Poultry on Antibiotics: Hazards to Human Health
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Founded in 1986, IATP works with family farm organizations around the country and the world, supporting policies and practices that result in healthy, profitable farms, greater public benefit, a safer food supply and flourishing rural communities.

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**Executive Summary**

Consumers expect the meat they purchase to be free of health-threatening bacteria. Increasingly, though, we’ve learned that food products, particularly meats, may be contaminated with bacteria that pose serious health risks.

In October 2002, the U.S. experienced the largest recall of meat in its history. It was associated with 13 deaths and 120 illnesses. Overall, the Centers for Disease Control and Prevention (CDC) estimates that bacteria cause nearly 5.2 million foodborne infections each year, resulting in 36,000 hospitalizations and almost 1300 deaths.

Most foodborne illness caused by bacteria gives victims a few days of intense discomfort and requires no treatment with antibiotics. But for patients whose infections spread beyond the intestine, antibiotics can be lifesaving.

For decades, antibiotics have dramatically reduced illness and death from bacterial infections. But recently, the effectiveness of these life-saving drugs has begun to wane because antibiotics are being overused.

Certainly antibiotics are overused in human medicine. Yet another major, and often overlooked, source of overuse is that factory farms routinely feed antibiotics to livestock to promote growth and to compensate for crowded, unsanitary conditions conducive to infection.

Scientific consensus now says that this antibiotic use in food animals contributes to antibiotic-resistant bacteria transferred to humans, mainly through contaminated food. The Union of Concerned Scientists estimates that 70 percent of all antibiotics in the U.S. are fed to pigs, poultry and cattle for reasons other than treating disease. The majority of such medicines are “medically important” – that is, identical, or nearly so to antibiotics used for humans.

Medical professionals are speaking out against this unnecessary use of antibiotics in food animals. If they can't rely upon effective antibiotics, it will become more difficult, and in some cases impossible, to treat bacterial illnesses. The American Medical Association (AMA) has gone on record opposing the use of antibiotics in farm animals that aren’t sick.

Given the current interest in foodborne illness and antibiotic resistance, this study focuses on determining the prevalence of antibiotic-resistant bacteria on poultry products routinely purchased at grocery stores. Consumers should know what bacteria may contaminate their food and the potential dangers of eating certain food products.

This is the first study to examine brand-name poultry products at the retail level for the presence of antibiotic-resistant bacteria, including resistance to medicines relied upon to treat human infections. We chose brand-name poultry products that were prominent in the grocery stores we visited. Ours is also the first study to test for drug resistance among multiple bacteria found on poultry products at the same time, arguably a better measure of risk to the people actually eating the poultry.
We bought 200 fresh whole chickens and 200 packages of ground turkey from grocery stores in Des Moines, Iowa and Minneapolis-St. Paul, Minnesota. We contracted with a certified food-testing laboratory to test the products for the presence of three bacterial strains – *Salmonella*, *Enterococci* and *Campylobacter* – and for resistance to a number of antibiotics.

*Campylobacter* and *Salmonella* are the top two bacterial causes of foodborne illness in the U.S. Together, they account for an estimated 3.3 million foodborne infections and more than 650 deaths each year. Not everyone is at the same level of risk. Infants are ten times more likely than the general population to contract *Salmonella* infections, and twice as likely as older people to suffer a *Campylobacter* infection.

Contaminated meat is the dominant source of human *Salmonella* infections, while 50 percent or more of *Campylobacter* infections may come from eating contaminated chicken, according to Food and Drug Administration (FDA) estimates.

Disease-causing bacteria, *Salmonella* or *Campylobacter*, contaminated a large proportion of the whole chickens and ground turkey we purchased. The widespread resistance of bacteria in poultry samples to one or multiple antibiotics is perhaps an even greater cause for concern.

- Ninety-five percent of the 100 whole chickens we tested were positive for *Campylobacter*, the top cause of bacterial foodborne illness, or food poisoning, in the U.S. Nearly 62 percent of the *Campylobacter* bacteria tested for resistance were resistant to 1 or more antibiotics.

- More than 8 percent of *Campylobacter* tested for resistance were resistant to Cipro, the antibiotic of choice for presumptively treating severe bacterial food poisoning. The FDA’s best estimate recently was that more than 153,000 people in 1999 alone contracted Cipro-resistant *Campylobacter*, just from eating contaminated chicken.

- Nearly 18 percent of whole chickens purchased were contaminated with *Salmonella*. Twenty percent of Country Pride chickens carried *Salmonella*, as did 15 percent of Gold’N Plump chickens. All 35 *Salmonella* isolated from whole chickens were analyzed for antibiotic resistance, and 6 percent were resistant to 4 or more antibiotics.

- Ground turkey purchased was more contaminated with *Salmonella* than was whole chicken, with an overall rate of 45 percent. Fifty-six percent of the Honeysuckle White ground turkey and 34 percent of the Jennie-O ground turkey carried *Salmonella*. Sixty-two percent of the *Salmonella* bacteria tested that were found in turkey were resistant to 1 or more antibiotics; a third of these *Salmonella* were resistant to 4 or more antibiotics.
• Both *Salmonella* and *Campylobacter* contaminated 32 percent of the Country Pride chickens and 14 percent of the Gold’N Plump chickens that we tested for both organisms (100 total), as well as 2 percent of the Jennie-O turkey we tested (1 of 51 packages).

• More than 90 percent of the *Enterococci* from chicken or turkey that was tested (101 total) for resistance was resistant to Synercid. Strains of resistant *Enterococci* are a growing cause of infections and deaths in hospitals, and Synercid is one of a few antibiotics still effective against them.

There are no good estimates of how many people overall suffer from foodborne infections resistant to antibiotics. As noted, more than 150,000 people may have developed fluoroquinolone-resistant *Campylobacter* infections just from eating contaminated chicken. Most antibiotic-resistant *Salmonella* in humans stems from eating contaminated food as well.

More people eating food contaminated with antibiotic-resistant *Salmonella* or *Campylobacter* will become ill than will people eating food with non-resistant organisms. One estimate is that the mere presence of *Salmonella* and *Campylobacter* strains resistant to at least one antibiotic could result in nearly 47,000 additional people getting foodborne illnesses, when compared to the expected number of sick following exposure to non-resistant strains.

