

Avian Influenza: Unjustly Blaming Outdoor Flocks

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By Dr. Michael Greger

All bird flu viruses seem to start out harmless, arising out of the perpetual, benign, stable reservoir of innocuous waterfowl influenza. They begin as mild, low grade, so-called LPAI viruses, which stands for low pathogenicity avian influenza. H5 and H7 viruses, however, have the potential to mutate into virulent, high-grade "fowl plague" viruses, now known as HPAI—highly pathogenic avian influenza.



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Compassion Over Killing

The World Organization for Animal Health (OIE) and the Food and Agriculture Organization of the United Nations (FAO) consider it "prove[n]" [\(1\)](#) that once low pathogenicity avian influenza viruses gain access to poultry facilities, they "progressively gain pathogenicity in domestic birds through a series of infection cycles until they become HPAI." [\(2\)](#) More specifically, U.S. Department of Agriculture researchers believe that "high density confinement rearing methods" give bird flu "a unique chance to adapt to the new species." [\(3\)](#) That is, intensive factory farming practices may remove the natural obstacles to transmission that prevent the virus from becoming too dangerous.

Deadly Bird Flu Viruses are Made Indoors

David Swayne is the USDA's leading bird flu researcher. Director of the USDA's chief poultry research laboratory, Dr. Swayne has authored more than 100 scientific publications on avian influenza. [\(4\)](#) According to Dr. Swayne, there has never been a recorded emergence of an HPAI virus in any backyard flock or free-range poultry operation. This is not surprising.

Imagine an outdoor setting. A duck flying overhead dive-bombs a dropping laden with relatively innocuous virus into a grassy field through which a flock of hens is pecking. The hens may be exposed to the virus, but coming straight from waterfowl, the virus is so finely-tuned to duck physiology that it may not gain a foothold before being wiped out by a healthy chicken's immune system. When researchers create deadly bird flu viruses in the lab by passing a harmless waterfowl virus through enough chickens, they facilitate transmission by injecting infected lung tissue from one bird to another. "The conditions under which we generated highly virulent viruses from an avirulent strain are generally not duplicated in nature," one research team admitted. "However, viruses with low pathogenicity can cause viremia in physically compromised chickens." [\(5\)](#) Viremia means successful invasion of the bloodstream by the virus, an incursion they deem more likely to occur in compromised hosts.

If an outdoor flock does manage to get infected, the virus still has to keep spreading to remain in existence. Influenza virus is rapidly killed by sunlight and tends to be dehydrated to death in the breeze. Its ability to spread efficiently from one chicken to the next outside in the open air is relatively limited. In a sparsely populated outdoor setting, there may simply be too few susceptible hosts to pass between in order to build up enough adaptive mutations to do more than ruffle a few feathers. According to bird flu expert Dennis Alexander of the U.K.'s Central Veterinary Laboratory, with the possible exception of an outbreak among South African ostriches, [\(6\)](#) highly pathogenic influenza viruses are "never known to arise in an outdoor flock." [\(7\)](#)

Factory Farm Breeding Grounds

Now imagine a new scenario. Tens of thousands of chickens crammed into a filthy, football field-sized shed, left to lie beak-to-beak in their own waste. The air is choked with moist fecal dust and ammonia, which irritates the birds' respiratory passages, further increasing susceptibility in chickens already compromised by the stress of confinement. Since the birds are standing in their own excrement, the virus need not even develop true airborne transmission via nasal or respiratory secretions. Rather, the virus has an opportunity to be excreted in the feces and then inhaled or swallowed by the thousands of other birds confined in the shed, allowing the virus to circulate rapidly and repeatedly. With so many

birds in which to readily mutate, low virulence strains can sometimes turn into deadly ones. Highly pathogenic bird flu viruses seem predominantly to be products of factory farming.(8) Indeed, said University of Ottawa virologist Dr. Earl Brown, a specialist in influenza virus evolution, "You have to say that high intensity chicken rearing is a perfect environment for generating virulent avian flu virus."(9)

