August 29, 2019

FSIS Docket Clerk
Department of Agriculture
Food Safety and Inspection Service
Room 2534 South Building
1400 Independence Avenue, S.W.
Washington, DC 20250-3700

Re: Petition to Require Accurate and Non-Misleading Labeling on Meat Processed with Non-Synthetic Nitrates and Nitrites

To Whom it May Concern:

The Center for Science in the Public Interest and Consumer Reports (the Petitioners) respectfully submit this petition asking that the Food Safety and Inspection Service (FSIS) clarify the labeling of processed meats.

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Sincerely,

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Center for Science in the Public Interest

UNITED STATES DEPARTMENT OF AGRICULTURE
FOOD SAFETY AND INSPECTION SERVICE (FSIS)

Petition to Require Accurate and	)	Docket No._____
Non-Misleading Labeling on Meat	)	
Processed with Non-Synthetic	)	
Nitrates and Nitrites	)	

CITIZEN PETITION

Submitted by:
Center for Science in the Public Interest
Consumer Reports
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Re: Petition to Require Accurate and Non-Misleading Labeling on Meat Processed with Non-Synthetic Nitrates and Nitrites

The Center for Science in the Public Interest and Consumer Reports (the Petitioners) respectfully submit this petition asking that the Food Safety and Inspection Service (FSIS) clarify the labeling of processed meats.[1] Specifically, we ask that the agency cease requiring that such products be labeled as "Uncured," and/or "No Nitrate or Nitrite Added[*]" when they have been processed using non-synthetic sources of nitrate and nitrite, such as celery powder, rather than traditional synthetic sources, such as sodium nitrite.

Both synthetic and non-synthetic nitrates and nitrites may cause cancer, and product testing results released today by Consumer Reports show that processed meats made with celery powder and other non-synthetic sources of nitrates and nitrites can contain residues of these substances, just as do meats that use synthetic sources.[2] Consumer Reports is also releasing survey data today showing that consumers are confused by the "No Nitrate or Nitrite Added[*]" statements, which are currently accompanied by a fine-print disclaimer on product labels identifying the non-synthetic source of nitrates or nitrites (*e.g.*, "[*]Except those naturally occurring in celery powder").

We therefore urge the agency to stop requiring, and instead prohibit, the "No Nitrate or Nitrite Added" claim on processed meat, except when no nitrate or nitrite is added from any source. In its place, we ask that the agency require a front-of-package declaration and clear ingredient labeling whenever nitrates or nitrites are used in meats, regardless of the source. We also urge the agency to take additional steps to minimize levels of residual nitrates, nitrites, and nitrosamines in these products.

I. Introduction

Despite growing public health concerns about processed meat consumption, the amount of processed meat consumed by Americans has remained roughly steady over the past 18 years.[3] On average, U.S. adults consume about 21 pounds of processed meat per year.[4] Yet numerous

[1] Unless otherwise defined, the term "processed meat" in this petition refers to meat and poultry that have been preserved or altered to enhance color and flavor, including bacon, hotdogs, deli meats, and similar products.
[*] "Except those that are naturally occurring in [ingredient]."
[2] *See* Appendix B, Consumer Reports Product Testing and Survey Methods and Results.
[3] Zeng L, *et al.* Trends in Processed Meat, Unprocessed Red Meat, Poultry, and Fish Consumption in the United States, 1999-2016. *J Acad Nutr Diet.* 2019;119(7):1085-1098.
[4] *Ibid.*

expert bodies, including the World Health Organization (WHO),[5] American Cancer Society,[6] and American Heart Association[7] advise limiting consumption of processed meats. A large and growing body of scientific research, discussed below, shows an increased risk of colorectal cancer in people who consume these products. These concerns are leading many consumers to seek out healthier alternatives.

Unfortunately, current trends in processed meat manufacturing and labeling are misleading to consumers, as they may lead them to believe that certain newer kinds of cured processed meats are healthier than their traditional counterparts. Technological advances in meat science mean that meats that were once cured using synthetic sources of nitrates and nitrites are now being prepared using celery powder and other non-synthetic sources. These newer sources of nitrates and nitrites can produce similar antimicrobial properties, taste, and appearance to synthetic nitrates and nitrites.

Moreover, tests by Consumer Reports and others demonstrate that processed meats prepared with non-synthetic sources of nitrates and nitrites, like celery powder, contain nitrates and nitrites at similar levels to those prepared with synthetic sources like sodium nitrite. They may therefore present a similar risk of cancer as traditional processed meats, which have been characterized by the International Agency for Research on Cancer as "carcinogenic to humans."[8]

Yet meats processed with nitrates and nitrites from these newer sources are labeled very differently from those prepared using synthetic nitrates and nitrites. A wide variety of these newer meats now bear "No Nitrate or Nitrite Added" claims that mislead consumers to believe that the meats are nitrate- and nitrite-free.

As we describe in greater detail below, federal labeling requirements, developed before these newer curing methods were fully refined and understood, today mislead consumers by requiring the newer processed meats to prominently bear the term "Uncured" and the statement "No Nitrate or Nitrite Added."[9] In other instances, companies make "No Nitrate or Nitrite

[5] World Health Organization. Q&A on the carcinogenicity of the consumption of red meat and processed meat. October 2015. https://www.who.int/features/qa/cancer-red-meat/en/

[6] American Cancer Society. ACS guidelines for nutrition and physical activity. April 13, 2017. https://www.cancer.org/healthy/eat-healthy-get-active/acs-guidelines-nutrition-physical-activity-cancer-prevention/guidelines.html

[7] Van Horn L, *et al*. Recommended dietary pattern to achieve adherence to the American Heart Association/American College of Cardiology (AHA/ACC) guidelines: a scientific statement from the American Heart Association. *Circulation.* 2016;134:e505-e529.

[8] IARC Working Group on the Evaluation of Carcinogenic Risk to Humans. Red meat and processed meat. *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans,* No. 114. Lyon, France: International Agency for Research on Cancer; 2018 [Hereinafter: "IARC Monograph on Processed Meat"]; *See also* IARC Working Group on the Evaluation of Carcinogenic Risk to Humans. Ingested nitrate and nitrite, and cyanobacterial peptide toxins. *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans,* No. 94. Lyon, France: International Agency for Research on Cancer; 2010. [Hereinafter: "IARC Monograph on Ingested Nitrate and Nitrite"]

[9] These requirements apply if the if the meat has a standard of identity that includes a curing agent or is otherwise typically cured. *See* 9 CFR § 319.2; 9 CFR § 317.17.

Added" claims on products that are not labeled "Uncured," in an apparent effort to market these products to consumers as nitrate- and nitrite-free."[10]

The agency currently requires that the "No Nitrate or Nitrite Added" statement be qualified by the words "Except for those naturally occurring in [name of source of nitrate/nitrite]." But this qualifier may be set off in smaller, less prominent text from the "No Nitrate or Nitrite Added" statement by use of an asterisk. *See fig* 1, *infra*.

Such claims, even when qualified, are misleading because they cause consumers to believe that products processed using celery powder and other non-synthetic sources of nitrates and nitrites are free of these compounds, when in fact nitrates and nitrites were simply added through a different ingredient. This is underscored by recent Consumer Reports survey data, described in detail below, showing that many consumers seek out "No Nitrate or Nitrite Added" claims, and are confused by the "Except for those naturally occurring…" disclaimer.

To avoid misleading consumers, the Petitioners ask that the FSIS cease requiring or allowing meats processed with non-synthetic sources of nitrates and nitrites, like celery powder, to be labeled as "Uncured," and/or "No Nitrate or Nitrite Added." Instead, we ask that the agency reserve these claims only for meats that were not processed using nitrates or nitrites from any source.

We also urge the agency to require all products processed using nitrates or nitrites to bear the disclosure "Nitrates or nitrites added" in lettering of easily readable style and at least one-half the size and prominence of the product name. This disclosure should apply to all products that were processed using any added sources of nitrate or nitrite to preserve the meat or enhance its color or flavor. And it should apply equally to synthetic sources, such as sodium nitrite, and non-synthetic sources, such as celery powder. We also ask that any ingredients used as a source of nitrate or nitrite as a coloring, flavoring, curing agent, antimicrobial, or similar uses be declared as such on the ingredients list, as follows: "[Ingredient] (Source of nitrate or nitrite for [use])."[11]

While these declarations should be apply to all products, the agency may also consider allowing manufacturers to remove the "Nitrates or Nitrites Added" statement in specific cases in which a manufacturer can present data demonstrating they have utilized a method to fully eliminate, to the point of non-detection using appropriately sensitive tests, nitrates and nitrites from the final product. Such an exception could serve the public health by creating an incentive for manufacturers to develop processes and technologies to further minimize nitrate and nitrite residues in processed meat.

Finally, we ask that the agency recognize non-synthetic sources of nitrates and nitrites as curing agents and take steps to minimize levels of residual nitrates, nitrites, and nitrosamines

[10] 9 CFR § 317.17 also requires the "Uncured" statement for products labeled under a common or usual name that resemble cured products, but this statement frequently does not appear on deli meats bearing the "No Nitrate or Nitrite Added" claim. *See*, e.g. Oscar Mayer. Oscar Mayer Natural No Antibiotics Ever Mesquite Smoked Turkey Breast. 2019. https://www.oscarmayer.com/our-products/cold-cuts/00044700091432.

[11] Appendix A includes an example of how the changes would appear in a hypothetical product label.

derived from these ingredients by setting maximum concentrations and requirements for the use of ascorbate or other cure accelerators when nitrites or nitrates are used.[12]

II. Brief Summary of Action Requested

Pursuant to 5 USC § 553(e), 9 CFR § 392, and 7 CFR § 1.28, the Petitioners request that the administrator of the FSIS take the following actions:

A. Amend 9 CFR § 317.17 and 9 CFR § 319.2 to:
   1) Prohibit the statements "No Nitrate or Nitrite Added" and "Uncured" on products that have been processed using any sources of nitrates or nitrites as a coloring, flavoring, curing agent, antimicrobial, or similar uses, reserving such claims only for meats that were not processed using nitrates or nitrites.
   2) Require a disclosure — "Nitrates or nitrites added" — on all products prepared with any sources of nitrates or nitrites as a coloring, flavoring, curing agent, antimicrobial, or similar uses, in lettering of easily readable style and at least one-half the size and prominence of the product name.
   3) Ensure that ingredients that are used as a source of nitrates or nitrites as a coloring, flavoring, curing agent, antimicrobial or similar uses be declared as such on the ingredients list, as follows: "[Ingredient] (Source of nitrate or nitrite for [use])." (For example: "Celery powder (Source of nitrates or nitrites for curing)"

B. Approve non-synthetic sources of nitrates and nitrites, such as celery powder, as curing agents under FSIS Directive 7120.1, and take steps to minimize levels of residual nitrites, nitrates, and nitrosamines in these products by setting maximum concentrations and requirements for the use of ascorbate or other cure accelerators when nitrites or nitrates are used.

Appendix A includes an example showing how a hypothetical beef frankfurter product processed with nitrates and nitrites from cultured celery juice might be labeled differently, should our petition request be granted.

III. Background

A. Nitrates and Nitrates Used in Curing Processed Meats

Processed meat is traditionally understood to include meat products that have been altered through smoking, salting, or the addition of chemical curing agents to preserve the meat and enhance its flavor.[13] Cured meats are a subset of processed meats that have been preserved

[12] We also question whether products prepared using non-synthetic sources of nitrates and nitrites meet the FSIS definition of "natural," since they are not minimally processed, but that issue falls outside the scope of this petition.
[13] *See, e.g.* Bouvard V, *et al.* Carcinogenicity of consumption of red and processed meat. *Lancet Oncol*. 2015;16(16):1599-1600. ("Processed meat refers to meat that has been transformed through salting, curing, fermentation, smoking, or other processes to enhance flavour or improve preservation.") Here and elsewhere in the petition, we define processed meat to include both meat and poultry.

using nitrates or nitrites, combined with salt and other ingredients.[14] While early curing processes relied on saltpeter, a form of nitrate, researchers in the late 1800's discovered that the nitrite, reduced from nitrate by bacteria, was the true curing agent.[15] FSIS regulations currently recognize four synthetic sources of nitrite as curing agents: sodium nitrite, potassium nitrite, sodium nitrate, and potassium nitrate.[16] The curing process enables preservation by inhibiting the growth of *Clostridium botulinum*, the bacteria responsible for botulism.[17] In addition to inhibiting bacterial growth, the curing process also gives meats a distinct color, texture, and flavor.[18]

B. Association Between Processed Meat and Colorectal Cancer

The International Agency for Research on Cancer (IARC), an agency of the WHO, has evaluated the carcinogenicity of nitrate and nitrite,[19] as well as consumption of processed meat.[20] IARC classifies ingested nitrate or nitrite under conditions that result in endogenous nitrosation—the formation of N-nitroso compounds in the body—as *probably carcinogenic to humans* (Group 2A), and classifies processed meat as *carcinogenic to humans* (Group 1).