In addition, people with antibiotic-resistant *Salmonella* and *Campylobacter* are likely to be sicker, for longer, than are people with non-resistant infections.

**Recommendations**

Consuming meat with antibiotic-resistant bacteria is not inevitable. Consumers, poultry producers and restaurants can all take steps to reduce or eliminate these health threats.

Poultry producers should reduce overall antibiotic use to a minimum. In addition, they should stop feeding antibiotics to birds or flocks that are not sick. Poultry producers also should stop using any antibiotic “cousins” of Cipro, which is simply too important to humans to risk its effectiveness by continuing the imprudent use of closely related drugs in poultry.

The good news is that some poultry producers are working hard to provide safer chickens and turkeys, by using better hygiene, by implementing growing or slaughter conditions to lower the levels of disease-causing bacteria on their meats, or by avoiding the use of antibiotics which increase the risk that meat will be contaminated with antibiotic-resistant bacteria.

Four of the top five top chicken producers already have sworn off any use of Cipro-like antibiotics, including ConAgra Poultry, producers of Country Pride chicken. Others, also including ConAgra, have made various claims to having stopped or greatly reduced the use of antibiotics for growth promotion or disease prophylaxis. We generally laud this approach, although there is no existing mechanism for verifying producers’ claims.
Large-volume buyers should only purchase poultry from producers that use no antibiotics for animals that are not sick, such as for growth promotion, and that use no critically important human antibiotics, like Cipro, for any reason. McDonald’s, Popeye’s and Wendy’s all now claim they refuse to buy chicken treated with Cipro-like antibiotics. Several other fast food companies, like Hardee’s, Subway and Domino’s, have similar policies, but also say they won’t buy chickens fed important human antibiotics for non-therapeutic reasons, like growth promotion.

For consumers to be certain of buying poultry raised without antibiotics, they can buy certified organic chickens and turkeys.

Some poultry producers use U.S. Department of Agriculture (USDA)-defined terms like “raised without antibiotics” or “no antibiotics administered” on their meat labels. Consumers can derive some assurance from these claims, although no third party certifies them, as is the case with organic products.

Check out the Eat Well Guide, www.iatp.org/EatWell, for a state-by-state listing of meat and poultry producers using no antibiotics, or no routine antibiotics, in addition to restaurants and other places to buy these products. If they are not available, consumers should ask grocery store or restaurant managers to provide this option.

Consumers also should always cook meat thoroughly and carefully follow safe meat-handling procedures. Consumers can find practical advice and general information on food safety at www.foodsafety.gov.
CHAPTER 1

INTRODUCTION

Bacterial foodborne illness is a serious health problem in the United States. In October 2002, the U.S. experienced the largest recall of meat in its history.\(^1\) It was associated with 13 deaths and 120 illnesses. Each year, foodborne bacteria result in nearly 5.2 million illnesses, 36,000 hospitalizations and almost 1300 deaths, according to Centers for Disease Control and Prevention (CDC) estimates.\(^2\)

*Campylobacter* and *Salmonella* are the leading causes of foodborne bacterial infections. Together, they are responsible for an estimated 3.3 million foodborne infections and more than 650 deaths each year.\(^3\) In rare cases, people infected with *Campylobacter* can later develop Guillain-Barré Syndrome, an acute paralytic condition that can sometimes be fatal.\(^4\)

An estimated 80 percent of *Campylobacter* infections and 95 percent of *Salmonella* infections are contracted via contaminated food.\(^5\) Contaminated meat is considered the dominant source of *Salmonella* infections.\(^6\) Poultry is a major source of human *Campylobacter* infection, 48.5 to 66.7 percent may come from eating chicken, according to recent estimates by the U.S. Food and Drug Administration (FDA).\(^7,8\)

U.S. poultry is significantly contaminated with *Campylobacter* and *Salmonella*. In 1994-95, the U.S. Department of Agriculture (USDA) surveyed whole chickens from slaughter facilities representative of the nation as a whole and found 88 percent were contaminated with *Campylobacter* bacteria, while 20 percent carried *Salmonella*.\(^9\)

**Antibiotics vs. Antimicrobials**

Antibiotics are naturally occurring chemicals that kill or inhibit bacteria. But the term is often used more loosely to also include synthetic antibacterial agents, as well as compounds that affect other microorganisms, like parasites (technically "antimicrobials").

*Salmonella* and *Campylobacter* on meat have long been a problem. The escalating resistance of these and other foodborne bacteria to one or multiple antibiotics has raised more recent concerns.

Most foodborne illness caused by bacteria gives victims a few days of intense discomfort – diarrhea, fever, abdominal cramps, and requires no treatment with antibiotics. For patients whose infections become invasive, entering the bloodstream, brain or other organs outside the intestine, antibiotics may be life-saving. Around 40 percent of people with *Salmonella* infections who seek treatment receive antibiotics, according to surveys by the CDC.\(^10\) Rising antibiotic resistance among foodborne pathogens therefore carries health consequences for humans, as well as for animals.\(^11,12,13\)

Eating food that contains antibiotic-resistant pathogens can have a direct impact on health. Resistant strains of bacteria can cause more severe or more prolonged illnesses than will non-resistant bacteria.\(^14\) Indirect health impacts are less obvious. Mounting evidence suggests that antibiotic-resistant bacteria on food, once ingested, may be able
to pass their resistance onto other bacteria in the human intestine. If pathogenic, these newly resistant bacteria could go on to cause disease in the person eating the food, although perhaps long after the food was actually consumed.

**Use of Antibiotics in Poultry and Other Food Animals**

Ultimately, it is the use of antibiotics that drives bacteria to become resistant. Certainly, human uses are important. But the scientific consensus emerging is that antibiotic use in food animals also contributes to antibiotic-resistant bacteria transmitted to humans, typically through contaminated food.\(^{15,16,17,18,19,20,21}\)

Bacteria found in the intestines of animals can be animal pathogens, human pathogens like *Salmonella* and *Campylobacter*, or "commensal" bacteria, which are part of the normal bacterial flora. Resistance can emerge and spread when these bacteria are exposed to non-lethal levels of antibiotics, such as those in animal feed or water for growth promotion. During slaughter or processing, these resistant bacteria can contaminate food.

