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Arsenic Levels in Chicken

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I commend Nachman et al. (2013) on their careful study of arsenic content in market samples of chicken and am dismayed to learn that arsenic levels in chicken remain high despite our report of arsenic levels in *Environmental Health Perspectives* in 2004 (Lasky et al. 2004).

One possible explanation is the very complicated lines of authority around the regulation of drugs fed to food animals, along with the enforcement of those regulations. Nachman et al. (2013) focused their discussion on the role of the Food and Drug Administration (FDA), but many other agencies participate in the regulation and enforcement of residue safety in food animals. As noted by the Food Safety and Inspection Service (FSIS) in the introduction to their 2012 Residue Sampling Plans (FSIS 2012),

> The U.S. National Residue Program (NRP) for Meat, Poultry, and Egg Products, administered by the USDA [U.S. Department of Agriculture] FSIS, is an interagency program designed to identify, rank and test for chemical contaminants in meat, poultry, and egg products.

They continue,

> The NRP requires the cooperation and collaboration of several agencies for its successful design and implementation. The USDA FSIS, the EPA [U.S. Environmental Protection Agency], and the Department of Health and Human Services (DHHS) FDA are the primary federal agencies managing this program. The FDA, under the Federal Food, Drug, and Cosmetic Act, establishes tolerances for veterinary drugs, and action levels for food additives and environmental contaminants. The EPA, under the Federal Insecticide, Fungicide, and Rodenticide Act (as modified by the Food Quality Protection Act), establishes tolerance levels for registered pesticides…. Representatives from FSIS, FDA, EPA, the USDA Agricultural Research Service (ARS), the USDA Agricultural Marketing Service (AMS), and the DHHS Centers for Disease Control and Prevention (CDC) collaborate to develop the scheduled sampling program.

Setting and enforcing safety levels involves several steps, one of which is the collection of meat and poultry samples, followed by statistical analysis, interpretation, and action. The NRP sampling plan is designed to identify samples with residues above the allowed levels. The data are then analyzed as categorical values (violation, no violation). Current methods of data analysis do not include estimation of mean values that can then be extrapolated to the national food supply. It was by analyzing the data as a continuous variable that my coauthors and I were able to describe the high levels of arsenic in chicken in 2004 (Lasky et al. 2004).

Concerns about arsenic levels in chicken are of increasing importance because of the increased per capita consumption of chicken over the past decade (USDA Economic Research Service 2013).

The author declares she has no actual or potential competing financial interests.

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References

Lasky T, Sun W, Kadry A, Hoffman MK. 2004. Mean total arsenic concentrations in chicken 1989–2000 and estimated exposures for consumers of chicken. Environ Health Perspect 112:18–21; doi:10.1289/ehp.6407.

Nachman KE, Baron PA, Raber G, Francesconi KA, Navas-Acien A, Love DC. 2013. Roxarsone, inorganic arsenic, and other arsenic species in chicken: a U.S.-based market basket sample. Environ Health Perspect 121:818–824; doi:10.1289/ehp.1206245.

USDA (U.S. Department of Agriculture) Economic Research Service. 2013. Food Availability (Per Capita) Data System: Summary Findings. Available: http://www.ers.usda.gov/data-products/food-availability-(per-capita)-data-system/summary-findings.aspx#.UZFPmOBoLH0 [accessed 13 May 2013].

USDA (U.S. Department of Agriculture), FSIS (Food Safety and Inspection Service). 2012. United States National Residue Program for Meat, Poultry, and Egg Products: 2012 Residue Sampling Plans. Available: http://www.fsis.usda.gov/PDF/2012_Blue_Book.pdf [accessed 13 May 2013].

Arsenic Levels in Chicken: Nachman et al. Respond

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In our paper (Nachman et al. 2013) we focused on dietary arsenic exposure from the use of arsenic-based drugs in food animal production, specifically chicken. We thank Lasky for broadening the discussion on arsenic regulations for food to include federal agencies beyond the Food and Drug Administration (FDA).