In its overall evaluation of nitrate and nitrite, IARC noted that there is an active endogenous nitrogen cycle in humans that involves nitrate and nitrite, which are interconvertible in the body.[21] Ingested nitrate is excreted in the saliva and reduced to nitrite, mainly by oral bacteria.[22] Under acidic conditions in the stomach, nitrite then reacts readily with nitrosatable compounds, especially secondary amines and alkyl amides (present in meat and other foods), to generate N-nitroso compounds. These nitrosating conditions are enhanced following ingestion of additional nitrate, nitrite, or nitrosatable compounds. Some of the N-nitroso compounds that could be formed in humans under these conditions are known carcinogens.[23]

Mechanistic studies show that the formation of N-nitroso compounds is accelerated by the presence of nitrosatable compounds (found in meat) and inhibited by vitamin C and other antioxidants (found often in vegetables). The Working Group recognized that the cancer hazard from nitrate/nitrite ingestion cannot be determined without considering these other factors, which is why it defined the agent not as "ingested nitrate or nitrite" but as "ingested nitrate or nitrite under conditions that result in endogenous nitrosation."[24]

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[14] Sebranek JG, Bacus JN. Cured meat products without direct addition of nitrate or nitrite: what are the issues? *Meat Sci.* 2007;77:136-147.
[15] *Ibid.*
[16] US Department of Agriculture Food Safety and Inspection Service. Processing inspectors' calculations handbook. Revised 1995; 9 CFR § 424.21.
[17] Alahakoon AU, Jayasena DD, Ramachandra S, Jo C. Alternatives to nitrite in processed meat: up to date. *Trends Food Sci Tech*, 2015;45(1), 37-49.
[18] Sindelar JJ, Houser TA. Alternative Curing Systems. Tartè R, editor., ed. *Ingredients in meat products: properties, functionality and applications*. Springer Science, New York, NY; 2009:379-405.
[19] IARC Monograph on Ingested Nitrate and Nitrite.
[20] IARC Monograph on Processed Meat.
[21] IARC Monograph on Ingested Nitrate and Nitrite at 325.
[22] *Ibid* at 26.
[23] *Ibid* at 325.
[24] *Ibid* at 39.

According to the IARC monograph on processed meat, eight N-nitroso compounds have been detected in meat, and six have sufficient evidence of carcinogenicity in animals (the other two had inadequate evidence).[25] Five of these are listed as "reasonably anticipated to be a human carcinogen" by the U.S. Report on Carcinogens.[26] One of these, NDEA, is an extremely potent carcinogen.[27]

Furthermore, IARC found that there was *sufficient evidence* in humans that the consumption of processed meat causes colorectal cancer.[28] The IARC Working Group that evaluated processed meat was comprised of 22 scientists from 10 countries, and assessed over 800 epidemiological studies that investigated the association of cancer with consumption of red meat or processed meat in populations across several continents. In its evaluation, the Working Group gave the greatest consideration to prospective cohort studies conducted in the general population, and also considered high-quality population-based case-control studies.[29] A meta-analysis of colorectal cancer in nine cohort studies (many of which were also included in the IARC Working Group's analysis) reported a statistically significant dose–response relationship, with an 18% increased risk of colorectal cancer (95% CI 1.10–1.28) per 50 g per day of processed meat.[30]

The IARC Working Group considering the consumption of red meat and processed meat concluded that "[o]n the basis of the large amount of data and the consistent associations of colorectal cancer with consumption of processed meat across studies in different populations, which make chance, bias, and confounding unlikely as explanations, … there is sufficient evidence in human beings for the carcinogenicity of the consumption of processed meat."[31]

Separately, the Continuous Update Project, a joint project of the World Cancer Research Fund and American Institute for Cancer Research, reviewed the scientific evidence from 13 studies (32 publications) and concluded that "[c]onsumption of processed meat is a convincing

[25] IARC Monograph on Processed Meat at 417.
[26] U.S. Department of Health and Human Services. 14th Report on Carcinogens. *N-Nitrosamines: 15 listings.* November 3, 2016.
[27] Tanaka A, Hisanaga A, Inamasu T, Hirata M, Ishinishi N. A Comparison of the carcinogenicity of N-nitrosodiethylamine and N-nitrosodimethylamine after intratracheal instillation into Syrian golden hamsters. *Food Chem Toxicol.* 1988;26(10):847-850.
[28] IARC Monograph on Processed Meat at 497. The IARC defines processed meat as meat that has been transformed through salting, curing, fermentation, smoking, or other processes to enhance flavor or improve preservation.
[29] Bouvard V, *et al*. Carcinogenicity of consumption of red and processed meat. *Lancet Oncol*. 2015;16(16):1599-1600.
[30] Chan DS *et al*. Red and processed meat and colorectal cancer incidence: meta-analysis of prospective studies. *PLoS One*. 2011;6(6):e20456.
[31] Bouvard V, *et al*. Carcinogenicity of consumption of red and processed meat. *Lancet Oncol*. 2015;16(16):1599-1600.

cause of colorectal cancer."[32] Based on this evidence, its Cancer Prevention Recommendations advise people to "Eat little, if any, processed meat."[33]

The growing body of evidence on cancer risk has contributed to longstanding recommendations by public health experts to limit or avoid processed meat. These include recommendations by the World Health Organization,[34] American Cancer Society,[35] and American Heart Association,[36] which all advise limiting consumption of processed meats.

C. Steps to Mitigate Cancer Risk in Cured Meats

In the late 1960s and early 1970s, it became clear that use of nitrates and nitrites in meat could result in the formation of nitrosamines, a class of N-nitroso compounds, raising public health concerns. The processed meat industry responded to consumer and regulatory pressure by taking steps to limit the amount of residual nitrites in processed meats, for example by eliminating nitrates from most curing processes in order to achieve better control of residual nitrite concentrations.[37] Cure accelerators such as ascorbic acid can also reduce the formation of nitrosamines by increasing nitrite conversion to nitric oxide, the compound responsible for meat curing reactions, thereby lowering levels of nitrates and nitrites.[38]

As early as the 1920s, the FSIS set caps on the level of nitrites in meat to avoid toxic effects, as high concentrations of nitrates or nitrites can induce methemoglobinemia, a particular risk for infants and children (these upper limits range from 120 to 200ppm, depending on the product).[39] The agency also recognizes that some nitrosamines are carcinogenic in animals, and has adopted regulations to prohibit the use of nitrates in bacon in response to carcinogenicity concerns.[40] The same regulations also require the addition of vitamin C (ascorbate) or another

[32] World Cancer Research Fund/American Institute for Cancer Research. Continuous Update Project Expert Report 2018. Diet, nutrition, physical activity and colorectal cancer. https://www.wcrf.org/sites/default/files/Colorectal-cancer-report.pdf
[33] *Ibid* at 110.
[34] World Health Organization. Q&A on the carcinogenicity of the consumption of red meat and processed meat. October 2015. https://www.who.int/features/qa/cancer-red-meat/en/
[35] American Cancer Society. ACS guidelines for nutrition and physical activity. April 13, 2017 https://www.cancer.org/healthy/eat-healthy-get-active/acs-guidelines-nutrition-physical-activity-cancer-prevention/guidelines.html.
[36] Van Horn L, *et al.* Recommended dietary pattern to achieve adherence to the American Heart Association/American College of Cardiology (AHA/ACC) guidelines: a scientific statement from the American Heart Association. *Circulation.* 2016;134:e505-e529.
[37] Sebranek JG, Bacus JN, Cured meat products without direct addition of nitrate or nitrite: what are the issues? *Meat Sci.* 2007;77, 136-147.
[38] *Ibid.*
[39] These upper limits for nitrite are: Ham and whole muscle – 200 ppm, Sausage – 156 ppm, bacon – 120 ppm. The first such limit was set at 156 ppm in 1926. Nuñez De González MT, Osburn WN, Hardin MD, Longnecker M, Garg HK, Bryan NS, Keeton JT, Survey of residual nitrate and nitrite in conventional and organic/natural/uncured/indirectly cured meats available at retail in the United States. *J Ag Food Chem.* 2012;60(15), 3981-3990.
[40] Food Safety and Inspection Service. Bacon and food safety. Oct 29, 2013. https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/meat-preparation/bacon-and-food-safety/ct_index.

cure accelerator in bacon, to reduce the amount of free nitrites and minimize the formation of nitrosamines. In addition, because nitrosamines are more likely to form when bacon is cooked at high temperatures, the agency counsels consumers that "well-done or burned bacon is potentially more hazardous than less well-done bacon" and advises that cooking bacon in the microwave results in less nitrosamine formation than frying.[41]

D. History of Regulation of "Uncured" Meats

Consumers seeking to avoid the harmful health effects of processed meat have long sought out substitute products produced without the use of nitrates or nitrites. Consumer interest in "nitrite-free" and uncured products grew rapidly in the 1960s and 1970s as news stories broke about research on the carcinogenic potential of these products.[42]

In 1979, the USDA granted a petition by consumer and industry groups to allow traditionally cured products, such as bacon, corned beef, and frankfurters, to be prepared without the addition of nitrates or nitrites, provided that the statement "No Nitrate or Nitrite Added" was included on the label in prominent text adjacent to the product name to distinguish these products.[43] The agency initially proposed that such products be permitted to use the same names as the traditionally cured meats, but in its final rule also required that the modifier "Uncured" be added as part of the product name to further distinguish these products from their cured counterparts.[44] These labeling requirements are applied if the meat has a standard of identity that includes a curing agent, or is otherwise typically cured.[45]

While the FSIS permitted the new products, the agency also expressed a concern that meats prepared without nitrates or nitrites would better support the growth and toxin production of *Clostridium botulinum*, the bacterium responsible for botulism. The agency therefore required addition of the handling instruction "Not Preserved - Keep Refrigerated Below 40 °F. at All Times," unless the meat had been treated to be shelf-stable.[46] These and the other required labeling statements were intended both to "inform consumers of the nature of such products prepared without nitrates or nitrites" and also "to ensure that such products prepared without nitrates and nitrites are safely handled."[47]

Since 1996, producers of "Uncured" processed meat have also been required to comply with FSIS's Hazard Analysis and Critical Control Point (HACCP) regulations, which require

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[41] Food Safety and Inspection Service. Bacon and food safety. Oct 29, 2013. https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/meat-preparation/bacon-and-food-safety/ct_index. While helpful, these measures are insufficient to eliminate potential cancer concerns because, as noted above, N-nitroso compounds can still form in the body when nitrate or nitrite are ingested under conditions that result in endogenous nitrosation.

[42] Sebranek JG, Jackson-Davis AL, Myers KL, Lavieri NA. Beyond celery and starter culture: advances in natural/organic curing processes in the United States. *Meat Sci.*, 2012;92(3), 267-273.

[43] Food Safety and Quality Service. Nitrates and nitrites; final rule. 44 *Fed. Reg.* 48959 (August 21, 1979); *codified as* 9 CFR § 319.2; 9 CFR § 317.17.

[44] *Ibid.*

[45] *Ibid.*

[46] *Ibid.* The Petitioners have not requested herein that the "Keep Refrigerated" declaration be modified.