Resistant bacteria, as well as the genetic material that makes them resistant, also can spread to human handlers, to other animals or to the broader environment – such as through manure, which can itself contaminate the surface waters, groundwater, and air that is next to, under or above livestock farms.

No government mechanism in the U.S. tracks antibiotic use, in humans or in food animals. Estimates by industry and advocacy groups agree that antibiotic use in food animals is huge, as much as 29.5 million pounds, dwarfing total human use by 4 to 10-fold.\(^{22,23}\)

Antibiotic use is widespread in confined animal feeding operations (CAFOs) – more commonly, “factory farms” – that have come to dominate food animal production in the U.S.\(^{24,25}\) Poultry factories now dominate U.S. production, accounting for more than 97% of U.S. sales of broiler chickens.\(^{26}\) The EPA defines factory broiler chicken and turkey facilities as those containing at least 100,000 broilers or 55,000 turkeys.

Surveys of poultry plants in 2000 found that two-thirds were giving broiler chickens “grower” feeds containing antibiotics, while almost 65 percent were using antibiotic “starter” feeds – this, according to an industry database representing more than 90 percent of the broiler industry.\(^{27}\) Arsenic compounds also were used in starter and grower feeds by almost 70 percent and 74 percent of broiler “plants” surveyed, respectively.\(^{28}\)

Antibiotics generally are put into feed not as therapy for treating sick birds or flocks, but rather to promote growth or to prevent infections among flocks raised in cramped, stress-inducing, often unhygienic conditions conducive to infection. The Union of Concerned Scientists, using available data, recently estimated that 10.5 million pounds of antibiotics annually are put in poultry feed or water for these non-therapeutic reasons.\(^{29}\)
Twenty-one percent (2.2 million pounds) are antibiotics identical or nearly so to ones used in human medicine. They include tetracyclines, erythromycin, penicillin, bacitracin, and virginiamycin (a close relative of the critical human medicine, Synercid). By comparison, all human antibiotic use may consist of just 3 million pounds each year.30

The balance of non-therapeutic poultry antibiotics – 8.3 million pounds – are arsenical compounds (like roxarsone) or other agents not considered important for human use.

By industry estimates (1999), around 38,000 pounds of fluoroquinolone antibiotics annually also are given in drinking water to poultry flocks when some birds become sick with respiratory disease.31 Fluoroquinolones, such as ciprofloxacin (Cipro) are considered critical human medicines. When fluoroquinolone agents were first approved for use in poultry in 1995, therefore, it provoked much public health concern. When a 1999 Minnesota study found 20 percent of Campylobacter isolated from retail chickens to be Cipro-resistant, that concern only grew.

**Purpose of this Report**

No government testing to date, nor studies appearing in scientific journals, have tested specific poultry brands for both the presence of disease-causing bacteria and their resistance to antibiotics. No studies that we have identified have tested multiple bacteria found on poultry at the same time for their resistance to antibiotics, perhaps the best reflection of bacterial risk to people actually eating the meat.

In 1998, the magazine *Consumer Reports* did test 1,000 whole chickens purchased from grocery stores in 36 cities for levels of *Salmonella*, *Campylobacter* and generic *Escherichia coli* (an indicator of fecal contamination). The study included tests of four leading brands – Perdue, Tyson Holly Farms, Foster Farms and Country Pride, as well as several “premium” supermarket and kosher brands (of these, Country Pride is the only brand we also tested). The *Consumer Reports* study did not test turkey meat, and did not test for antibiotic resistance among any of the bacteria found on meat.

That study also preceded the U.S. Department of Agriculture’s 1998 launch of its new HACCP (Hazard Analysis and Critical Control Point) slaughterhouse inspection program, specifically designed to reduce the levels of certain pathogens on meat and poultry. For poultry consumers, especially those in Minnesota and Iowa, therefore, our study gives new or updated information about the effectiveness of the program in ensuring lower pathogen levels on the specific poultry brands they buy.

The Sierra Club and the Institute for Agriculture & Trade Policy jointly commissioned this study, using funds from non-profit foundations or individual donors. We neither solicited nor used any money from corporations for this project.
CHAPTER 2

BACKGROUND INFORMATION ON BACTERIAL CONTAMINATION OF MEAT AND PUBLIC HEALTH CONCERNS

Government studies, as well as articles published in scientific journals, have long demonstrated that U.S. meats, including chicken and turkey, are significantly contaminated with disease-causing bacteria, including Salmonella and Campylobacter. More recent studies also demonstrate that Salmonella, Campylobacter, and other bacteria on meat individually often are resistant to antibiotics.

Government Testing for Bacteria in Meat

In 1994-95, the U.S. Department of Agriculture’s Food Safety Inspection Service (FSIS) sampled nearly 1300 broiler chickens from slaughter facilities responsible for 99 percent of all slaughtered U.S. chickens. It found 88 percent were contaminated with Campylobacter bacteria, while 20 percent carried Salmonella bacteria. Similarly, FSIS collected nearly 300 ground turkey samples in 1995 from 40 slaughterhouses, and found half (49.9 percent) carried Salmonella, and one in four samples (25.4 percent) was contaminated with Campylobacter species.

For both broilers and ground turkey, the 1994-95 Salmonella data became the microbiological “baseline” or standard for the USDA’s new HACCP system for slaughterhouse inspection, which began in 1998. Under HACCP, USDA collects hundreds or thousands of meat samples each year from large and small slaughterhouses and tests them for Salmonella. To be in compliance, for example, no more than 20 percent of the 51 broilers tested in a plant (or 49.9 percent of the ground turkey) can carry Salmonella. Plants out of compliance must start corrective actions in order to meet the standard in follow-up testing. Strictly speaking, HACCP is simply an inspection program to monitor the cleanliness of slaughter facilities, and not a program for assuring consumers access to safe meat at the retail level.

