

A 2004 study of California egg farms in the journal *Avian Diseases* finds comparatively low *Salmonella* prevalence in indoor housing systems as compared to cage-free and free-range housing systems.<sup>1</sup>

The principal mode of *Salmonella* contamination occurs after the hens have laid their eggs where the source of infection is the environment, usually when the laid egg comes in contact with feces or waste. Thus another way the egg industry has been successful in decreasing *Salmonella* prevalence is through the implementation of measures separating hens from their feces and waste in modern housing systems.

The scientific consensus clearly states that eggs laid by hens in modern housing systems have a lower prevalence of *Salmonella* across the board than those laid by free-range and cage-free-range hens. In fact, the most sanitary housing systems are those that separate hens from their waste and keep the eggs as clean as possible.

The journal *Avian Diseases* conducted a study of one egg farm in 1996, examining a statistically significant sample of egg laying hens. This study found that the prevalence of *Salmonella* in the hens kept indoors in modern housing systems was far lower than in the free-range hens. The study explicitly states, "The highest prevalence [was] in the free-range birds kept on the dirt floors."<sup>2</sup>

That's because hens in free-range systems live in an open environment and frequently lay their eggs in their own feces and waste, so eggs from free-range systems are typically more contaminated than those from cage systems.<sup>3</sup> The researchers of the California study explain that the lower prevalence of *Salmonella* in the hens kept in modern housing units was due to better manure management and to minimal exposure from birds and rodents.<sup>4</sup> In addition, previous research suggests that eggs from modern housing systems have superior structural integrity in their shells, allowing for greater resistance to penetration by the *Salmonella Enteritidis* pathogen and decreasing the risk of egg contamination.<sup>5</sup> On the other hand, the infection of free-range hens in the California study was caused via the "fecal-oral route through contamination of the feed through feces" from rodents that had easy access to these hens.<sup>6</sup>

In addition to being more vulnerable to exposure from rodents, free-range hens did not have the same level of manure management as those hens kept in modern housing systems. This is because the hens housed indoors had a manure belt that ran under their enclosures and transported the feces to collection receptacles, common to modern housing systems in California.<sup>7</sup> On the other hand, according to a report by the *Rural Industries Research & Development Corporation*, the total number of bacteria on free-range eggs is 15 times greater than that found on eggs from modern housing systems.<sup>8</sup> This alarming figure is entirely due to the fact that eggs produced in free-range systems are in closer proximity to feces and potential infectious agents.

Furthermore, there is a wealth of scientific literature that clearly states free-range hens are far more susceptible and vulnerable to infection from rodents and various species of wildlife.

- The study even notes that “feral cats, rodents, skunks, opossums, wild birds, and other wildlife” were seen near the free-range hens’ feeding areas, and that rodents “were considered to be the biological vectors and amplifiers” of *Salmonella* on the egg farm in the study.<sup>9</sup>
- The *Rural Industries* report also postulates that the very construction of the indoor housing systems precludes the possibility of poultry and rodents existing closely, thereby potentially decreasing the possibility of cross-infection.<sup>10</sup>
- A 2003 study from the *Journal of Applied Microbiology* uses genetic mapping to conclude that wildlife species are the most virulent intruders on egg farms, and that these species serve as highly pathogenic vectors of *Salmonella*.<sup>11</sup> The researchers of the study specifically state that their study provides “definitive molecular evidence for the involvement of several wildlife species in the maintenance of [*Salmonella*] *Enteritidis* infection on farms.”<sup>12</sup> This conclusion that wildlife species are particularly dangerous vectors for *Salmonella* is shared by another study published in the journal *Applied and Environmental Microbiology* that collected data from a period of more than 30 years.<sup>13</sup>

As evidenced by the studies above, not only are eggs from free-range systems typically more contaminated than those from modern housing systems but also free-range hens are at a greater risk for *Salmonella* infection as they are far more vulnerable to exposure from wildlife species and rodents.

Since hens housed in cage-free and free-range housing systems have access to the outdoors, it substantially increases their risk of exposure to Avian Influenza (AI), Exotic Newcastle Disease, and other diseases from wildlife species of birds, according to the United States Animal Health Association, just as it increases their chance of exposure to *Salmonella*.<sup>14</sup>

Scientific consensus is clear that maintaining an egg industry where the infrastructure and procedures are highly ordered, well maintained, sanitary and informed by sound evidence is most beneficial to humans and hens alike. These guidelines ensure that the highest standards of food safety are maintained.