[47] *Ibid.*

manufacturers to identify and control potential food safety hazards that arise during production and handling.[48] These methods, along with the widespread availability of refrigeration in the United States, have been effective at controlling botulism risks from such products: cases of foodborne botulism are now exceptionally rare in the United States. Only 19 cases of foodborne botulism were reported to the Centers for Disease Control and Prevention in 2017, none of which were traced back to processed meats.[49]

E. Newer Products Using Non-Synthetic Sources of Nitrates and Nitrites

In recent decades, the market for processed meats has undergone further dramatic evolution. New methods have allowed meat manufacturers to derive consistent levels of nitrates and nitrites from non-synthetic sources, providing for a level of uniformity and stability not previously obtainable without the use of synthetic nitrates or nitrites. Some vegetables, such as celery, Swiss chard, spinach, radish, and lettuce, contain considerable amounts of nitrates, which can be used as sources of nitrites by combining them with a bacterial culture.[50] Celery powder is commonly used for this purpose, as it contains approximately 2.75% nitrates by weight[51] and may be combined with a bacterial starter culture to convert the nitrates to nitrites during the manufacturing process.[52]

These non-synthetic curing agents can be manufactured to achieve equivalent nitrite concentrations to those derived from sodium nitrite, giving them similar antimicrobial effects and equivalent protection against pathogens. For example, King *et al.* evaluated the antimicrobial impact of using either a combination of 50 ppm of nitrite and 500 ppm of ascorbate or a combination of $\geq$75 ppm of nitrite and $\geq$ 250 ppm of ascorbate, derived from either non-synthetic sources (cultured celery juice powder and cherry powder) or synthetic sources (sodium nitrite and sodium ascorbate) against *Clostridium perfringens*, a disease-causing bacteria, during the post-thermal processing cooling period of deli-style turkey breast. They found that equivalent concentrations of nitrites, regardless of the source, provided similar inhibition of *C. perfringens* during chilling and that ascorbate enhances the antimicrobial effect of nitrites on *C. perfringens* at concentrations commonly used in alternative cured meats.[53]

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[48] U.S. Department of Agriculture. Food Safety and Inspection Service. Pathogen reduction; hazard analysis and critical control point (HACCP) systems; final rule. 61 *Fed. Reg.* 38806 (July 25, 1996). https://www.fsis.usda.gov/wps/wcm/connect/e113b15a-837c-46af-8303-73f7c11fb666/93-016F.pdf?MOD=AJPERES.

[49] Centers for Disease Control and Prevention. National botulism surveillance summary, 2017. https://www.cdc.gov/botulism/surv/2017/index.html.

[50] Alahakoon AU, Jayasena DD, Ramachandra S, & Jo C. Alternatives to nitrite in processed meat: up to date. *Trends Food Sci Tech*. 2015;45(1), 37-49; Sebranek JG, Jackson-Davis AL, Myers KL, Lavieri NA. Beyond celery and starter culture: advances in natural/organic curing processes in the United States. *Meat Sci.* 2012;92(3), 267-273.

[51] Sindelar JJ et al. Effects of varying levels of vegetable juice powder and incubation time on color, residual nitrate and nitrite, pigment, pH, and trained sensory attributes of ready-to-eat uncured ham. *J Food Sci.* 2007;72(6):S388-S395.

[52] Sebranek JG, Jackson-Davis AL, Myers KL, Lavieri NA. Beyond celery and starter culture: advances in natural/organic curing processes in the United States. *Meat Sci.*, 2012;92(3), 267-273.

[53] King AM, Glass KA, Milkowski AL, Sindelar JJ, Comparison of the effect of curing ingredients derived from purified and natural sources on inhibition of Clostridium perfringens outgrowth during cooling of deli-style turkey breast. *J Food Prot*. 2015;78(8):1527-1535.

Similarly, Golden *et al.* found that fermentation-derived nitrites from vegetable sources had similar impacts on inhibiting *Listeria monocytogenes* in deli-style turkey breast compared to nitrites from synthetic sources when equivalent concentrations were used.[54] Other studies found similar results for ham cured with "natural" nitrites combined with one of two selected natural antimicrobials (a blend of cherry, lemon, and vinegar powder or a cultured sugar-vinegar blend) to control *Listeria monocytogenes*[55] and for vacuum-packaged turkey bologna when celery juice powder and cherry juice powder were combined to control *Staphylococcus aureus, Salmonella*, and *Listeria monocytogenes.*[56]

However, sufficient concentrations may not be used consistently in products cured with celery powder and other non-synthetic sources of nitrates and nitrites. Jackson *et al.* studied the growth of *C. perfringens* in commercial brands of hams and bacon that had been manufactured using sea salt or celery juice as ingredients that were potential sources of nitrite.[57] The researchers observed reduced inhibition of bacterial growth in many of the brands when compared with a sodium nitrite-added control, suggesting that such meats may not always utilize adequate concentrations of nitrite to achieve the same preservative effects as products processed with sodium nitrite as a curing agent.

Meat processed with non-synthetic sources of nitrates or nitrites like celery powder can appear similar in taste and color to meat products cured with synthetic sources.[58] Celery powder imparts no off flavors to the final product[59] and has very little pigment, so the color of the final product is also similar to that of products cured with synthetic sources.[60] Sindelar *et al*. found that ham processed with vegetable juice powder and a starter culture could produce similar aroma, flavor, color, and firmness to ham conventionally cured with sodium nitrite.[61] Terns *et al.* likewise compared a combination of vegetable juice powder, cherry powder, and starter culture with sodium nitrite (156 ppm) in emulsified cooked sausages and found no differences in

[54] Golden MC, McDonnell LM, Sheehan V, Sindelar JJ, Glass KA. Inhibition of Listeria monocytogenes in deli-style turkey breast formulated with cultured celery powder and/or cultured sugar-vinegar blend during storage at 4°C. *J Food Prot.* 2014;77(10):1787-1793.
[55] Sullivan GA, *et al.* Inhibition of Listeria monocytogenes using natural antimicrobials in no-nitrate-or-nitrite-added ham. *J Food Prot.* 2012;75(6):1071-1076.
[56] Djeri N, Williams SK. Celery Juice powder used as nitrite substitute in sliced vacuum-packaged turkey bologna stored at 4C for 10 weeks under retail display light. *J Food Qual.* 2014;37(5):361-370.
[57] Jackson AL, Sullivan GA, Kulchaiyawat C, Sebranek JG, Dickson JS. Survival and growth of Clostridium perfringens in commercial no-nitrate-or-nitrite-added (natural and organic) frankfurters, hams, and bacon. *J Food Prot.* 2011;74(3):410-415.
[58] Sebranek JG, Bacus JN, Cured meat products without direct addition of nitrate or nitrite: what are the issues? *Meat Sci.* 2007;77:136-147.
[59] *Ibid.*
[60] Alahakoon AU, Jayasena DD, Ramachandra S, & Jo C. Alternatives to nitrite in processed meat: up to date. *Trends Food Sci Tech*, 2015;45(1):37-49.
[61] Sindelar JJ et al. Effects of varying levels of vegetable juice powder and incubation time on color, residual nitrate and nitrite, pigment, pH, and trained sensory attributes of ready-to-eat uncured ham. *J Food Sci.* 2007;72(6):S388-S395.

consumer preferences for aroma, internal color, texture, and overall acceptability.[62] The concentrations of nitrite needed to achieve appropriate coloring and flavoring effects are lower than the concentrations needed to achieve curing: as little as 50 ppm of ingoing sodium nitrite has been established as sufficient to develop the color of cured meat.[63] Similar concentrations of ingoing nitrite have also been reported to effectively reduce oxidation and control off-flavors in meat.[64]

Meat processed with non-synthetic and synthetic sources of nitrates and nitrites is also similar in terms of levels of residual nitrate and nitrite that persist in the product at the point of sale. In the past year, Consumer Reports tested deli meat to determine and compare the levels of nitrates and nitrites in pre-packaged deli meat samples labeled "Uncured" or "No Nitrate or Nitrite Added," ("uncured" samples) with samples labeled "cured" or with sodium nitrite listed as an ingredient ("cured" samples).[65] Consumer Reports found that nitrite levels in the "cured" deli meat samples (with sodium nitrite listed as an ingredient) were not statistically significantly different from "uncured" samples ($F=2.46$, $p=0.127$). On average, the nitrite levels were 12 µg/g in "cured" meat and 9 µg/g in "uncured" meat (per gram of meat). Further, the average nitrate levels in the "cured" and "uncured" deli meat samples were comparable at 5 µg/g and 3 µg/g, respectively. Although the difference in nitrate levels between "cured" and "uncured" meats was statistically significant ($F=4.84$, $p=0.036$), the overall results suggest that there is no practical difference in nitrate and nitrite levels between deli meats cured with synthetic and non-synthetic sources of nitrates or nitrites.

Other studies found similar levels of residual nitrates and nitrites in processed meats prepared with synthetic and non-synthetic nitrates or nitrites. A study of "uncured/no-nitrate/nitrite added" bacon, hams, and frankfurters by Sindelar *et al.* in 2007 compared four commercial brands of "uncured" products with one brand of cured products and found residual nitrite (1.4 - 29.7 ppm) and nitrate (6.8 - 44.4 ppm) in all brands, with the exception of nitrite in bacon from two brands, which had concentrations of <1ppm.[66] The single "cured" product had significantly higher nitrite levels than the other four brands. A study by Nuñez De González *et al*. in 2012 measured nitrate and nitrite concentrations in six types of cured meats purchased in five US cities. Researchers in that study found that in all cases except one (cured cooked sausage in New York City), there were no differences in the mean nitrite concentrations of

[62] Terns MJ, Milkowski AL, Rankin SA, Sindelar JJ. Determining the impact of varying levels of cherry powder and starter culture on quality and sensory attributes of indirectly cured, emulsified cooked sausages. *Meat Sci*. 2011 Jun;88(2):311-318.
[63] National Research Council. Alternatives to the current use of nitrite in foods: Part 2 of a 2-part study. Washington, DC: The National Academies Press. 1982.
[64] MacDonald B, Gray JI, Stanley DW, Usborne WR. Role of nitrite in cured meat flavor: sensory analysis. *J Food Sci.* 1980a;45:885–888, 904; MacDonald B, Gray JI, Kakuda Y, Lee ML. Role of nitrite in cured meat flavor: chemical analysis. *J Food Sci*. 1980b;45:889–892. MacDonald B, Gray JI, Gibbins LN. Role of nitrite in cured meat flavor: antioxidant role of nitrite. *J Food Sci*. 1980c;45:893–897.
[65] *See* Appendix B for the detailed methodology and results of these tests.
[66] Sindelar JJ, Cordray JC, Olson DG, Sebranek JG, Love JA. Investigating quality attributes and consumer acceptance of uncured, no-nitrate/nitrite-added commercial hams, bacons, and frankfurters. *J Food Sci*. 2007 Oct;72(8):S551-S559.

"conventional" and "organic/natural/uncured/indirectly cured" meats.[67] A study by Redfield and Sullivan in 2015 found that deli-style turkey breast treated with comparable levels of nitrites from sodium nitrite or celery powder had similar residual nitrite concentrations, except when relatively high levels of nitrite were used.[68] Finally, a study by Jackson *et al.* in 2011 tested hot dogs, hams, and bacon that were conventionally cured with sodium nitrite or naturally cured with celery juice powder or sea salt.[69] The researchers found varying levels of residual nitrate and nitrite present in all conventionally cured and "naturally" cured samples. For example, residual nitrite concentrations ranged from 3.34 to 65.69 ppm in naturally cured hot dogs (8 brands) and from 5.73 to 6.83 ppm in conventionally cured hot dogs (2 brands).

While nitrate and nitrite residues were low, with nitrite residues falling well within USDA limits established to prevent toxic reactions (120 – 200 ppm), these results suggest that all meats processed with nitrates or nitrites, regardless of source, can contain residual levels of nitrates and nitrites. Studies have also generally found similar levels of residues between synthetic sources and non-synthetic sources of nitrates or nitrites, with relatively few statistically significant differences detected. However, due to small sample size and variability of the products, these are insufficient to rule out the possibility that meats cured with non-synthetic sources have levels of nitrates or nitrites that are higher or lower than products made from synthetic sources. It is possible that lower concentrations of nitrate and nitrite in non-synthetic sources like celery powder could lead to lower residues. However, it is also possible that higher levels may be present in specific products due to greater variability in the naturally-sourced ingredients, particularly if chemical cure accelerators are not used to reduce residues.[70]

Given the similarities in antimicrobial properties, color, flavor, and nitrate and nitrite residues between deli meats cured with synthetic and non-synthetic sources of nitrates or nitrites, "uncured" products have the potential to be indistinguishable from "cured" products in all but the label. Most importantly, the fact that nitrates and nitrites are being used as inputs and that residual levels are present in products labeled as "No Nitrate or Nitrite Added" and "Uncured" is potentially confusing and misleading for consumers seeking to avoid nitrates and nitrites in processed meats.