In the years since HACCP began, USDA data (Table 1) show that in large plants meeting the Salmonella standards for either broilers or ground turkey, the prevalence of Salmonella has tended to fall. For 2001, the most recent data show Salmonella contamination of just 9.7 percent and 25.2 percent on broilers and ground turkey, respectively, for these same large plants – roughly half the levels found in USDA’s “baseline” surveys in 1994-95.
By way of comparison, USDA (2001) recently tested whole turkeys in 38 slaughter plants throughout the U.S. for Salmonella contamination. The Center for Science in the Public Interest released the data to the public, including contamination levels for specific named plants, which ranged from 0 percent to more than 30 percent. For example, Honeysuckle White brand whole turkeys tested in various Cargill plants were found to have Salmonella contamination ranging from 1.8 percent of tested birds (in California, MO) to 8.9% of birds (in Ozark, AR). Jennie-O brand whole turkeys tested in various Jennie-O plants were found to have Salmonella contamination ranging from 7.0 percent of tested birds (in Pelican Rapids, MN) to 14.3 percent of birds (in Faribault, MN plant).

Unlike for Salmonella, there is no performance standard for Campylobacter contamination under HACCP, nor does it require any testing of slaughter facilities for Campylobacter contamination of meat.

Other Select Studies of Bacteria in Meat

In Fall 1997, scientists at the Minnesota Department of Health purchased 91 “domestic chicken products” from retail supermarkets in the Minneapolis-St. Paul area, and found 88 percent contaminated with Campylobacter – the same prevalence as that found in USDA’s 1994-95 baseline survey of broilers in slaughter facilities.

A study by White et al. (2001) purchased ground meats from supermarkets in the Washington, DC area and found 41 out of 200, or 20 percent, were contaminated with Salmonella. Ground chicken (35%) and ground turkey (24%) were more frequently contaminated than were ground pork (16%) or ground beef (6%).

Recent surveys of U.S. retail meats also have found that an alarming percentage carry bacteria resistant to one or more important antibiotics. White et al. (2001), for example, analyzed 45 Salmonella from the 41 ground meat samples positive for Salmonella (some samples yielded multiple isolates). Eighty-four percent were resistant to at least one antibiotic, 53 percent were resistant to three or more antibiotics, and 27 percent were resistant to at least six antibiotics.

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**Table 1: Prevalence of Salmonella and Campylobacter (in % of samples) on Raw Broiler Chickens and Ground Turkey Meat in Large U.S. Slaughterhouses Meeting USDA’s Standards Under HACCP, 1998-2001, and Compared to Baseline.**

<table>
<thead>
<tr>
<th>Year of Testing</th>
<th>Salmonella</th>
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<tr>
<td></td>
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</tr>
<tr>
<td>2001</td>
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In the Minnesota study just described, *Campylobacter* bacteria found on retail chicken products were also analyzed for antibiotic resistance. Twenty percent (18 of 91 products) of *Campylobacter* were resistant to ciprofloxacin. Eight of these Cipro-resistant isolates were also resistant to two other human fluoroquinolone medicines, grepafloxacin and trovafloxacin, as well as to two poultry fluoroquinolones, enrofloxacin (Baytril) and sarafloxacin. Six of the eight were also resistant to a fifth fluoroquinolone.38

As indicated by preliminary data from the Centers for Disease Control and Prevention, human *Campylobacter* infections resistant to fluoroquinolone (FQ) antibiotics rose from 13 percent in 1997 to 19 percent in 2001.39 A decade ago, fluoroquinolone resistance was negligible. Human use of FQ antibiotics began in 1986. Yet FQ-resistant *Campylobacter* infections increased little until 1996-97, soon after the 1995 FDA approval of these drugs for use in poultry.40 McDermott et al. (2002) have demonstrated that in poultry flocks given such fluoroquinolones, *Campylobacter* bacteria rapidly become less sensitive to these drugs, and the resistance persists long after the antibiotic is stopped.41 In 2000, the FDA proposed banning these poultry fluoroquinolones, due to concern that their use has contributed to the dramatic rise in the prevalence of Cipro-resistant *Campylobacter* infections in humans.

**Health Hazards from Resistant Bacteria on Retail Meats**

There are no good estimates of how many people suffer from foodborne infections resistant to antibiotics. The Food and Drug Administration’s best estimate using 1999 data is that 153,580 Americans developed FQ-resistant (Cipro-resistant) *Campylobacter* infections alone after eating contaminated chicken inside the U.S.42 Most human infections with antibiotic-resistant *Salmonella* come from contaminated food, as well.43,44,45,46,47

While eating contaminated food may be the most obvious way to contract a resistant infection, bacteria in meat juices can also contaminate kitchen surfaces and utensils, indirectly leading to infection.

Though most infections do not require them, it is not uncommon for foodborne illness to be treated with antibiotics. Forty percent of patients with *Salmonella* seeking treatment received antibiotics, according to CDC surveys in 1990 and 1995. Rising antibiotic resistance among foodborne pathogens, like *Salmonella* and *Campylobacter*, therefore carries direct health consequences, a few of which are described.48,49,50

**Less effective antibiotics, and fewer alternatives.** Patients with bacterial infections respond poorly to an antibiotic given empirically (without a culture) if it turns out to be a medicine to which the bacteria are resistant.

Antibiotics work best at limiting the duration of a serious (bacterial) foodborne infection when taken early, even before cultures have confirmed exactly which microbe is the cause.51,52 Yet, an infection caused by an actually resistant bacterial strain can mean that the initial, empirically-chosen antibiotic proves to be ineffective. Even a suspicion of resistance, therefore, can compel a health practitioner to choose a more toxic or
expensive antibiotic than would otherwise be the case. The rising resistance of foodborne pathogens to fluoroquinolones, therefore, is particularly concerning.53

Fluoroquinolone antibiotics, like Cipro, are currently favored for empirically treating a severe foodborne infection of undetermined origin, because they work against most bacterial causes and have relatively few side effects. Rising resistance among foodborne bacteria means that previously used medicines are no longer favored. Macrolide antibiotics (like erythromycin) are also effective for treating Campylobacter, but not Salmonella or many other foodborne pathogens, so they are less useful as an empiric therapy.

A recent Minnesota study found that sixty-five percent of patients treated for Campylobacter received a fluoroquinolone antibiotic. Fluoroquinolones are not approved for use in children, however.

