncooked cured sausage	USDA (1980) NDB No. 07013
Dried sausage	USDA (1980) NDB No. 07069
Semi-dried sausage	USDA (1980) NDB No. 07072
Cured products	USDA (1975a) item 375
Liver sausage	USDA (1980) NDB No. 07041 (sodium estimated 1200 mg 100g)
Loaves & other formulated products	USDA (1980) Avg. of NDB Nos. 07021, 07035, 07056, 07058 and 07062
Other cooked items	USDA (1980) Avg. of NDB Nos. 07059 and 07037
Canned hams	USDA (1975a) item 1783
Canned luncheon meats	USDA (1980) NDB No. 07045
Canned Vienna sausage	USDA (1980) NDB No. 07083
All other canned meats	Average of 3 immediately above
Imported canned hams & shoulders	USDA (1975a) item 1783
Imported canned corned beef	USDA (1975a) item 378 (sodium estimated at 1500 mg 100g)
Other import processed meats	Average of 2 immediately above

Table 10 summarizes the estimated dietary contribution of the various groups of processed products in terms of protein, fat, KCal and sodium. While a great deal of compositional variability exists among the various products, the total of the processed meat dietary components contains an estimated 16.2% protein, about 23.1% fat, about 228 KCal per 100g and about 1153 mg of sodium per 100 g. It seems plausible to assume that B-vitamins and minerals exist in about the same relationship to protein as is true for other meats.

As stated previously, hard consumption data simply do not exist for foods. We are, therefore, forced to make a number of estimates and assumptions in order to interpret production data to per capita consumption. Composition for products produced, kitchen preparation losses and plate waste are among those factors presumed to have the greatest potential impact on such an interpretation. In the estimates of population herein, an attempt has been made to eliminate a portion of the population who would not be expected to consume meat. If one included the entire population, per capita consumption figures would be about 96.2% of those reported herein. In addition, since no allowance has been made for spoilage or other product losses through distribution, the per capita consumption is believed to be somewhat of an overestimate of actual consumption.

Our daily per capita consumption of processed meats supplies 12.7% of an adult male's RDA for protein and supplies only 4.7% of his recommended energy intake (FNB 1980). The sodium content of the consumed processed meats is about 10.5% to 12.5% of the average daily per capita sodium intake (Pearson and Wolzak, 1982). If one is concerned about the percent of dietary KCals originating

Table 10. Daily U.S. Per Capita Nutrient Contribution of Processed Meat

	Consumption g	Protein g	Fat g	KCal	Sodium mg
Smoked, Dried or Cooked Hams & Pork	1.964	.345	.208	3.574	25.87
Smoked, Dried or Cooked Hams & Pork, W.A.	5.870	.937	.564	9.712	70.28
Hams, Dry Cured	.254	.059	.025	.480	6.50
Bacon	2.052	.539	1.067	12.17	20.90
Cooked Beef	1.409	.441	.086	2.82	1.50
Dried Beef	.137	.047	.009	.28	5.90
Other Meats	1.047	.184	.111	1.906	13.79
Frankfurters	7.732	.872	2.254	24.742	86.60
Bologna	4.055	.474	1.146	12.814	41.32
Fresh Beef & Other Sausage	.787	.109	.197	3.117	6.34
Fresh Pork Sausage	2.666	.524	.831	9.838	34.50
Uncooked Cured Sausage	.067	.009	.017	.202	.37
Dried Sausage	1.464	.335	.503	6.120	27.23
Semi-Dried Sausage	.514	.072	.103	1.285	5.47
Cured Products	1.185	.271	.296	3.470	15.40
Liver Sausage	.601	.085	.171	1.959	7.21
Loaves & Other Formulated Products	2.736	.399	.363	5.526	36.36
Other Cooked Items	4.626	.633	1.293	14.711	45.15
Canned Hams	1.079	.197	.133	2.082	11.87
Canned Luncheon Meat	1.232	.154	.373	4.115	15.88
Canned Vienna Sausage	.472	.049	.119	1.317	4.50
All Other Canned Meat	.325	.044	.073	.874	3.62
Imported Canned Hams and Shoulder	1.094	.200	.135	2.111	12.03
Imported Canned Corned Beef	.382	.101	.031	.707	5.73
Other Processed Imports	.120	.027	.012	.227	1.56
TOTAL	43.870	7.107	10.120	126.159	505.88

from fat, processed meats as a group have about 72.4% of their energy originating from fat. On the other hand, Rizek et al. (1982) estimate daily per capita fat intake in the U.S. to be about 169 g. Thus the contribution of processed meats is slightly less than 6% of our daily consumption of fat. If, as some suggest, we were to reduce fat consumption by 25%, current consumption of processed meats would still represent only about 8% of that consumption.

In spite of the foregoing defense of dietary processed meats, it would seem prudent to explore means by which both fat and sodium content could be reduced while still retaining the palatability characteristics and the current or superior food safety expectation. It is common wisdom that we consume much more sodium than is metabolically required and that weight control is one of the most serious health problems in the U.S.

Finally, processed meats have long added great taste appeal variety to the diet. They are nutrient dense, meaning that their contribution to dietary protein, B-vitamins and minerals is high compared to their energy contribution. As in all meats, the protein of processed meats is highly usable by the human. Processed meats have long been, and should continue to be, an important component of a palatable, balanced and varied diet.

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