F. Current Regulation of Products Prepared with Non-Synthetic Nitrates and Nitrites

The FSIS has taken several actions to modify its regulations in recognition of the fact that consistent levels of nitrates and nitrites may now be derived from non-synthetic sources like

[67] Nuñez De González MT, Osburn WN, Hardin MD, Longnecker M, Garg HK, Bryan NS, Keeton JT, Survey of residual nitrate and nitrite in conventional and organic/natural/uncured/indirectly cured meats available at retail in the United States. *J Ag Food Chem.* 2012;60(15), 3981-3990.
[68] Redfield A, Sullivan G, Effects of conventional and alternative curing methods on processed turkey quality traits. *Poultry Sci*, 2015;94(12), 3005-3014.
[69] Jackson AL, Sullivan GA, Kulchaiyawat C, Sebranek JG, Dickson JS. Survival and growth of Clostridium perfringens in commercial no-nitrate-or-nitrite-added (natural and organic) frankfurters, hams, and bacon. *J Food Prot.* 2011;74(3):410-416.
[70] Sebranek JG, Bacus JN, Cured meat products without direct addition of nitrate or nitrite: what are the issues? *Meat Sci.* 2007;77:136-147.

celery powder. Yet these actions are not fully adequate to address consumer deception and ensure that nitrate and nitrite levels are minimized in such products.

Recognizing that the statement "No Nitrate or Nitrite Added" is misleading when applied to products processed with non-synthetic nitrates and nitrites, the agency currently requires the statement to be qualified by the words "except for those naturally occurring in [name of source of nitrate/nitrite]. "[71] This statement is required so that products are not considered misbranded as false and misleading.[72] But this disclosure simply leads to confusion, as it implies that nitrates and nitrites are both present and not present. The claims may also leave consumers with the false impression that the levels of nitrates or nitrites from non-synthetic sources such as celery powder are negligible compared to nitrates or nitrites from synthetic sources. Furthermore, unlike the "No Nitrate or Nitrite Added" statement, which must appear "adjacent to the product name in lettering of easily readable style and at least one-half the size and prominence of the product name," the agency permits the "except those naturally occurring…" qualifier to be set off in smaller, less prominent text from the "No Nitrate or Nitrite Added" statement by use of an asterisk. *See fig* 1.

[71] US Department of Agriculture Food Safety and Inspection Service. Part 1 of 3: Use of celery powder and other natural sources of nitrite as curing agents, antimicrobials or flavorings. Published April 5, 2018. https://askfsis.custhelp.com/app/answers/detail/a_id/2029/~/part-1-of-3%3A-use-of-celery-powder-and-other-natural-sources-of-nitrite-as

[72] *Ibid.*

Figure 1: The statement "No Nitrates or Nitrites Added" is far more prominently displayed than the qualifier "Except those Naturally Occurring in Sea Salt and Cultured Celery Juice" on this product label.

Similar claims have also appeared in television and internet advertising, where the asterisk and disclaimer may be even less noticeable. One such advertisement for Oscar Mayer hot dogs included a prominent image of the chemical formulas for nitrate and nitrite being crossed out, then exploding off a chalk board, with narration stating "We removed added nitrates and nitrites." A barely-noticeable disclaimer, "Except those naturally occurring in celery juice" flashes only briefly on the screen in small text.[73] *See fig* 2. While not regulated by the FSIS, such advertising uses language approved by the agency. This language misleads consumers regarding

[73] iSpot.tv. Oscar Mayer TV commercial, 'big changes.' 2017. https://www.ispot.tv/ad/wAbR/oscar-mayer-big-changes.

the content of FSIS-regulated products and should be prohibited by both FSIS and the Federal Trade Commission as the agency responsible for advertising claims.

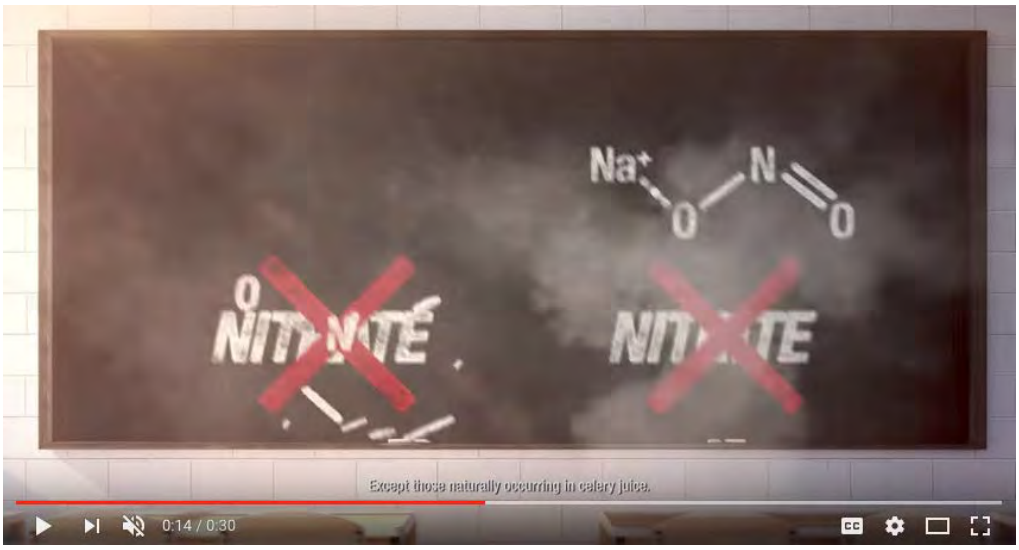

Figure 2: The disclaimer "except those naturally occurring …" is even harder to read when flashed briefly onscreen during video advertising.

In addition to making these adjustments to the labeling, the FSIS has also considered the preservative properties of non-synthetic ingredients by approving "Natural sources of nitrates and nitrites" as "antimicrobials" under FSIS Directive 7120.1, Safe and Suitable Ingredients Used in the Production of Meat, Poultry, and Egg Products.[74] This approval allows nitrates and nitrites to be added from any natural source, provided it is formulated at a rate of a minimum of 75 ppm of nitrite and minimum of 500 ppm of ascorbate or at a rate of a minimum of 100 ppm of nitrite and a minimum of 250 ppm of ascorbate from natural sources by weight of the finished food product.[75]

The recognition of natural sources of nitrates and nitrites as curing agents allows FSIS-regulated establishments to utilize these ingredients where a preservative agent is required under their HACCP plans to control pathogen growth. Yet because the changes relate only to the use of these ingredients as "antimicrobials" and not "curing agents," the FSIS continues to require "Uncured" and "No Nitrate or Nitrite Added" statements even on the labels of products meeting these specifications.[76]

[74] US Department of Agriculture. Food Safety and Inspection Service. Safe and suitable ingredients. June 2019. https://www.fsis.usda.gov/wps/wcm/connect/ce40e7ae-3d55-419e-9c68-a1b6fefcd4de/7120.1_Table_2.pdf?MOD=AJPERES.
[75] *Ibid.*
[76] US Department of Agriculture Food Safety and Inspection Service. Part 1 of 3: Use of celery powder and other natural sources of nitrite as curing agents, antimicrobials or flavorings. Published April 5, 2018. https://askfsis.custhelp.com/app/answers/detail/a_id/2029/~/part-1-of-3%3A-use-of-celery-powder-and-other-natural-sources-of-nitrite-as.

The agency has taken little public action to regulate the use of non-synthetic sources of nitrates and nitrites as colorings or flavorings. Products prepared with non-synthetic sources of nitrates and nitrites as a color or flavoring, but not officially as curing agents, are labeled as "Uncured" and/or "No Nitrate or Nitrite Added,"[77] and the FSIS does not regulate the concentrations of nitrate and nitrite in such cases, meaning the nitrate and nitrite levels in such products may be lower, similar or even higher than the levels of nitrates and nitrites from synthetic sources. The FSIS also does not require the use of a cure accelerator in cases where nitrates and nitrites are added as a color or flavor. Finally, some sources of nitrates and nitrites, including celery powder, need not be declared specifically in the ingredient list when used as a flavoring, and may instead be listed instead only as "natural flavoring."[78]

IV. Full Statement of the Requested Action and Supporting Data

While the USDA has made some efforts to update its regulations in response to changing industry practices, the current requirements still mandate labeling that can mislead consumers by requiring or allowing the statements "Uncured" and "No Nitrate or Nitrite Added" even on products that were treated with non-synthetic sources of nitrates and nitrites, such as celery powder.

Pursuant to 9 CFR § 392.3, the Petitioners provide the following full statement of the actions requested to address this problem, including the exact wording and citation of the existing regulation and the proposed regulation or amendment requested, as well as the factual and legal basis on which we rely for the action requested.

A. Amendments to 9 CFR § 317.17 and 9 CFR § 319.2

Requested Changes:

1) Prohibit the statements "No Nitrate or Nitrite Added" and "Uncured" on products that have been processed using any sources of nitrate or nitrite as a coloring, flavoring, curing agent, antimicrobial, or similar uses, reserving such claims only for meats that have not been processed using nitrate or nitrite.
2) Require a disclosure — "Nitrates or nitrites added" — on all products prepared with any source of nitrate or nitrite as a coloring, flavoring, curing agent, antimicrobial, or similar uses, in lettering of easily readable style and at least one-half the size and prominence of the product name.
3) Ensure that ingredients that are used as a source of nitrate or nitrite as a coloring, flavoring, curing agent, antimicrobial or similar uses be declared as such on the ingredients list, as follows: "[Ingredient] (Source of nitrate or nitrite for [use])," *Example:* "Celery powder (source of nitrate or nitrite for curing)"

[77] *Ibid.*
[78] 9 CFR 317.2(f).

Rationale for requested changes:

As described above, meats prepared with non-synthetic sources of nitrates and nitrites, such as celery powder, can be identical in all material respects to meat processed with sodium or potassium nitrate and nitrite, yet their labeling continues to misrepresent such products as materially different, leading to consumer deception.

These requirements mislead consumers, particularly those who are seeking to avoid or minimize the cancer risk associated with consuming processed meat by avoiding meat with added nitrates or nitrites. As noted above, the nitrates and nitrites added to processed meats likely contribute to the cancer risk associated with these products, because these ingredients can trigger the formation of N-nitroso compounds in the food or in the body, some of which are known cancer-causing agents.

Many Americans today seek to purchase meats that are prepared without the use of nitrates and nitrites. Consumer Reports conducted a nationally representative telephone survey of 1,000 U.S. adults in April 2019. This survey asked Americans who eat deli meats if they typically try to buy ones labeled as "no nitrates added." Forty-six percent say they look for this label claim when purchasing deli meats.

Awareness of cancer risk likely plays a role in this preference: nearly half (45%) of respondents say they are aware of the WHO finding that processed meats can increase the risk of cancer. These individuals are more likely to try to buy deli meats labeled as "no nitrates added" (57% compared to 38% among those unaware of the WHO finding). Similarly, 16% of Americans who said that they knew about the WHO finding that processed meats can increase risk of cancer rarely to never eat deli meats (less than five times a year), compared to 10% of those who did not know about this finding.

The current FSIS approach of requiring the disclaimer "Except those naturally occurring in [name of source of nitrate/nitrite]" creates consumer confusion. The April 2019 Consumer Reports telephone survey asked Americans to describe their feelings about the claim "No Nitrates or Nitrites Added except those added that are naturally occurring." *See table* 1.

Deli meats or cold cuts that are processed using celery juice or celery powder, which contain non-synthetic nitrates, are labeled as "NO NITRATES OR NITRITES ADDED except those added that are naturally occurring." Which of the following statements BEST describes your feelings about this label claim?	**Total % of Respondents** *(N = 984)*
If you saw this label, you would be confused about if or what type of nitrates are added?	42
Labels SHOULD be allowed to say this because no synthetic nitrates are added	40
Labels SHOULD NOT be allowed to say this because, regardless of the source, some nitrates are added	11
Don't know[79]	7

Table 1: Americans describe their feelings about current "No Nitrates…" labeling claims.

Almost half of Americans say they would either be "confused about if or what type of nitrates are added" (42 percent) or they don't know (7 percent). And an additional 11 percent think this label claim should not be used "because, regardless of the source, some nitrates are added." Thus, a majority of respondents were either confused by, or did not approve of, the current label. While four in 10 felt that the statement should be allowed, the telephone interview format did not allow participants to view a product label and see text size and prominence. The survey also did not assess how respondents would react if made aware that the levels of residual nitrate and nitrite were similar regardless of the source of nitrate or nitrite. We do not know how such additional information might have affected the results.