Ciprofloxacin also is the most-prescribed antibiotic for Salmonella infections, according to CDC surveys.54 Expanded spectrum cephalosporins are the current antibiotic of choice for treating children with serious Salmonella infection, in part due to the low prevalence of resistance. In the past, ampicillin, chloramphenicol and trimethoprim-sulfamethoxazole (Bactrim) have all been the “drug of choice” for treating Salmonella infections.55

Increased resistance to any antibiotics used for treating severe foodborne infections is worrisome. Because they are the antibiotics of choice for serious infections in adults and children, however, increased Campylobacter resistance to erythromycin and fluoroquinolones, or Salmonella resistance to fluoroquinolones and cephalosporins, would have grave consequences for human health. Because of their beneficial properties, no clear and effective alternatives are available to these critical medicines.

Worse, more prolonged illness. For both Salmonella and Campylobacter, data suggest that antibiotic-resistant strains cause more severe or more prolonged illnesses than do non-resistant strains. For example, one recent study estimates that each year more than 400,000 additional days of diarrhea can be attributed to people in the U.S. contracting fluoroquinolone-resistant Campylobacter infections from domestically contaminated food.56

Not everyone is equally vulnerable to antibiotic-resistant infections. Children face higher risks, and more limited treatment options. Infants are ten times more likely than the general population to contract Salmonella infections, for example, and twice as likely as older people to suffer a Campylobacter infection.57 Infants and toddlers also can become infected by lower levels of bacteria on food than do adults. In newborns and very young infants, such infections are more likely to invade the bloodstream.58 With Salmonella and other foodborne pathogens becoming increasingly resistant to existing antibiotics, fewer medicines may be available to treat children with these infections.59

More infections. Foodborne pathogens need not be resistant to the antibiotics specifically used for treating foodborne disease for that resistance to be significant to public health.
The normal complement of bacteria in the human gut provides an important level of protection against intestinal infections by disease-causing bacteria. Even routine antibiotic use disrupts this protection, increasing a person’s odds of getting an infection if exposed to a foodborne pathogen.

When that foodborne pathogen is resistant to an antibiotic (or more than one), however, studies suggest the person who happens to be taking that same medicine – even for an unrelated reason – has a more than 3-fold greater vulnerability to being infected.60 In other words, antibiotic resistance among foodborne bacteria actually results in more people getting sick with foodborne infections than would have been the case without such resistance. In 2002, a published study estimates that the mere presence of Salmonella and Campylobacter strains resistant to at least one antibiotic will result in 29,300 additional human Salmonella infections and 17,600 additional Campylobacter infections each year.61

**Concerns About “Opportunistic” Bacteria on Meat**

The human intestine is colonized by around 500 commensal bacteria species.62 Commensal bacteria typically cause no disease, but may do so opportunistically, when the immune system or other normal defenses against infection have been compromised – as in hospitalized patients, or patients undergoing chemotherapy for cancer. Some of these non-pathogenic bacteria are found on food, and are also becoming more and more resistant to antibiotics. They pose a health threat as well.

*Enterococci* bacteria are considered commensal. Retail meats are often contaminated with antibiotic-resistant *Enterococci*.63,64,65 Danish researchers recently studied volunteers intentionally given chicken or pork contaminated with antibiotic-resistant *Enterococci*; these bacteria persisted in their intestines for at least two weeks.66 People whose intestines become colonized with drug-resistant *Enterococci* can later develop opportunistic infections in the hospital. Certain *Enterococci* strains, with resistance to vancomycin and with high-level resistance to gentamicin, have become important causes of illness and death in hospitals.67 Gentamicin and vancomycin are important treatments for *Enterococci* infections; many strains resistant to these drugs may now only be treated with two newer human antibiotics, linezolid (Zyvox) and quinupristin/dalfopristin (Synercid). Synercid, a combination of two streptogramin antibiotics, was FDA-approved in 1999 specifically for treating these resistant infections. Resistance to Synercid is increasing however.

Gentamicin along with virginiamycin, a close cousin of Synercid, is frequently used non-therapeutically, for growth promotion and disease prevention in chickens. Research suggests the widespread use of virginiamycin and gentamicin in chickens has created a reservoir of Synercid-resistant and gentamicin-resistant *Enterococci* in the food supply.68 This raises concerns that poultry contaminated with these bacteria may carry the “seeds” of resistance to these medicines from animals into the intestinal flora of the human populations, where *Enterococci* is also part of the normal bacterial flora.69
CHAPTER 3

PATHOGENS IN POULTRY: OUR TEST RESULTS

For this project, we bought and had tested chicken and turkey products routinely available to shoppers at large supermarket chains in Des Moines, Iowa and Minneapolis-St. Paul, Minnesota.

We tested 200 fresh whole chickens and 200 packages of fresh ground turkey in all, 100 of each from the two states. Iowa-purchased poultry products included Country Pride chicken and Honeysuckle White turkey; Minnesota-purchased brands were Gold’N Plump chicken and Jennie-O turkey. Each brand is commonly found in groceries, either regionally or nationally.

Gold’N Plump chicken is produced by Gold’N Plump Poultry (St. Cloud, MN). Country Pride is a brand of ConAgra Poultry Group (Duluth, GA). Ground turkey under the Jennie-O and Honeysuckle White labels are products of Jennie-O Turkey Store, Inc. (Willmar, MN) – a subsidiary of Austin, MN-based Hormel Foods, and Cargill, Inc. (Minneapolis, MN).

We contracted with a certified food-testing laboratory to test the products for the presence of three bacterial strains – Salmonella, Campylobacter and Enterococci – and for resistance to a number of antibiotics. For cost reasons, not every meat sample was tested for every type of bacteria (Table 2 and Tables A-2 and A-3 in Appendix A). Testing also was not done to determine the exact strain of certain bacteria present on the meat – Salmonella typhimurium, for example. Finally, not every bacteria actually isolated in these tests was itself tested for antibiotic resistance.

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</tr>
<tr>
<td>Jennie-O</td>
<td>50</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Honeysuckle White</td>
<td>51</td>
<td>100</td>
<td>51</td>
</tr>
<tr>
<td>Overall</td>
<td>101</td>
<td>200</td>
<td>101</td>
</tr>
</tbody>
</table>

Appendix A describes in detail the methodology for collecting the meat samples, as well as the methodology for the actual testing of the meat samples. Appendix B summarizes the results of testing individual bacteria for resistance to antibiotics.
Whole Chicken Contamination

Laboratory testing found that, overall, nearly 18 percent of the fresh whole chickens purchased were contaminated with Salmonella, the second leading bacterial cause of foodborne illness in the U.S. (Table 3).

