

Feeding Arsenic to Poultry

Is This Good Medicine?

Each year U.S. hospitals and long-term care facilities buy poultry, mostly chicken, worth millions of dollars. At the same time, U.S. poultry companies routinely and unnecessarily use arsenic in raising their birds. Voluntary arsenic use in animal feeds imposes an unnecessary risk to the health of Americans and the environment that sustains us. The U.S. purchases more commercial arsenic than any other country.¹

Arsenic's toxicity has been recognized for millennia—its name comes from the Greek, meaning “potent.”² Arsenic causes cancer, even at the low levels currently found in our environment.^{3,4} Arsenic exposure also contributes to birth defects, declines in intellectual function, diabetes and heart disease.^{5,6,7}

Arsenic use in agriculture

The Food and Drug Administration approves arsenic's use as an additive to poultry feed. This practice has never been approved as safe in the 25 countries of the European Union.

According to estimates,⁸ at least 70 percent of the broiler chickens raised annually in the U.S. (8.7 billion in 2005) are fed arsenic—typically a compound called roxarsone (3-nitro-4-hydroxyphenylarsonic acid).^{*} However, no public authority in the U.S. tracks exactly how much arsenic is added to chicken feed. Based on the best available data, however, annual roxarsone use can be estimated at 1.7-2.2 million pounds.^{9,10,11} The FDA approves roxarsone use for a variety of purposes: growth promotion, feed efficiency and improved pigmentation. Many feed additives containing

roxarsone are combinations that also include an antibiotic and an anti-parasitic drug called an ionophore. While chicken producers sometimes claim arsenic in poultry feed is used to control parasites (coccidiosis), roxarsone itself is not FDA-approved as anti-parasitic.

Risks to human and ecosystem health

Widespread, voluntary use of arsenic feed additives creates unnecessary risks: risks for people who eat chicken; risks to communities near chicken farms; risks to water and soil quality; and risks to people with infections requiring treatment with antibiotics.

- Meat from chickens fed arsenic can carry arsenic residues, which add to a person's total risk from arsenic-caused disease.^{12,13} Arsenic is also approved as a turkey feed additive, but we are unaware of data confirming its use in turkey production or its detection in turkey meat.
- Up to three-quarters of arsenic in feed will pass through chickens into the estimated 26 to 55 billion pounds of chicken litter or waste created in the U.S. annually.¹⁴ Around 90 percent of chicken waste currently is applied to fields and cropland as “fertilizer.”^{15,16,17} Poultry litter containing arsenic also is fed as a protein source to beef cattle.^{18,19} So, the legal practice of feeding arsenic to poultry can add to the arsenic contamination of other foods as well.
- Incineration of arsenic-containing poultry waste is currently being

Organic or Inorganic Arsenic: Does it Matter?

Arsenic exists in various forms, both organic and inorganic. Recent science calls into question the presumption that organic arsenics, like roxarsone, necessarily pose fewer risks than inorganic arsenics from the earth's crust, which contaminate many drinking water systems. Once ingested by animals, roxarsone can be degraded into inorganic forms of arsenic (arsenite and arsenate) within the animal's digestive tract and in animal waste (Sapkota et al. 2007; Arai et al. 2003; Stolz et al. 2007). Arsenite and arsenate are both known to cause cancer in humans. (NAS 1999; NAS 2001).

* Other FDA-approved arsenical additives to poultry feed include arsanic acid, nitarsone, and carbarsone.

promoted as a “renewable” source of energy.²⁰ This questionable practice will contribute to air pollution from toxics and heavy metals such as arsenic contained in the waste.

- 70-90 percent of arsenic in poultry litter becomes water soluble, meaning it can readily migrate through soils and into underlying groundwater.^{21,22} Routine roxarsone use in chicken feed likely adds to the already significant public health burden from arsenic-contaminated drinking water supplies.^{23,24} According to the EPA, 13 million Americans drink water contaminated with arsenic beyond the safety standard of 10 ppb.²⁵
- Exposing chickens routinely to arsenic may spur creation of bacteria in those chickens that are resistant to multiple antibiotics, in addition to the arsenic.