Amending the ingredient list to state "[Ingredient] (Source of nitrate or nitrite for [use])" will ensure that celery powder and other sources of nitrite/nitrate are always declared in the ingredients list and help consumers accurately identify the products as sources of nitrates and nitrites, as well as understand the reason for their use.

The disclosure "Nitrates or Nitrites Added" will allow consumers to more accurately identify processed meat that has been prepared with nitrates and nitrites and distinguish these products from those that are truly prepared without such ingredients. We propose requiring this disclosure in all cases where ingredients that contain nitrites or nitrates have been added to products for any purpose. USDA may also consider waiving this requirement in cases where manufacturers can demonstrate that residues have been decreased to non-detectable levels in the final product using the most accurate and sensitive test methods.

The disclosure is particularly needed to correct years of labeling and advertising using the misleading "No Nitrate or Nitrite Added" claim on products prepared with substantial concentrations of nitrate and nitrite from vegetable sources. In addition to helping consumers select products that are free of residual nitrate and nitrite, the proposed changes would be helpful to consumers who are seeking to reduce their exposure to nitrates and nitrites by cooking

[79] "Don't know" was not a response offered to survey respondents. Nevertheless, seven percent indicated that their response was that they did not know the answer, and these responses were captured and reported here.

processed meats at lower temperatures, and by microwaving rather than frying bacon, a method counseled by the FSIS to reduce the formation of N-nitroso compounds in the meat.[80] Accurately identifying processed meats that contain nitrates and nitrites can help these consumers understand which products are more likely to form N-nitroso compounds during cooking or in the body, so that they may apply safer cooking techniques to reduce them.

Finally, eliminating the term "Uncured" from processed meat except when it contains no added nitrates or nitrites *from any source* will help to avoid consumer deception, and is consistent with the intent of the agency's 1979 rule. The agency stated in its 1979 Final Rule that "[t]he term 'Uncured' in the labeling of a meat food product is commonly understood to mean that the product does not contain nitrates or nitrites, and that the product was not preserved with salt."[81] Because "Uncured" implies that the product contains no nitrates or nitrites, the term is misleading on products that contain a source of these compounds.

Data from the 2019 Consumer Reports survey indicate that the term "Uncured" is not material to many consumers today. More than half of deli meat consumers (57 percent) say they are equally likely to buy "uncured" or "cured" products, and nearly half (49 percent) say that deli meat labeled as cured and deli meat labeled as uncured are "equally healthy or unhealthy." Requiring the term "Uncured" on processed meat is unnecessary for these consumers.

However, a notable proportion of consumers (15 percent) believe that uncured products are healthier than cured products, while another substantial proportion (28 percent) believe that cured products are healthier. Similarly, 10 percent of deli meat consumers say that they buy more labeled "uncured" than "cured" and 24 percent say they buy more labeled as "cured" than "uncured." These consumers could be helped by reserving the use of the term "Uncured" only for meat that is processed without nitrate or nitrite from any source, as such products will be truly free of residual nitrate or nitrite.

Importantly, we do not believe that these changes will increase food safety risks for consumers. The original rationale for these labeling requirements is no longer present: it is no clear that meat can be prepared with non-synthetic sources of nitrate and nitrite, such as celery powder, at the levels needed to achieve antimicrobial and curing effects. This allows such ingredients to be used in cases where antimicrobial effects are needed to control biological hazards in compliance with FSIS's Hazard Analysis and Critical Control Point (HACCP) Regulations. As noted above, these measures have been highly effective at controlling the incidence of botulism, the original food safety concern informing the FSIS's adoption of distinct labeling requirements for such products. In addition, the widespread availability of refrigeration further minimizes these risks. Finally, such products will still be labeled with appropriate handling and storage instructions, including by providing a "Keep Refrigerated" warning on products that are not shelf-stable.[82]

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[80] Food Safety and Inspection Service. Bacon and food safety. Oct 29, 2013. https://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/meat-preparation/bacon-and-food-safety/ct_index.

[81] Food Safety and Quality Service. Nitrates and nitrites; final rule. 44 *Fed. Reg.* 48959 (August 21, 1979); *codified as* 9 CFR § 319.2; 9 CFR § 317.17.

[82] 9 CFR § 317.17.

B. Approval as a curing agent and steps to minimize levels of residual nitrite, nitrate, and nitrosamines.

Requested Changes:

Approve novel sources of nitrates and nitrites as curing agents under FSIS Directive 7120.1, and take steps to minimize levels of residual nitrite, nitrate, and nitrosamines in these products by setting maximum concentrations and requirements for the use of ascorbate or other cure accelerators when nitrites or nitrates are used.

Rationale for requested changes:

As noted, the FSIS has already approved "a combination of natural source of nitrite and natural source of ascorbate" as an antimicrobial. Agency officials informed the petitioners that in order to similarly approve these ingredients as a curing agent, the agency would rely on studies demonstrating that these non-synthetic sources of nitrates and nitrites can also achieve the coloring and flavoring effects of curing agents. As noted above, studies have demonstrated that products prepared with non-synthetic sources of nitrates and nitrites resemble cured meat color and flavor. For example, Terns *et al.* found no differences in consumer preferences between conventionally and alternatively cured sausages for aroma, internal color, texture, and overall acceptability.[83] Sindelar *et al.* found similar results for conventionally and alternatively cured hams in flavor, aroma, and firmness.[84]

We therefore request that the agency approve nitrates and nitrites from any source as a curing agent, provided the product meets levels necessary to demonstrate antimicrobial, coloring, and flavoring effects, which the agency has already recognized occur when ingredients are added at to achieve a minimum of 75 ppm of nitrite and a minimum of 500 ppm of ascorbate or a minimum of 100 ppm of nitrite from and minimum 250 ppm of ascorbate from natural sources by weight of the finished food product.

Finally, we also request that the agency take steps to minimize the potential risk to consumers from the use of non-synthetic ingredients containing nitrates and nitrites by setting maximum concentrations of nitrate and nitrite for such uses. We generally request that the agency adopt the maximum limits for nitrite in bacon and other cured products already employed in 9 CFR 424.22 and 9 CFR 424.21(c) for curing agents, applying these standards universally to all sources of nitrate or nitrite, regardless of whether they are intended for use as a color, flavor, antimicrobial, or curing agent. Similarly, we ask that the agency to develop requirements for the use of ascorbate or other cure accelerators when nitrites or nitrates are used.

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[83] Terns MJ, Milkowski AL, Rankin SA, Sindelar JJ. Determining the impact of varying levels of cherry powder and starter culture on quality and sensory attributes of indirectly cured, emulsified cooked sausages. *Meat Sci.* 2011 Jun;88(2):311-318.

[84] Sindelar JJ *et al.* Effects of varying levels of vegetable juice powder and incubation time on color, residual nitrate and nitrite, pigment, pH, and trained sensory attributes of ready-to-eat uncured ham. *J Food Sci.* 2007; 72(6): S388-S395.

V. Conclusion

For the foregoing reasons, the Petitioners urge the FSIS to act swiftly to clarify the labeling of processed meats by amending its regulations to stop requiring the statements "Uncured," and/or "No Nitrate or Nitrite Added" on meats processed using non-synthetic sources of nitrate and nitrite, such as celery powder or sea salt. These declarations are misleading to consumers and should be prohibited on meats processed using nitrates or nitrites, regardless of source. Instead, we ask that the agency require a clear front-of-package declaration ("Nitrates or Nitrites Added) and ingredient labeling ("[Ingredient] (source of nitrate or nitrite for [use])") whenever nitrates and nitrites from any source are used in meats as a color, flavor, antimicrobial, or curing agent. Finally, we urge the agency to take additional steps to minimize levels of residual nitrate and nitrite in these products.

We look forward to your timely response, questions related to this petition may be directed to Sarah Sorscher, Deputy Director of Regulatory Affairs at Center for Science in the Public Interest, ssorscher@cspinet.org (202) 777-8397, or Jean Halloran, jhalloran@consumer.org (914) 378-2457 or Charlotte Vallaeys, charlotte.vallaeys@consumer.org (914) 378-2498.

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Appendix A


CURRENT LABEL EXAMPLE
CLIFFORDS
FAMOUS
ALL NATURAL*
UNCURED
BEEF FRANKS
NO NITRATES OR NITRITES ADDED**
Nutrition Facts
** Except those naturally occurring in cultured celery juice. Fully cooked. Once opened use within 7 days
* No artificial ingredients and minimally processed
Not preserved - Keep refrigerated at or below 40°F at all times
Ingredients: beef, water, contains 2% of less of salt, sugar, natural flavoring, dehydrated garlic yeast extract, vinegar, cultured celery juice, paprika
Remove "Uncured"
Remove "No Nitrates/Nitrites" and related messaging
REQUESTED LABEL EXAMPLE
CLIFFORDS
FAMOUS
ALL NATURAL*
BEEF FRANKS
Nitrates or nitrites added.
Nutrition Facts
Fully cooked. Once opened use within 7 days
* No artificial ingredients and minimally processed
Not preserved - Keep refrigerated at or below 40°F at all times
Ingredients: beef, water, contains 2% of less of salt, sugar, natural flavoring, dehydrated garlic, yeast extract, vinegar, cultured celery juice (source of nitrate or nitrite for curing), paprika
Add "(source of nitrate or nitrite for curing)"
Add "Nitrates or nitrites added" (at least half size of "Beef Franks")

Appendix B

Consumer Reports Product Testing and Survey Methods and Results

Consumer Reports (CR) Methodology for Testing Pre-packaged Deli Meats for Nitrates and Nitrites

The objective of this study was to determine and compare the levels of nitrates and nitrites in pre-packaged deli meat models labeled “uncured” and/or “no nitrates or nitrites added” with models labeled “cured” or with sodium nitrite as an ingredient. We tested 30 samples (three unique samples each of 10 models) of deli meat labeled “cured” or with sodium nitrite as an ingredient, and 61 samples (2-3 unique samples each of 21 models) of deli meat labeled “uncured” and/or “no nitrates or nitrites added”. The products tested were selected on the basis of a shopper survey conducted by CR staff of stores in Yonkers, N.Y., and the surrounding area between May and September of 2018. Based on types of products found to be available in this survey, we purchased popular models of pre-packaged deli meat, including roast beef, chicken, ham, turkey, and salami, from supermarkets and retail outlets in the New York and New Jersey area, online, and the state of California in November and December 2018. It was harder to find ‘cured’ deli meats than ‘uncured’; however, we were able to identify enough ‘cured’ models to set a baseline or reference points to compare against nitrate and nitrite levels in ‘uncured’ models.

Consumer Reports conducts its testing to provide consumers with advice to inform their decision-making. We do not perform compliance or regulatory testing, and our results are not meant to be viewed as such.

Sample Preparation
The meat samples were transferred from their original packaging into reclosable zipper food storage bags, blind coded to preserve their identities, and shipped overnight to an independent, accredited laboratory for testing.

Testing
All samples were prepared and analyzed in accordance with the most up-to-date industry standards and test methodologies. The testing conformed to the quality control criteria and performance requirements set in the cited official methods, as well as to those in ISO 17025. See attached Table of test results and analytical methods.

Data Analysis
We classified a deli meat model as “cured” if the label contained the word cured or the label listed sodium nitrite as an ingredient, and as “uncured” if the label made a claim of “uncured” and/or “no nitrates or nitrites added” and did not list sodium nitrite as an ingredient. Figure 1 shows a boxplot of the nitrite levels for the 30 “cured” and 61 “uncured” deli meats. The nitrite measurements ranged from below the limit of reporting (1 ug/g or ppm) to a high of 37 ppm for the “cured” samples and from below the limit of reporting to a high of 30 ppm for the “uncured” samples. While the two largest nitrite levels are from “cured” samples, overall there is little difference between the two groups. The nitrite data were analyzed with a linear mixed model using SAS PROC MIXED. The results showed no statistically significant difference in nitrite concentration between “cured” and “uncured” deli meats ($F=2.46$, $p=0.127$). Figure 2 shows a boxplot of the nitrate levels. The nitrate measurements ranged from below the limit of reporting (1 ug/g or ppm) to a high of 15 ppm for the “cured” samples and from below the limit of reporting

to a high of 11 ppm for the “uncured” samples. In spite of the single large outlier in the “cured” data, the model with the highest average concentration of nitrate was “uncured” and both the “cured” and “uncured” types had models below the limit of reporting. The results showed a statistically significant difference in nitrate concentration between “cured” and “uncured” deli meats (F=4.84, p=0.036). Despite the moderate statistical significance we considered the curing status to have little predictive value due to the complete overlap of the data. We also do not believe the measured difference in nitrate level between the ‘cured’ and ‘uncured’ deli meats has any significance for nutrition or safety.