<table>
<thead>
<tr>
<th>Table 3: Prevalence of Foodborne Pathogens on Whole Chicken, Ground Turkey Purchased in Minnesota and Iowa</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Whole Chicken</strong></td>
</tr>
<tr>
<td>Gold'N Plump</td>
</tr>
<tr>
<td>Country Pride</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
</tr>
<tr>
<td><strong>Ground Turkey</strong></td>
</tr>
<tr>
<td>Jennie-O</td>
</tr>
<tr>
<td>Honeysuckle White</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
</tr>
</tbody>
</table>

Twenty percent of Country Pride chickens carried Salmonella, as did 15 percent of Gold'N Plump chickens. By comparison, in 2001 the prevalence of Salmonella on whole chickens from large slaughter facilities passing the USDA's Salmonella “baseline” or standard under its HACCP inspection program was 9.7 percent – although this program tests chicken in the slaughterhouse, not at the retail level. The contamination rate in all slaughter facilities, large, small or very small, was 11.9 percent. Both of the chicken brands we tested exceeded these levels.

All 35 Salmonella isolated from whole chickens were analyzed for antibiotic resistance. Nearly six percent (n=2) were resistant to 4 or more antibiotics (Table 4). One of these Salmonella, from a Gold'N Plump chicken, carried resistance to gentamicin, streptomycin, sulfamethoxazole, and tetracycline. The other, from a Country Pride chicken, was resistant to six antibiotics, including augmentin-clavulenic acid, ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, and tetracycline. Though no resistance to Cipro was observed in these Salmonella from chicken, there was some resistance to ampicillin and chloramphenicol, which – along with trimethoprim-sulfamethoxazole (Bactrim) – have been “treatments of choice” for Salmonella infections in the past.

<table>
<thead>
<tr>
<th>Table 4: Salmonella Resistance to One or Multiple Antibiotics (in % of isolates tested)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Whole Chicken</strong></td>
</tr>
<tr>
<td>Gold’N Plump</td>
</tr>
<tr>
<td>Country Pride</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
</tr>
<tr>
<td><strong>Ground Turkey</strong></td>
</tr>
<tr>
<td>Jennie-O</td>
</tr>
<tr>
<td>Honeysuckle White</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
</tr>
</tbody>
</table>
Campylobacter contaminated 95 percent of the whole chickens tested.

Forty-seven of the Campylobacter found on chicken were further tested for resistance. Nearly 62 percent (n=29) were found resistant to 1 or more antibiotics, and more than 6 percent (n=3) were resistant to 2 or more antibiotics (Table 5).

More than 6 percent of these chicken isolates overall were resistant to Cipro. By brand, 8.7 percent (2 isolates) of Campylobacter on Country Pride chickens, and 4.2 percent (1 isolate) on Gold’N Plump chickens, were Cipro-resistant (Appendix B).

| Table 5: Campylobacter Resistance to One or Multiple Antibiotics (in % of isolates tested) |
|--------------------------------------------------|----------|----------|----------|
|                                                   | 1 or more | 2 or more | 4 or more |
| **Whole Chicken**                                 |          |          |          |
| Gold’N Plump                                      | 75.0%    | 4.2%     | 0.0%     |
| Country Pride                                     | 47.8%    | 8.7%     | 4.3%     |
| **Overall**                                       | 61.7%    | 6.4%     | 2.1%     |
| **Ground Turkey**                                 |          |          |          |
| Jennie-O                                          | 100.0%   | 0.0%     | 0.0%     |
| Honeysuckle White                                 | 100.0%   | 0.0%     | 0.0%     |
| **Overall**                                       | 100.0%   | 50.0%    | 50.0%    |

Ground Turkey Contamination

Ground turkey tested was more contaminated with Salmonella than was whole chicken, with an overall rate of 45 percent. Fifty-six percent of Honeysuckle White turkey carried Salmonella bacteria, while contamination of Jennie-O turkey, at 34 percent, was somewhat lower.

By comparison, in 2001 the prevalence of Salmonella in ground turkey from large slaughter facilities passing the USDA’s Salmonella “baseline” or standard under its HACCP inspection program was 25.2 percent. Again, ground turkey that we tested of either brand exceeded this level. Salmonella contamination of Honeysuckle White turkey was more than twice as high.

Of the 90 Salmonella isolated from ground turkey overall, half were tested for antibiotic resistance. Over 62 percent (28 of 45) of the latter were resistant to at least one antibiotic, almost half were resistant to 3 or more antibiotics, and roughly one-third to 4 or more antibiotics (Table 4). Resistant turkey isolates were most likely to carry resistance to the antibiotics streptomycin and tetracycline (48.9 percent), sulfamethoxazole (42.2 percent) and gentamicin (35.6 percent). Kanamycin resistance was 15.6 percent (Table 6).

While the Jennie-O products tested carried less Salmonella than did Honeysuckle White products, the resistant Salmonella in the Jennie-O products tended to be resistant to more antibiotics; nearly 59 percent of these isolates were resistant to four or more antibiotics, compared with just over 14 percent for Honeysuckle White.
Of the two *Campylobacter* isolated from ground turkey packages, both were antibiotic resistant. One, from a Jennie-O package, was the most resistant of any *Campylobacter* bacteria identified, with resistance to six antibiotics including ciprofloxacin (Cipro), tetracycline and erythromycin. The same package also yielded a *Salmonella* bacterium resistant to four antibiotics.

Cipro and erythromycin are the two antibiotics of choice for treating severe *Campylobacter* infections in adults, so the presence of bacteria resistant to both of them raises concerns.

More than 8 percent of the *Campylobacter* isolated from chicken or turkey products and tested for resistance were resistant to Cipro (Table 7), while more than 61 percent were resistant to tetracycline. Only the turkey *Campylobacter* isolate mentioned above was fully resistant to erythromycin. In 22 percent of the *Campylobacter* bacteria tested, however, there was diminished susceptibility to erythromycin, meaning they were somewhat resistant. Whether or not this has implications for the likely evolution of full resistance to erythromycin in the future is unclear.