Arsenic use promotes antibiotic resistance

Bacteria live in animal guts, as in ours. From Darwin, we understand that conditions will select for the most resistant bacteria (natural selection) when that trait allows the latter to outcompete their non-resistant cousins. They can develop resistance to metals, like arsenic, routinely put into animal feed just as they develop resistance to routine antibiotics put there for many of the same reasons.^{26,27} The individual genes—pieces of DNA—that confer bacteria with resistance to antibiotics and heavy metals, respectively, can be physically linked on larger pieces of DNA that bacteria often swap with one another.

What this means is that exposing bacteria to arsenic in feed can inadvertently cause an increase in antibiotic resistance as well. Infectious disease concerns are heightened by the fact that poultry producers routinely use feed additives that include both antibiotics and arsenic components.^{28,29,30}

That is, we intentionally and routinely expose bacteria in food animals to a variety of things that will promote resistance.

Arsenic: unexplored cumulative risks

Arsenic has been mined from the earth’s crust, and then intentionally used for all sorts of commercial reasons. Use of arsenic as a pesticide on crops, now banned, has contaminated fertile, food-producing land, and created Superfund sites where many pesticide manufacturing facilities once stood. Wood products treated with arsenical pesticides—now banned—led to children being exposed to hazardous levels as they played on arsenic-treated playground equipment and wood decks. Disposal hazards from this longstanding use remain.

Many foodstuffs, especially seafood, contain arsenic derived from its occurrence in groundwater or seawater. Survey data also suggest that U.S. rice may carry 40 percent to 5-times higher arsenic levels than rice from Europe, India or Bangladesh, possibly due to historic use of arsenical pesticides on those same fields.³¹ To the total intake of arsenic in the American diet, arsenic-contaminated poultry makes a significant—and apparently preventable—contribution.³²

Thus, voluntary arsenic use in poultry only adds to the so-far uncounted cumulative risk from our many exposures to arsenic, from both natural and man-made sources. Similarly, cumulative health risks from the multiple metals legally added to U.S. animal feeds—including copper, manganese, magnesium, zinc, and metal amino acid complexes, as well as arsenic—are not assessed.³³

A role for health care

It clearly is possible to raise poultry without arsenic. European officials have never allowed its use in poultry production, and some of the largest U.S. producers now state they have ended the practice.

By making arsenic use a criterion in their purchase of poultry meat, hospitals and health care systems can realize important benefits:

- they can help ensure that patients, staff and other clients are eating chicken with reduced levels of arsenic;
- because arsenic use in chicken production contributes to the overall arsenic contamination of the environment, these facilities can help reduce their communities’ risks from arsenic-induced disease more generally;
- our current industrial system of meat production is characterized by many practices that contribute to systemic negative impacts on public health and chronic disease.^{34,35,36} By opting for chicken raised using more sustainable, arsenic-free practices, health care facilities can send an important signal to the marketplace and change food production practices to ones that protect public health.

Other aspects of poultry production besides arsenic use deserve greater attention. See our Purchaser’s Guide to Sourcing Sustainable Poultry and Poultry Primer, www.HealthyFoodinHealthCare.org, for a comprehensive overview.

Possible next steps for your health care institution

- Ask your GPO to develop contracts requiring suppliers to supply only poultry that is raised without arsenic-containing compounds.
- Many food distributors have private label poultry products. Hospitals can ask distributors to supply poultry raised without arsenic.
- Some hospitals contract with companies to manage their food service, such as Sodexo, Morrison, Aramark and others. Hospitals can ask these management companies to source only poultry raised without arsenic. More broadly, health care

food service companies could commit to serving only poultry raised without antimicrobials, including antibiotics.

- For meetings of their professional associations, nurses, physicians, dieticians and other health care professionals can require conference centers to source only poultry raised without the use of arsenic.
- Ask the FDA to withdraw its approval of arsenic feed additives as an unnecessary public health risk.

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This fact sheet is based on a longer report, *Playing chicken: Avoiding arsenic in your meat*, available at <http://www.iatp.org/foodandhealth>

More resources are available at
www.healthyfoodinhealthcare.org.



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