FIGURE 1. Nitrite vs. Curing Status

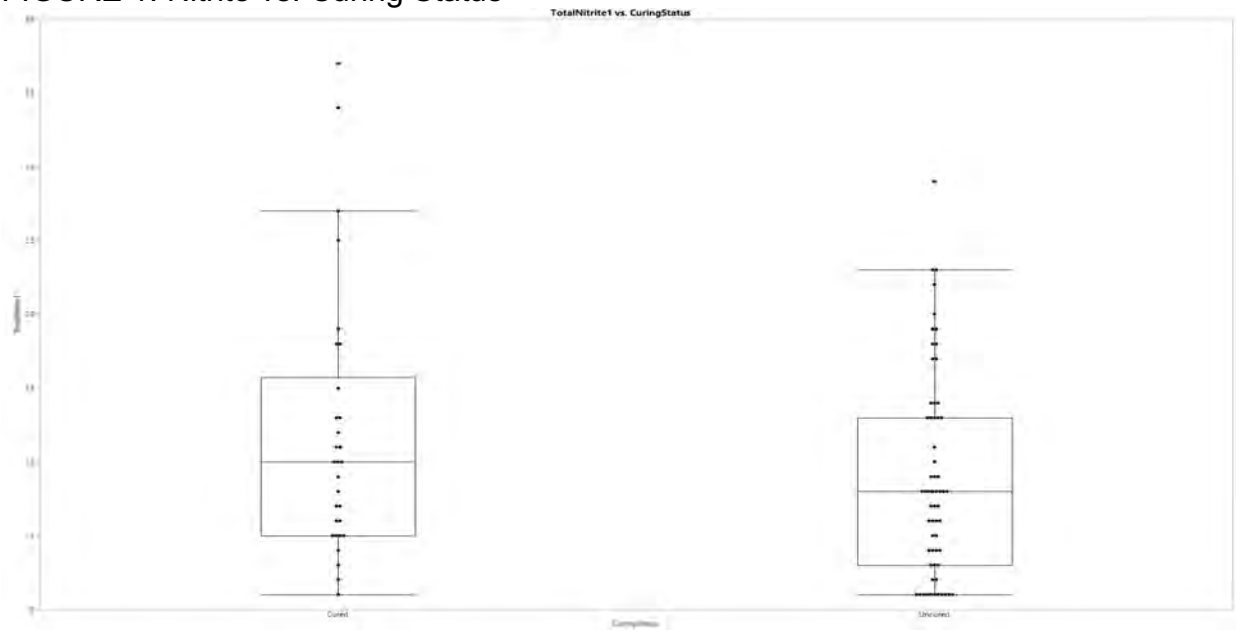
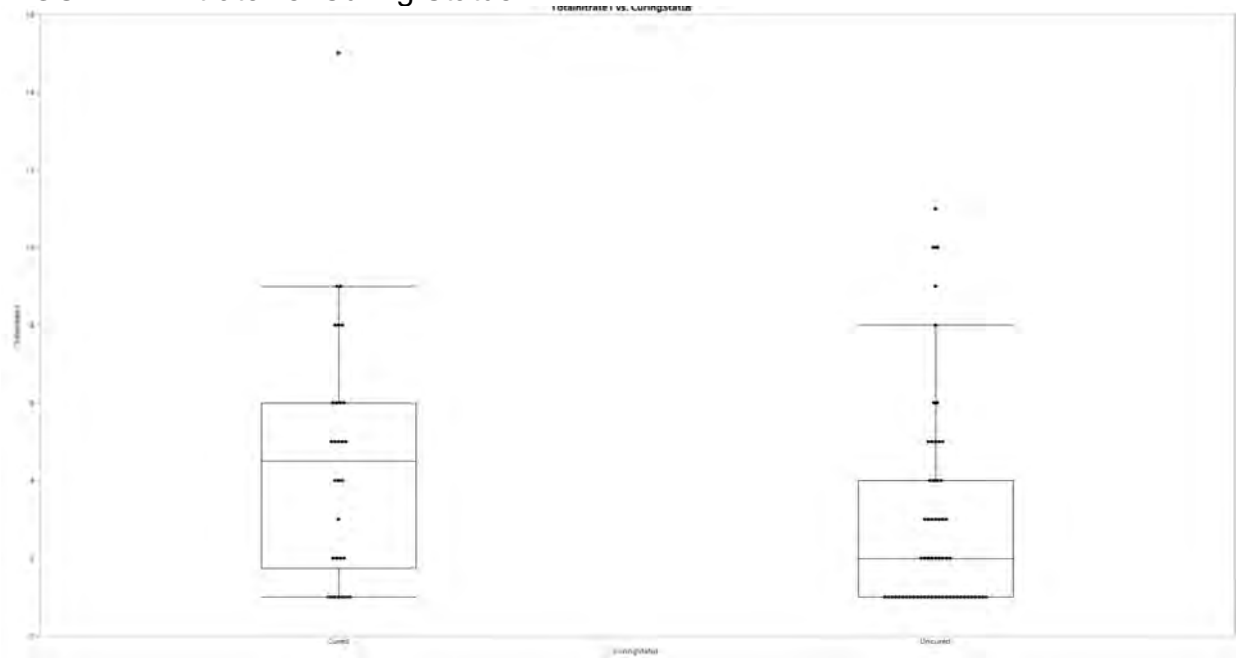


FIGURE 2. Nitrate vs. Curing Status



Attachments-

Table 1: Consumer Reports - Analyzed Levels of Nitrate and Nitrite in Pre-Packaged Deli Meats

Checked by: CR Staff
Creation Date: 8/20/19

Table 2: Consumer Reports - Analyzed Levels of Nitrate and Nitrite in Pre-Packaged Deli Meats

				Label Claims			Analyzed Per Gram[2]		Analyzed Per 3 oz (84g) Serving[2,3]		
Brand	Model	Package Size (Oz)	Serving Size Oz (g)	No Nitrates or Nitrites	Contains Sodium Nitrite	N (# of Samples Tested)	Total Nitrate ug (ppm)	Total Nitrite ug (ppm)	Total Nitrate ug	Total Nitrite ug	Comments
Cured											
A	97% Fat Free Cooked Ham Water Added	16, 32	NL (28)	No	Yes	3	7	20	560	1680	
A	Thin Sliced Hard Salami	7	1 (28)	No	Yes	3	1	3	84	280	
B	Cotto Salami made with Chicken, Beef, Pork added	16	1 (28)	No	Yes	3	3	13	280	1120	
B	96% Fat Free Deli Fresh Slow Roasted Cured Roast Beef	7	2 (56)	No	Yes	3	6	17	532	1456	
B	Lean Smoked Ham Water Added	12	NL (64)	No	Yes	3	2	8	196	644	
B	Deli Fresh Rotisserie Seasoned Chicken Breast coated with Paprika and other seasonings	9	2 (56)	No	Yes	3	7	16	560	1372	
B	Extra Lean Oven Roasted Turkey Breast & White Turkey Browned with Caramel Color	40	1 (28)	No	Yes	3	6	15	532	1288	
C	Cooked Ham Water Added	8	2 (56)	No	Yes	3	3	6	224	532	
A	97% Fat Free Black Forest Ham Water Added	16	1 (28)	No	Yes	3	6	8	476	672	
D	97% Fat Free Deli Sliced Fat Free Low Sodium Premium Ham, Water Added	12	1 (28)	No	Yes	3	4	11	364	924	
						Avg	**5**	**12**	**381**	**997**	
Uncured											
A	96% Fat Free Thin Sliced Roast Beef	7	2 (56)	Yes	No	3	2	3	140	252	
E	Naturals Black Forest Ham	8	NL (49)	Yes	No	3	2	15	140	1288	
A	98% Fat Free Thin Sliced Oven Roasted Turkey Breast	9, 16	2 (56)	Yes	No	3	5	5	420	420	
A	97% Fat Free Thin Sliced Black Forest Ham	8, 16	2 (56)	Yes	No	3	6	12	504	1036	
F	Smoked Deli Turkey	8, 14	NL (56)	Yes	No	3	1	9	112	728	
E	Naturals Hardwood Smoked Turkey Breast	8	NL (52)	Yes	No	3	3	9	280	784	
G	Uncured Honey Ham	7	2 (56)	Yes	No	3	2	7	140	560	
G	Oven Roasted Turkey Breast	7	NL (55)	Yes	No	3	1	7	84	560	
F	Honey Deli Ham	8, 14	NL (56)	Yes	No	3	2	6	196	504	
B	Natural Slow Roasted Chicken Breast	8	2 (56)	Yes	No	3	8	20	700	1680	
B	Natural Slow Roasted Roast Beef	7	2 (56)	Yes	No	3	5	15	448	1260	
A	99% Fat Free Thin Sliced Rotisserie Seasoned Chicken Breast	16	2 (56)	Yes	No	3	4	15	308	1260	
A	98% Fat Free Reduced Sodium Thin Sliced Oven Roasted Turkey Breast[1]	8	2 (56)	Yes	No	2	2	12	126	1008	Avg of 2 samples
G	Uncured Genoa Salami	4	1 (28)	Yes	No	3	1	6	84	504	
G	Oven Roasted Chicken Breast	7	NL (55)	Yes	No	3	1	5	84	448	
G	Roast Beef	5	2 (56)	Yes	No	3	2	3	196	224	
H	99% Lean Smoked Turkey Breast Natural Smoke Flavor Added	7	2 (56)	Yes	No	3	1	2	84	168	
B	Natural Hickory Smoked Uncured Ham	7	2 (56)	Yes	No	3	2	5	168	420	
I	Uncured Genoa Salami	4, 6	2 (56)	Yes	No	3	1	7	84	560	
H	96% Lean Classic Uncured Ham with Natural Smoke Flavor	7	2 (56)	Yes	No	3	4	12	336	1008	
B	Natural Mesquite Smoked Turkey Breast[1]	7	2 (56)	Yes	No	2	3	14	210	1134	Avg of 2 samples
						Avg	**3**	**9**	**231**	**753**	

Notes
All test results are averages of three tested samples, except where noted; NL = Not listed on product label.
Total nitrate by AOAC 935.48 and total nitrite by AOAC 973.31. LOQs = 1 ppm for nitrate and 1 ppm for nitrite.
1 = Test results are averages of 2 lots [whereas the other test results are averages of 3 lots]
2 = For nitrate and nitrite results reported as less than the method limit of quantitation or LOQ, the upper value of the LOQ was used to estimate the product and group averages.
3= CR conservative estimate of what restaurants and food service locations generally serve, and the average person making a sandwich consumes at a serving (1.5 x the 2 oz Reference Amount in 9 CFR 317.312)

CR CONSUMER REPORTS®

DELI MEATS

2019 Nationally Representative Phone Survey

Prepared by Survey Research Department

August 26, 2019

INTRODUCTION

Deli meats-- also known as cold cuts or lunch meats-- are precooked and processed meats that are sliced and served cold or hot, such as on sandwiches. Some meats that can be purchased as cold cuts or lunch meats include ham, salami, turkey, chicken, and roast beef. They can be bought pre-sliced in vacuum packs at the grocery store or purchased from a delicatessen or deli counter, where they are sliced to order. You may also eat deli meats on a sandwich purchased at a deli, restaurant, or other location.

In April 2019, Consumer Reports conducted a *nationally representative survey of 1,000 U.S. adults* on consumer behavior, knowledge about labeling, and health concerns regarding deli meats.

REPORT HIGHLIGHTS

92%
EAT
DELI MEATS

More than nine in 10 Americans eat deli meats, cold cuts, or lunch meats. Almost five in 10 (47%) eat them frequently (at least once a week), and another four in 10 eat them at least sometimes. Eight percent say they never eat deli meats. Ham, turkey, and chicken are the most common types of deli meats.

57%
SAY THEIR CHILDREN
EAT DELI MEATS FREQUENTLY

Among Americans with children under the age of 12, fifty-seven percent say their kids eat deli meats frequently (at least once a week). Most children eat cold cuts at least sometimes (17% do so daily; 9% never eat them).

51%
TAKE HEALTH INTO
CONSIDERATION

Half of Americans say they consider their health when choosing whether or not to eat deli meats. Those aged 55 and up are more likely to take health risks and benefits of deli meats into consideration than those aged 18 to 34.