### Table 6: Antibiotic Resistance Summary for 35 *Salmonella* Isolates from Chicken, 45 Isolates from Turkey

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Whole Chicken % Resistant</th>
<th>Ground Turkey % Resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amikacin</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Amoxicillin-clavulanic acid</td>
<td>2.9%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>2.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Cefoxitin</td>
<td>0.0%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Cefotiofur</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Cephalothin</td>
<td>0.0%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>2.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>2.9%</td>
<td>35.6%</td>
</tr>
<tr>
<td>Kanamycin</td>
<td>0.0%</td>
<td>15.6%</td>
</tr>
<tr>
<td>Nalidixic acid</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>5.7%</td>
<td>48.9%</td>
</tr>
<tr>
<td>Sulfamethoxazole</td>
<td>5.7%</td>
<td>42.2%</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>5.7%</td>
<td>48.9%</td>
</tr>
<tr>
<td>Trimethoprim-sulfamethoxazole</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

### Table 7: Antibiotic Resistance Summary for 49 *Campylobacter* Isolates from Poultry

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>% Resistant</th>
<th>% Intermediate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azithromycin</td>
<td>2.0</td>
<td>12.2</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>8.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>2.0</td>
<td>14.3</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>2.0</td>
<td>22.4</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>0.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Nalidixic acid</td>
<td>8.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>61.2</td>
<td>0.0</td>
</tr>
</tbody>
</table>
In 2001, the Union of Concerned Scientists estimated that 1.4 million pounds of a tetracycline antibiotic (chlortetracycline), and 380,000 pounds of erythromycin, annually are fed to poultry flocks for non-therapeutic purposes. 

Enterococcus Contamination. Enterococcus was found on 100% of the chicken and turkey products we tested from Iowa and Minnesota. Enterococcus is a group of approximately twenty species of bacteria that are ubiquitous in man, animals and in the environment. In healthy persons, Enterococci are considered benign. In hospitals, however, antibiotic-resistant strains are becoming an important cause of serious, difficult-to-treat infections. We did not attempt to identify particular species of Enterococci.

Of the 100 Enterococci bacteria isolated from whole chickens, half were tested for antibiotic resistance. Ninety-eight percent (n=49) of those were found resistant to one or more antibiotics, nearly 75 percent to two or more antibiotics (n=37), and 38 percent (n=19) to 3 or more antibiotics. Almost one in five Enterococci carried resistance to 4 or more antibiotics (Table 8). Gold’N Plump whole chickens carried a higher percentage of Enterococci bacteria resistant to 3 or more antibiotics at 60 percent (n=15), and to 4 or more antibiotics at 32 percent (n=8), than did other whole chicken or ground turkey brands.

For all 101 Enterococci isolated from chicken or turkey products and subsequently tested for resistance (Table 9), resistance was most likely to quinupristin/dalfopristin (96 percent), tetracycline (81.2 percent), erythromycin (19.8 percent), and gentamicin (10.9 percent). Resistance to Synercid was somewhat higher for bacteria from turkey versus chicken (100% to 92%), as was also true for tetracycline (92% versus 70%). The reverse, higher resistance in chicken versus turkey isolates, was true for erythromycin (32% to 8%) and gentamicin (18% to 4%).

| Table 8: Enterococci Resistance to One or Multiple Antibiotics (in % of isolates tested) |
|---------------------------------|----------------|----------------|----------------|----------------|----------------|
|                                 | 1 or more     | 2 or more      | 3 or more      | 4 or more      | 5 or more      |
| Whole Chicken                   |               |                |                |                |                |
| Gold’N Plump                    | 100.0%        | 92.0%          | 60.0%          | 32.0%          | 4.0%           |
| Country Pride                   | 96.0%         | 56.0%          | 16.0%          | 4.0%           | 0.0%           |
| Overall                         | 98.0%         | 74.0%          | 38.0%          | 18.0%          | 2.0%           |
| Ground Turkey                   |               |                |                |                |                |
| Jennie-O                        | 100.0%        | 88.0%          | 16.0%          | 0.0%           | 0.0%           |
| Honeysuckle White               | 100.0%        | 100.0%         | 19.2%          | 0.0%           | 0.0%           |
| Overall                         | 100.0%        | 94.1%          | 17.6%          | 0.0%           | 0.0%           |

<table>
<thead>
<tr>
<th>Table 9: Antibiotic Resistance Summary for 101 Enterococci Isolates from All Whole Chicken and Ground Turkey Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotic</td>
</tr>
<tr>
<td>Chloramphenicol</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
</tr>
<tr>
<td>Erythromycin</td>
</tr>
<tr>
<td>Gentamicin</td>
</tr>
<tr>
<td>Linezolid</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
</tr>
<tr>
<td>Penicillin</td>
</tr>
<tr>
<td>Quinupristin/dalfopristin</td>
</tr>
<tr>
<td>Streptomycin</td>
</tr>
<tr>
<td>Tetracycline</td>
</tr>
<tr>
<td>Vancomycin</td>
</tr>
</tbody>
</table>
CHAPTER 4

CONCLUSION AND RECOMMENDATIONS

For decades, antibiotics have dramatically reduced illness and death from bacterial infections. But recently, the effectiveness of these life-saving drugs has begun to wane because antibiotics are being overused.

Antibiotic overuse is the key factor in development of antibiotic resistance. Certainly, antibiotics are being overused in human medicine. But industrial-scale poultry producers also routinely put antibiotics in poultry feed, more than 10 million pounds a year by some estimates. More than 2 million pounds per year are antibiotics identical or closely related to important human medicines.

Evidence now links the widespread use of antibiotics in animal feed with the transmission to humans of antibiotic-resistant bacteria, and an increase in antibiotic-resistant infections that respond less well to treatment with these same, or similar, medicines. In 1989, the Institute of Medicine estimated that as much as 90 percent of drug-resistant Salmonella in food stems from the practice of giving antibiotics to food animals at lower than therapeutic levels.

The American Medical Association has gone on record opposing the use of antibiotics in farm animals that aren’t sick. Other medical professionals are also speaking out. If they cannot rely upon these antibiotics, it will become more difficult and in some cases impossible to treat bacterial illnesses.