The results of our study (Nachman et al. 2013) indicate that the use of arsenic-based drugs increases the levels of inorganic arsenic in chicken meat. Based on these findings, we recommend banning the use of arsenic-based drugs in food animal production, which are under the jurisdiction of the FDA. It is important, however, to recognize the potential role that could be played by the U.S. Department of Agriculture (USDA) Food Safety and Inspection Service (FSIS) under its National Residue Program (NRP).

Under its mandate, the NRP facilitates the monitoring of arsenic levels in poultry products and supports enforcement actions for animal products in violation of arsenic standards (USDA FSIS 2012). Unfortunately, the NRP faces constraints (in addition to those noted by Lasky) that limit its effectiveness (Silbergeld and Nachman 2008). The most important of these constraints is the current arsenic standard for meat, which was set before 1963 (FDA 1963) and does not account for recent epidemiologic research. In addition, the standard applies to total arsenic concentrations rather than to inorganic arsenic, the species of greatest health relevance. Because arsenic can be present in food in various forms that have widely varying toxicity, standards might need to be species specific.

The U.S. Environmental Protection Agency (EPA) is currently revising its toxicological assessment for inorganic arsenic (U.S. EPA 2010) as part of its Integrated Risk Information System (IRIS) program. The purpose of this revision is to produce health-based guidance that can be useful in setting arsenic standards in different media (including foods) that reflect our current understanding of dose–response relationships between arsenic exposures and adverse health outcomes. To achieve this goal, coordination between the FDA, U.S. EPA, and NRP is essential. By applying appropriate standards and methods with adequate sensitivity for the arsenic species of interest, the NRP could play a central role in minimizing dietary exposure to arsenic through animal products.

Although sale of roxarsone remains suspended in the United States, nitarsone, a chemically similar arsenical drug, continues to be sold (Zoetis 2013). Industry statements in the media have confirmed nitarsone use in the turkey industry (Aubrey 2013), and the USDA estimates of per capita turkey consumption are increasing (USDA 2013). Research is needed to characterize potential contributions of nitarsone to inorganic arsenic concentrations in turkey meat. For these reasons, monitoring efforts remain relevant. In the absence of regulations that limit inorganic arsenic in our foods, the banning of arsenic-based drugs would minimize dietary arsenic exposures in poultry consumers.

The authors declare they have no actual or potential competing financial interests.

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References

Aubrey A. 2013. How Trace Amounts of Arsenic End Up in Grocery Store Meat. Available: http://www.npr.org/blogs/thesalt/2013/05/15/184261664/how-trace-amounts-of-arsenic-end-up-in-grocery-store-meat [accessed 12 June 2013].

FDA (Food and Drug Administration). 1963. Food additives resulting from contact with containers or equipment and food additives otherwise affecting food. Fed Reg 28:10871.

Nachman KE, Baron PA, Raber G, Francesconi KA, Navas-Acien A, Love DC. 2013. Roxarsone, inorganic arsenic, and other arsenic species in chicken: a U.S.-based market basket sample. Environ Health Perspect 121:818–824; doi:10.1289/ehp.1206245.

Silbergeld EK, Nachman K. 2008. The environmental and public health risks associated with arsenical use in animal feeds. Ann NY Acad Sci 1140(1):346–357.

USDA (U.S. Department of Agriculture) FSIS (Food Safety and Inspection Service). 2012. National Residue Program for Meat, Poultry, and Egg Products: 2012 Residue Sampling Plans. Available: http://www.fsis.usda.gov/PDF/2012_Blue_Book.pdf [accessed 13 June 2013].

USDA (U.S. Department of Agriculture). 2013. World Agricultural Supply and Demand Estimates. Available: http://www.usda.gov/oce/commodity/wasde/latest.pdf [accessed 13 June 2013].

U.S. EPA (U.S. Environmental Protection Agency). 2010. IRIS Toxicological Review of Inorganic Arsenic (Cancer) (2010 External Review Draft). EPA/635/R-10/001. Washington, DC:U.S. EPA. Available: http://cfpub.epa.gov/ncea/iris_drafts/recordisplay.cfm?deid=219111 [accessed 24 October 2012].

Zoetis. 2013. Histostat Type A Medicated Article. Available: http://online.zoetis.com/US/EN/Products/Pages/Histostat.aspx [accessed 12 June 2013].