49%
THINK CURED & UNCURED
LABELS ARE EQUALLY HEALTHY

Almost half of Americans think that deli meats are equally healthy or unhealthy, regardless of if it is labeled as cured or uncured, OR if it is processed with synthetic or non-synthetic nitrates.

45%
AWARE PROCESSED MEATS
INCREASE CANCER RISK

Recently, the World Health Organization (WHO) concluded that eating processed meats can increase your risk of cancer. Forty-five percent of respondents were aware of this; more than half were unaware of this finding. Those who are aware of this finding tend to say they eat deli meats less frequently.

46%
TRY TO BUY
"NO NITRATES" LABEL

We asked those Americans who eat deli meats if they typically try to buy ones labeled as "no nitrates added." Forty-six percent say they look for this label claim when purchasing deli meats.

42%
CONFUSED BY
"NO NITRATES" LABEL

We asked Americans what best describes their feelings about a "no nitrates" label claim on deli meats which has fine print stating that only naturally occurring nitrates are used. Almost half say they would either be confused about if or what type of nitrates are added (42%) or they don't know (7%). Four in 10 say that they are OK with this label claim because no synthetic nitrates are added.

FINDINGS

Before finding out what people think about labels on deli meats or how healthy or unhealthy these processed foods are, we first set out to determine Americans habits around consumption. We found that *most people eat deli meats*, and many do so regularly.

Who Eats Deli Meats?

More than **nine in 10** Americans eat deli meats, cold cuts, or lunch meats. Almost five in 10 (47%) eat them frequently (at least once a week), and another four in 10 eat them at least sometimes. Eight percent say they never eat deli meats.

Younger individuals (aged 18 to 34) are more likely to eat cold cuts frequently compared to those aged 55 and older.

We asked Americans who eat deli meats or cold cuts if they *buy them most frequently* in a package, at the deli counter, or on a sandwich:

Forty-four percent of deli meat eaters buy them most **PRE-SLICED AND PACKAGED**

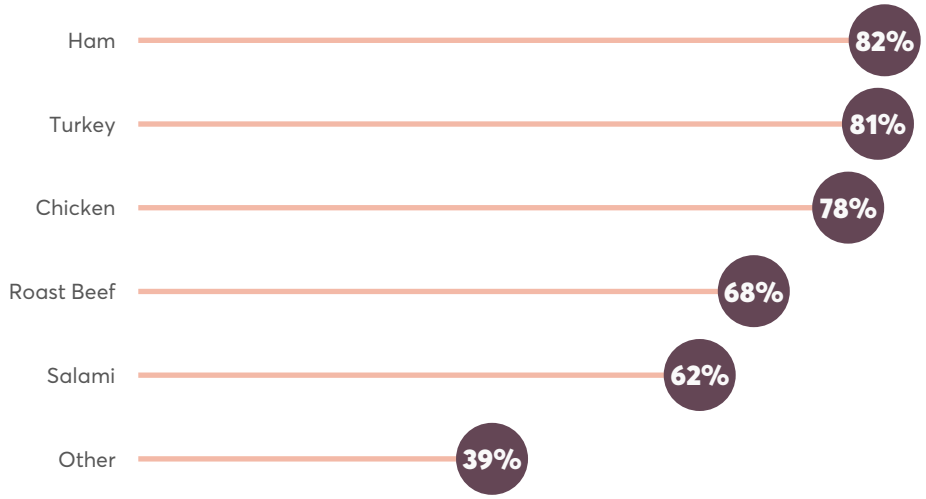
More than **a third** of deli meat eaters buy them most **SLICED FOR THEM AT A DELI COUNTER**

Two in 10 of deli meat eaters buy them most **ON A SANDWICH FROM A DELI/ RESTAURANT**

The graph that follows displays different types of deli meats. Individuals were asked to tell us if they *ever eat each type*.

- Ham, turkey, and chicken are the most common types of deli meats. More than three-quarters of Americans say they eat these types of cold cuts.
- Roast beef and salami are less popular.

DO YOU EVER EAT THIS TYPE OF DELI MEAT?

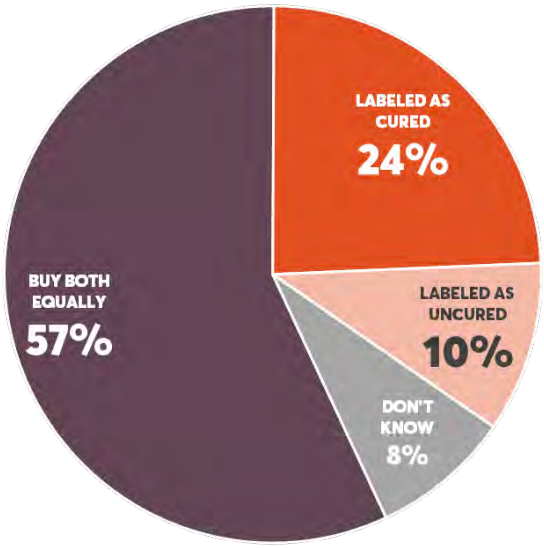


*Respondents could select all that apply.

Base: All respondents

Another choice that Americans make when they purchase deli meats is whether to buy ones *labeled as cured or labeled as uncured*. The figure below presents buying habits around these labels.

Which Do Americans Buy More:
Deli Meats Labeled as Cured or Uncured?



More than half of Americans who eat deli meats say they buy ones labeled as cured and labeled as uncured **equally.**

It is **more common to purchase deli meats labeled as cured than it is to purchase ones labeled as uncured**—almost a quarter say they buy cold cuts labeled as cured most frequently; only one in 10 say they buy ones labeled as uncured most frequently.

Nearly one in 10 don't know which type of deli meats, labeled as cured or uncured, they buy more.

Health Concerns

45%

AWARE PROCESSED MEATS INCREASE CANCER RISK

Recently, the World Health Organization (WHO) concluded that eating processed meats, including deli meats or cold cuts, can *increase your risk of cancer*. We asked respondents if, before taking this survey, they were aware of this. Forty-five percent say yes; more than half were unaware of this finding.

Given the safety concerns raised by the World Health Organization, we were interested in how Americans view the healthiness of eating deli meats.

Agree or Disagree?

"I take into consideration health benefits and health risks of eating deli meats or cold cuts when deciding to eat or not eat them."

HALF OF AMERICANS SAY THEY CONSIDER THEIR HEALTH WHEN CHOOSING WHETHER OR NOT TO EAT DELI MEATS

- Those aged 55 and up are more likely to agree with the statement than those aged 18 to 34
- People who know the research are taking it into consideration:
  - *Among those who are aware of increased cancer risk associated with processed meats, **63%*** agree or strongly agree
  - *Among those who are not aware, **41%*** agree or strongly agree
- People who agree with the statement are more likely to look for a "no nitrates added" label when buying cold cuts *(56% compared to 36%)*

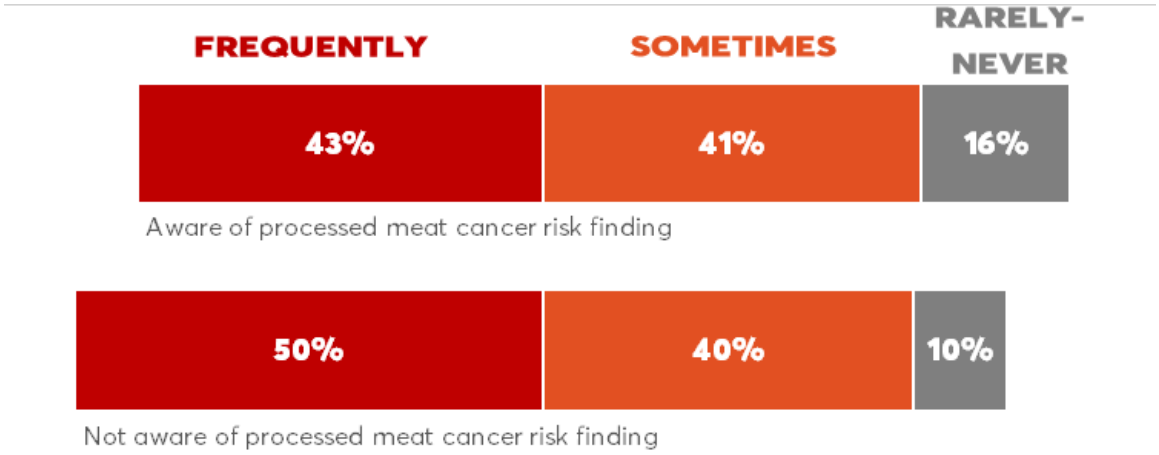
46%

TRY TO BUY
"NO NITRATES" LABEL

We asked those Americans who eat deli meats if they typically try to buy ones labeled as "no nitrates added." Forty-six percent say they *look for this label claim* when purchasing deli meats. Nearly one in 10 say they 'don't know.'

Those respondents who are aware of the WHO finding that processed meats can increase risk of cancer are more likely to try to buy cold cuts labeled as "no nitrates added" (*57% compared to 38%*). As shown in the graph below, they also tend to say they eat deli meats less frequently.

Those Aware of WHO Finding Eat Deli Meats Less Frequently



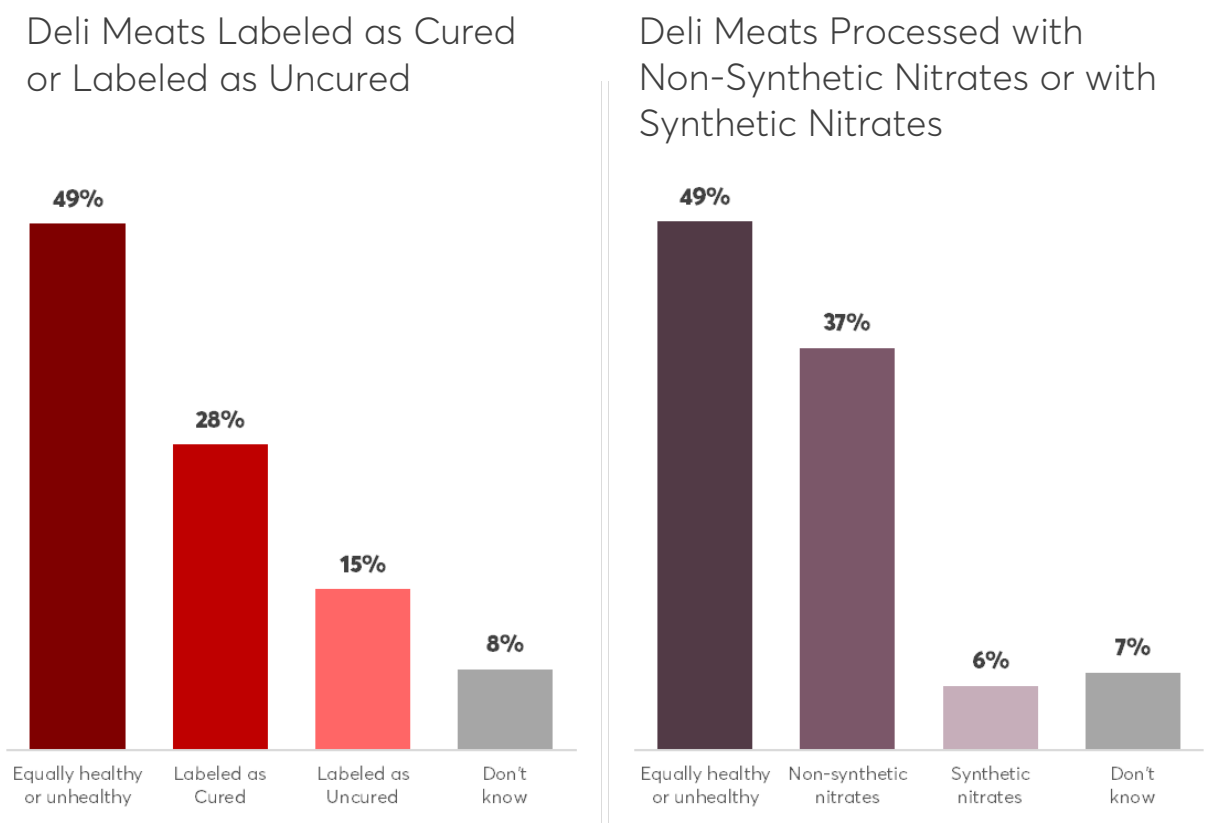
Sixteen-percent of Americans who say they knew about the World Health Organization finding that processed meats can increase risk of cancer rarely to never eat deli meats (less than five times a year), compared to 10% of those who did not know about this finding.