This report, based on testing of 400 poultry products purchased in Des Moines and Minneapolis-St. Paul, finds these products were frequently contaminated with bacteria that can cause infections. In this respect, our study confirms data available from previous government surveys and other studies (Table 10).

Our tests also revealed, however that the bacteria on these products frequently were resistant to one or multiple antibiotics important to human medicine, like Cipro, gentamicin and Synercid. In one case, the same package of ground turkey carried multiple pathogenic bacteria, each resistant to multiple human antibiotics.
Among the *Campylobacter* found on poultry and tested, over 8 percent were resistant to Cipro – which, along with closely related drugs, are the antibiotics that doctors most rely upon for treating Campylobacter infections, as well as other severe, potentially life-threatening cases of food poisoning in adults. In 2000, the FDA concluded that continued use of the Cipro analog, Baytril (enrofloxacin) in poultry flocks makes Cipro less effective for treating people sick with severe cases of *Campylobacter* food poisoning. The agency estimated that in 1999, the eating of chickens contaminated with fluoroquinolone (FQ)-resistant *Campylobacter* bacteria led to 153,580 Americans developing a foodborne infection caused by FQ-resistant bacteria. FDA’s best estimate was that 9,261 of these sick people subsequently were given Cipro, or a related medicine, to try and treat their infection.\(^79\)

Subsequently, the FDA proposed banning the use of FQ antibiotics like Baytril on poultry. One manufacturer, Abbott Laboratories, complied with this request. Another, Bayer, has refused. Bayer continues to manufacture the drug, and poultry companies continue to use it. Bayer should voluntarily withdraw the use of this product to protect public health.

The widespread resistance of *Enterococci* found in our testing of both chicken and turkey products is another concern, especially the near universal resistance to Synercid. Synercid has only been used in people since 1999, while its close analog, virginiamycin, has been used non-therapeutically in poultry since 1974. Since resistant *Enterococci* from food can persist in the human intestine for weeks, there is grave concern that there will be rising Synercid-resistant infections in people, as rising human use of the medicine creates the conditions for these originally foodborne, Synercid-resistant bacteria to propagate and cause increased infections in humans.

**Recommendations**

Consumers expect the meat they purchase to be free of health-threatening bacteria. Increasingly, though, we have learned that food products, particularly meats, may be contaminated with bacteria that pose serious health risks.

The science clearly shows that raising animals with antibiotics results in antibiotic-resistant bacteria that get transmitted to people, typically via the eating of food contaminated with them. It stands to reason that chicken and turkeys raised without antibiotics are less likely to carry resistant bacteria.

Industry, consumers and government therefore all should act to reduce the threat of antibiotic-resistant bacteria in food.

Consumers can help reduce the threat simply by buying chicken or turkey raised without antibiotics, or at the very least, without antibiotic growth promoters or other non-therapeutic antibiotics. By choosing these products, consumers also are supporting producers who raise poultry using methods less likely to introduce resistant bacteria – and the genes that make them resistant – into the broader environment, including surface waters, groundwater and soil.
Poultry produced with little or no antibiotics is widely available throughout the U.S. One certain way of buying it is to purchase certified organic chickens and turkeys. Other producers, particularly smaller ones, may claim to use no antibiotics even if they have not gone through the expense of becoming certified organic.

Consumers can buy poultry products, for example, carrying “raised without antibiotics” or “no antibiotics administered” on the label, which the USDA defines as meaning meat from animals receiving no antibiotics over the course of their lifetime. Since USDA does define the terms, it has authority to hold producers responsible for the use of these labels. Unlike certified organic meats, however, neither USDA nor any independent, third party verifies the claims.80

Check the Eat Well Guide, www.iatp.org/EatWell, for a state-by-state listing of organic and other meat and poultry producers using either no antibiotics, or no routine antibiotics, in addition to restaurants and other places to buy these products.

Whatever meat products consumers purchase, they should always practice safe meat handling procedures. This will help avoid contamination between or on food items, cooking utensils, countertops, and other kitchen surfaces. Consumer advice is available at the website, www.foodsafety.gov.

Some industry groups also have begun to take some steps to address this problem. McDonald’s, Popeye’s and Wendy’s all now state it is their policy not to buy chicken from producers using Cipro-like antibiotics.81 Several other fast food companies, like Hardee’s, Subway and Domino’s, have similar policies, but also say they will not buy chickens fed important human antibiotics for non-therapeutic reasons, like growth promotion.82

Four of the top five top chicken producers also have sworn off any use of Cipro-like antibiotics, including ConAgra Poultry, producers of Country Pride chicken. Others, also including ConAgra, claim to have stopped using or to have greatly reduced the use of antibiotics for growth promotion or disease prophylaxis. We generally laud this approach, although there is no mechanism for verifying producers’ claims.

While these are promising initial steps, all poultry producers should commit to reducing overall antibiotic use to a minimum, and to phasing out the use of antibiotics in animals that are not even sick. This especially includes ending the non-therapeutic use of antibiotics that are, or may become, important to human medicine.

Drug manufacturers also have a part to play in protecting the effectiveness of antibiotics for the benefit of everyone. And yet the failure of Bayer to act responsibly in withdrawing its Cipro-like product from the poultry market highlights the need for strong governmental action.
As a priority, the FDA should ban the use of fluoroquinolone antibiotics in poultry, as it has proposed. Two years have already passed since FDA first launched its proposal. Fluoroquinolones are critical antibiotics for treating many infections, including severe cases of food poisoning. FDA needs to act quickly lest this critical human drug lose any more of its effectiveness for treating seriously ill people.
ENDNOTES

3 Ibid.
4 Ibid.
5 Ibid.
26 Ibid.
28 Ibid.
30 Ibid.


Ibid.


Ibid.


Federal Register, Enrofloxacin for Poultry; Opportunity for Hearing, 64954-64965 (October 31, 2000).


Department of Health and Human Services, Food and Drug Administration. Enrofloxacin for Poultry; Opportunity for Hearing; Correction. 66 FR 6623-6624 (January 22, 2001).

For more information on USDA-defined labels, see www.eco-label.org.