Developing responsible management criteria has been a primary concern of egg farmers for years. Working with the foremost animal scientists, they have developed leading egg production methods to ensure that fundamental components of sound animal care are provided to egg-laying hens: optimal feed, light, air, water, space and sanitation for egg-laying hens.<sup>15</sup>

These sound methods are a direct result of the United Egg Producers' development of the first industry guidelines in the early 1980's, followed by the commission of the independent Scientific Advisory Committee for Animal Welfare in 1999.<sup>16</sup> The guidelines developed by this committee resulted in the UEP certification program, and now approximately 95 percent of California's egg farmers are UEP-certified.<sup>17</sup> Certified farmers must place top priority on health, safety, and comfort of their hens and submit to independent United States Department of Agriculture (USDA) audits.<sup>18</sup>

Because the indoor housing systems that egg-laying hens are kept in are clean, sanitary and biosecure, antibiotics are used only when the animals are sick and in need of care. In fact, antibiotics are prohibited in feed unless administered for therapeutic reasons (disease treatment) and then only under direction of a veterinarian.<sup>19 20</sup> Furthermore, hormones are not given to *any* egg-laying hens under any circumstances.<sup>21</sup>

As for the study referenced in the article from [motherearthnews.com](http://motherearthnews.com), the study's construction was dubious and its lack of publication in any scientific journals or any sort of a peer review process further erode its credibility. Under the UEP certified program, the hens have a high-quality, nutritionally balanced diet that is meticulously formulated with the proper nutrients to produce quality eggs and is perfectly balanced with ingredients made up mostly of corn, soybean meal, vitamins and minerals. In a cage-free and free range environment the feed cannot be as precisely controlled and depending on what the animal is foraging there can be inconsistencies in the required nutrients that could adversely affect the egg's nutritional quality and the shell's composition.

Finally, debeaking is a gross misrepresentation of the process that is more accurately referred to as beak trimming. Beak trimming is only recommended when necessary to prevent feather pecking and cannibalism and only when carried out by properly trained and monitored personnel. Some of the advantages of beak trimming include reduced pecking, reduced feather pulling, reduced cannibalism, better feather condition, less fearfulness, less nervousness, less chronic stress and decreased mortality. It is important to note that cannibalism and other aggressive behaviors are more commonplace in cage-free and free range systems where the flock sizes are larger.

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- <sup>1</sup> Castellan, DM et al. 2004. "Descriptive Study of California Egg Layer Premises and Analysis of Risk Factors for *Salmonella enterica* serotype *enteritidis* as Characterized by Manure Drag Swabs." *Avian Diseases* 48:550-561.
- <sup>2</sup> Kinde, H. et al. 1996. "*Salmonella enteritidis*, Phage Type 4 Infection in a Commercial Layer Flock in Southern California: Bacteriologic and Epidemiologic Findings." *Avian Diseases* 40:665-671.
- <sup>3</sup> Ibid.
- <sup>4</sup> Ibid.
- <sup>5</sup> Dawson, RC et al. Rural Industries Research & Development Corporation. October 2001. *Food Safety Risk Management in Different Egg Production Systems*.
- <sup>6</sup> Kinde, H. et al. 1996. "*Salmonella enteritidis*, Phage Type 4 Infection in a Commercial Layer Flock in Southern California: Bacteriologic and Epidemiologic Findings." *Avian Diseases* 40:665-671.
- <sup>7</sup> Ibid.
- <sup>8</sup> Dawson, RC et al. Rural Industries Research & Development Corporation. October 2001. *Food Safety Risk Management in Different Egg Production Systems*.
- <sup>9</sup> Kinde, H. et al. 1996. "*Salmonella enteritidis*, Phage Type 4 Infection in a Commercial Layer Flock in Southern California: Bacteriologic and Epidemiologic Findings." *Avian Diseases* 40:665-671.
- <sup>10</sup> Dawson, RC et al. Rural Industries Research & Development Corporation. October 2001. *Food Safety Risk Management in Different Egg Production Systems*.
- <sup>11</sup> Liebana, E. et al. 2003. "Molecular fingerprinting evidence of the contribution of wildlife vectors in the maintenance of *Salmonella enteritidis* infection in layer farms". *Journal of Applied Microbiology*. 94:1024-1029.
- <sup>12</sup> Ibid.
- <sup>13</sup> Refsum, T. et al. 2002. "Salmonellae in Avian Wildlife in Norway from 1969 to 2000." *Applied and Environmental Microbiology*. Vol 68, No 11: 5595-5599.
- <sup>14</sup> World Health Organization. December 5, 2005. Epidemic and Pandemic Alert and Response (EPR). Avian Influenza Frequently Asked Questions. [http://www.who.int/csr/disease/avian\\_influenza/avian\\_faqs/en/](http://www.who.int/csr/disease/avian_influenza/avian_faqs/en/). Accessed September 10, 2008.
- <sup>15</sup> United Egg Producers. 2008. *United Egg Producers Animal Husbandry Guidelines for U.S. Egg Laying Flocks*. Accessed September 08, 2008.
- <sup>16</sup> Ibid.
- <sup>17</sup> Sumner, Daniel J. et al. July 2008. "Economic Effects of Proposed Restrictions on Egg-Laying Hen Housing in California." University of California Agricultural Issues Center.
- <sup>18</sup> Bell, D. et al. March 15, 2004. "UEP Uses Scientific Approach in its Establishment of Welfare Guidelines." *Feedstuffs*. Volume 76, No 11. Pp 1-2.
- <sup>19</sup> United Egg Producers. 2008. *United Egg Producers Animal Husbandry Guidelines for U.S. Egg Laying Flocks*. Accessed September 08, 2008.
- <sup>20</sup> U.S. Poultry & Egg Association. 2008. "Frequently asked questions". <http://www.poultryegg.org/faq/docs/industryFAQ.pdf>. Accessed September 10, 2008.
- <sup>21</sup> Ibid.