Knowledge about Labeling

Deli meats or cold cuts are precooked and processed meats that undergo a technique called curing. This is done through the use of nitrates or nitrites. These may be added from a synthetic source. Many deli meat packages have a label to indicate that the meat is "cured," however some are labeled as "uncured." This is due to the use of celery juice or celery powder, which has naturally occurring, non-synthetic nitrates. Deli meats or cold cuts that are processed this way are labeled as "uncured" and state "no nitrates or nitrites added except those added that are naturally occurring."

The survey presented information on labeling to respondents. We were interested in if Americans feel that different deli meats are *more or less healthy for them, based on how the package is labeled*.

WHICH DO YOU THINK IS HEALTHIER FOR YOU?

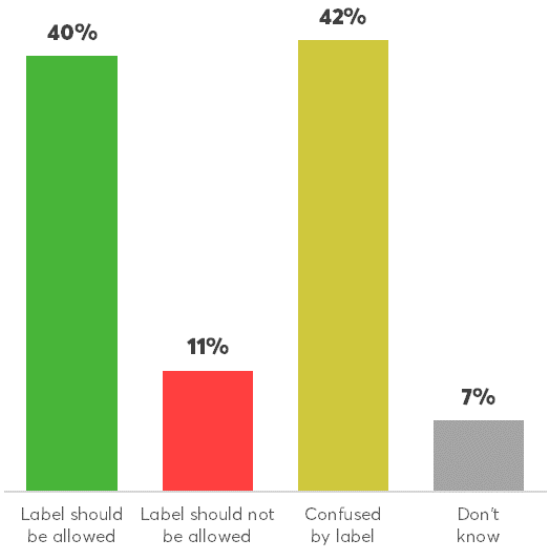


Base: All respondents

As can be seen in the graph above:

- *Almost half* of Americans think that deli meats are *equally healthy or unhealthy*, regardless of if it is labeled as cured or uncured, OR if it is processed with synthetic or non-synthetic nitrates.
- Of those who think there is a difference:
    - More believe cold cuts with a *cured label* to be healthier.
    - Many think that deli meats processed with *non-synthetic nitrates* are healthier.

WHAT DO YOU THINK ABOUT "NO NITRATES ADDED" LABELS?



We asked Americans what best describes their feelings about a "no nitrates" label claim on deli meats which has fine print stating that **only naturally occurring nitrates are used.**

Four in 10 say that they are OK with this label claim because no synthetic nitrates are added.

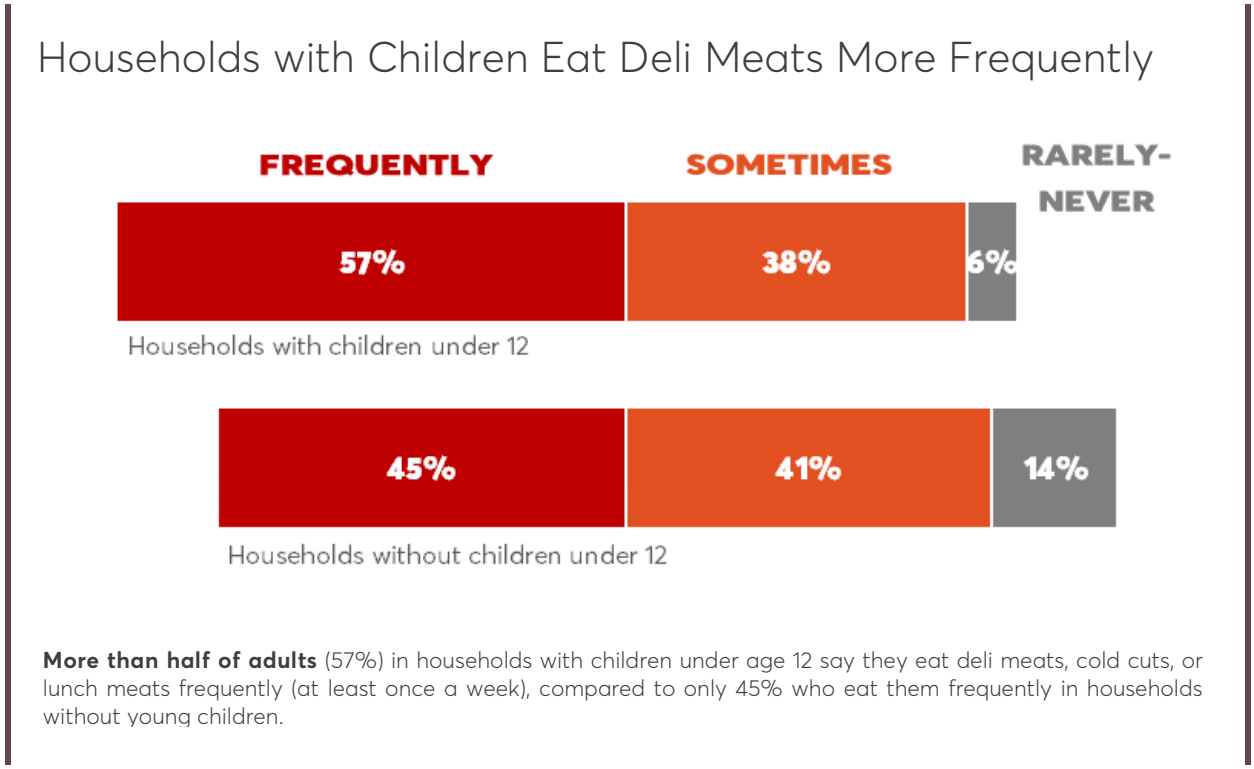
About **one in 10** don't think this label claim should be used because, regardless of the source, some nitrates are added.

Almost half of Americans say they would either be confused about if or what type of nitrates are added (42%) or they don't know (7%).

Base: All respondents

Households with Children Under 12

Eating unhealthy or unsafe foods can be particularly problematic if it starts at a very young age. What the parents eat often reflects what they give to their children. We examined results on the *adult eating habits* among those who have children under the age of 12 in the household compared to those who do not. We also asked those Americans with children to tell us about *how often their kids eat deli meats* themselves.



More than half of adults (57%) in households with children under age 12 say they eat deli meats, cold cuts, or lunch meats frequently (at least once a week), compared to only 45% who eat them frequently in households without young children.

57%

SAY THEIR CHILDREN EAT DELI MEATS FREQUENTLY

Among Americans with children under the age of 12, fifty-seven percent say *their kids eat deli meats frequently* (at least once a week). Most children eat cold cuts at least sometimes (17% do so daily; 9% never eat them).

SUMMARY

Almost everyone eats deli meats at least some of the time. And more than half of American families with young children consume these processed meats at least once a week. When it comes to a food product consumers eat so regularly, one would hope they are knowledgeable about what they are buying and how it impacts their health. There are lots of different labels out there for people to consider—cured, uncured, no nitrates added. Over four in 10 Americans say they most frequently buy cold cuts in a pre-sliced package, where they can take a look at the label. It is even more challenging for those consumers who buy at the deli counter or order a sandwich, where there may not be a label readily available.

The current labeling rules allow manufacturers to put the word "uncured" on deli meats in certain cases, even though the meat still undergoes a curing process. And a "no nitrates added" label displayed on a product may be attractive to many consumers, but can also be confusing. That's because this claim is coupled with a fine print that there are, in fact, nitrates added—but only the naturally occurring ones. Almost half of Americans realize there is no health difference between those labeled as cured or labeled as uncured. Similarly, just under half understand synthetic and non-synthetic nitrates are both just as bad for you. But, when it comes to the other fifty percent of the population, it's clear that many consumers are under informed. The cured versus uncured terminology is particularly unclear—more people actually think that cured deli meats are a healthier choice than those labeled as uncured.

It is promising to note that almost half of Americans know that processed meats, including deli meats or cold cuts, can increase your risk of cancer, according to the World Health Organization. This knowledge may make some consumers cut back on how much they eat deli meats. Unfortunately, many in the know still eat deli meats frequently. More of them just choose to purchase items with a "no nitrates added" label, even though those deli meats are just as unhealthy.

METHODOLOGY

This telephone survey was fielded by SSRS on its Omnibus survey platform using a nationally representative sample between April 23, 2019 and April 28, 2019.

The SSRS Omnibus sample is designed to represent the adult U.S. population. The SSRS Omnibus uses a stratified random-digit-dialing (RDD) sample of landline telephone households, and randomly generated cell phone numbers. In total, SSRS collected 1,000 responses (963 in English; 37 in Spanish). Telephone interviews were conducted by landline (370) and cell phone (630). The margin of error for total respondents is +/-3.75% at the 95% confidence level. Smaller subgroups will have larger error margins.

The survey was conducted using a computer-assisted telephone interviewing system (CATI), which allows for computer control of questionnaire administration, automatic handling of skip pattern response editing, and range checks. Where appropriate, response answer choices are randomized or scales rotated. Each unit in the sample receives as many calls as necessary in order to survey qualified respondents and to fulfill the required number of interviews within each sub-strata of the samples. Additional callback attempts follow a differential callback schedule to ensure the highest completion rate possible.

Final data is weighted by age, race, sex, region, education, and telephone type to be proportionally representative of the U.S. adult population.

Key demographic characteristics (after weighting is applied) are presented below:

- 51% female
- Median age of 47
- 62% White, non-Hispanic
- 32% 4-year college graduates
- 42% have a household income of $50,000 or more

APPENDIX

Tables below present question wording, survey behavior (such as rotated order of response options), sample sizes, and percentages of responses in each answer category for selected items.

Introduction Text

Deli meats-- also known as cold cuts or lunch meats-- are precooked and processed meats that are sliced and served cold or hot, such as on sandwiches. Some meats that can be purchased as cold cuts or lunch meats include ham, salami, turkey, chicken, and roast beef. They can be bought pre-sliced in vacuum packs at the grocery store or purchased from a delicatessen or deli counter, where they are sliced to order. You may also eat deli meats on a sandwich purchased at a deli, restaurant, or other location.

Survey administration note: For all items that follow, 'Don't know' option was not read aloud.

Deli meats or cold cuts may be labeled as CURED or UNCURED. Which type do you think is healthier for you?	
	%
Both are equally healthy or unhealthy	49
Deli meats labeled as CURED	28
Deli meats labeled as UNCURED	15
Don't know	8
Base: All respondents	*989*

CURED and UNCURED verbiage was rotated in the question stem and in the order of response choices.

Deli meats or cold cuts are processed through the use of nitrates or nitrites. These may be added from a synthetic source. Sometimes, celery juice or celery powder is used instead, which has naturally occurring, non synthetic nitrates. Which do you think is healthier for you?	
	%
Both are equally healthy or unhealthy	49
Deli meats processed with NON-SYNTHETIC NITRATES	37
Deli meats processed with SYNTHETIC NITRATES	6
Don't know	7
Base: All respondents	*989*

The order of response choices SYNTHETIC and NON-SYNTHETIC NITRATES was rotated.

Deli meats or cold cuts that are processed using celery juice or celery powder, which contain non synthetic nitrates, are labeled as "NO NITRATES OR NITRITES ADDED except those added that are naturally occurring." Which of the following statements BEST describes your feelings about this label claim?	
	%
If you saw this label, you would be confused about if or what type of nitrates are added	42
Labels SHOULD be allowed to say this because no synthetic nitrates are added	40
Labels SHOULD NOT be allowed to say this because, regardless of the source, some nitrates are added	11
Don't know	7
Base: All respondents	*984*

The order of response choices SHOULD and SHOULD NOT be allowed was rotated.

Which do you buy more frequently? Deli meats or cold cuts that are…?	
	%
You buy both equally	57
Labeled as cured	24
Labeled as uncured	10
Don't know	8
Base: Respondents who eat deli meats	*904*

The order of response choices CURED and UNCURED was rotated.

When purchasing deli meats or cold cuts, do you typically try to buy meats labeled as "no nitrates added"?	
	%
Yes	46
No	45
Don't know	9
Base: Respondents who eat deli meats	*913*

Recently, the World Health Organization concluded that eating processed meats, including deli meats or cold cuts, can increase your risk of cancer. Before taking this survey, were you aware of this?	
	%
Yes	45
No	55
Don't know	1
Base: All respondents	*998*