Today's industrialized broiler chicken and egg-laying hen factory farms confine tens of thousands—and, with laying hens, even hundreds of thousands—of chickens into what are essentially giant slums.(10) These animals spend the entirety of their shortened lives eating, sleeping, and defecating in the same cramped quarters, breathing in particles of their neighbors' waste and the stinging ammonia of decomposing feces. Their first breath of fresh air is on the truck to the slaughter or rendering plant, if they're not killed on-site. In this kind of environment, mass disease outbreaks may be inevitable.(11)

The WHO, OIE, and FAO are respectively the world's leading medical, veterinary, and agricultural authorities. They all implicate industrial poultry production as playing a role in the current crisis.(12,13,14) In October 2005, the United Nations issued a press release on bird flu stating: "Governments, local authorities and international agencies need to take a greatly increased role in combating the role of factory-farming, commerce in live poultry, and wildlife markets which provide ideal conditions for the virus to spread and mutate into a more dangerous form...."(15)

The overcrowding of factory farms conspires with the stress of confinement to cause immune suppression in birds already bred with weakened immunity, offering viruses like bird flu ample opportunities for spread, amplification, and mutation. Placing inbred birds into unsanitary conditions typical of factory farms seems the "perfect storm" environment for the evolution of the next superflu strain of pandemic influenza. Why, then, has there been concern about the opposite, free-range flocks?

Outdoor Flocks Not the Culprit

In 2004, while H5N1 was blasting across southeast Asia, a highly pathogenic H7N3 outbreak swept through Canada's Fraser Valley east of Vancouver.(16) The backyard chicken farmers blamed the commercial factory-farming industry for the outbreak,(17) and the industry blamed the small farmers.(18) Publicly, the industry denies culpability, but internally admits "the growing realization that viruses previously innocuous to natural host species have in all probability become more virulent by passage through large commercial populations."(19) An August 2005 article in the trade journal *Poultry International* offers a concise explanation of the role of large-scale production: "The AI virus lives harmlessly in the ducks popular in Asia to control insect pests and snails in rice paddies. If this duck flu passes to chickens kept nearby, it can mutate into a deadly and highly contagious strain that speeds rapidly with accompanying high mortality. The larger the flocks and the more intensive the production level, the more scope there is for the disease to spread for genetic changes to the virus."(20)

University of Ottawa's Dr. Brown explained to the Canadian Press, "If you get a [H5 or H7] virus into a high-density poultry operation and give it a period of time, generally a year or so, then you turn that virus into a highly virulent virus. That's what always happens...."(21) Canada's National Manager of Disease Control within the Food Inspection Agency agreed: "Just passing the virus to 3,000 or 4,000 chickens is enough to change a harmless virus into something more pathogenic."(22) "It is high-density chicken farming that gives rise to highly-virulent influenza viruses," Dr. Brown concluded. "That's pretty clear."(23)

These conclusions were based on the best available science. The Canadian outbreak first erupted not in a backyard flock or free-range farm, but on an entirely enclosed, "sophisticated" industrial facility. It then jumped from broiler chicken shed to broiler chicken shed, largely skipping free-range farms.(24) The spread of the virus was traced mainly to the human lateral transmission of infective feces via equipment or some other fomite moved from farm to farm.(25) This may also explain how the virus was first introduced into the industrial broiler factory farms. Chickens don't need to come in direct contact with ducks to get infected; they just need contact with the virus, which can be walked into a "biosecure" operation on someone's clothing.(26)

Factory Farms at Higher Risk for the Emergence of Deadly Bird Flu Viruses

In the end, epidemiological analyses placed commercial flocks in the 2004 Canadian outbreak at 5.6 times more likely to be infected than backyard flocks. Infected backyard flocks were discovered *after* nearby commercial flocks were infected, suggesting that the virus spread from the industrialized operations to free-range poultry and not vice versa.(27) Birds kept outdoors are more likely to come in contact with wild waterfowl, but also more likely to come in contact with sunlight,

space, and fresh air. Lower stress levels may help their bodies better resist the initial infection, and, since they don't live in their own waste while cramped into poorly-ventilated sheds by the tens of thousands as their factory-farmed counterparts do, the virus may not spread effectively enough to mutate into a killer. Instead of blaming backyard flocks, attention should be turned to industrialized animal factories.

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