

Dr. Mercola: We are pleased today to have with us an investigative journalist, Maryn McKenna, who has done loads of work in public health, and has written three books in this area. She's actually a senior fellow for Investigative Journalism at Brandeis University. Her latest book is Big Chicken, which I am confident is going to open your eyes to many aspects of this industry that you are unaware of. It certainly did for me. Welcome and thank you for joining us today, Maryn.

Maryn McKenna: Thank you for having me.

Dr. Mercola: We're just delighted to be able to connect with you because your book is such a useful treatise on the exploration of this really important topic, and that many of us are so unaware of on the whole history of how chicken is used as a primary food. Before we go into those details, why don't you tell us what motivated you to write a book on this topic.

Maryn McKenna: Yeah. Thanks for asking. I have written about public health and global health for most of my career as a journalist. About seven years ago, I got really interested in the problem of antibiotic resistance, which, I think, for most people, is really an unappreciated health threat. I mean, in the United States, every year, 23,000 people die of drug resistant infections. Two million are made sick enough to go to a doctor or seek help at a hospital. Globally, the deaths per year may be 700,000, and predicted to go up into the millions in a fairly short period of time.

I was investigating that. I was trying to tell the story of the rise of antibiotic resistance through the biography of one organism. I was reading a lot of scientific papers, and looking at a lot of international statistics. I ran across a statistic that really snapped my head back, which was that in the United States, in an average year, four times as many antibiotics are sold for use in livestock as were sold for use in human patients.

Now, I was in the midst of doctors, and researchers, and drug developers who are all saying to me, "Antibiotics are precious. Antibiotics are threatened by antibiotic resistance. We are about to lose them and return to the pre-antibiotic era. We have to protect their power and conserve them." I could not make sense of how in the same space and time. We were both getting messages that we have to protect antibiotics. At the same time, spending antibiotics so freely, mostly to be fed to animals that are not sick. That contradiction is what set me on the journey that ended up in this book.

Dr. Mercola: Well, your book does a magnificent job of answering that question that you had. Congratulations at compiling a resource that answered it because it really goes deep, and gets the backstory as to why this happened. Why don't you start explaining it because I thought ... I mean, obviously, this is Big Chicken. Most people aren't aware of the history. I certainly wasn't. Why don't you walk us

through the history of how chicken developed, and how they grew so enormously? Obviously, all the eventually integrated antibiotics as growth promoters, but a very interesting story.

Maryn McKenna: I'll start with the end of the story first because, then, going back to the beginning or the history will make sense. The short version is that we give antibiotics to most of the meat animals on the planet on most days of their lives. We don't give them those antibiotics because the animals are sick. We give them because back in the 1950s, it was discovered that if you give tiny doses of antibiotics to animals, much too small to cure an infection, you will cause them to put on weight faster, which is an economic benefit to the farmer or the producer.

Then, a little while after that, it was discovered that if you gave a slightly larger dose, but still not enough to cure an infection -- what would technically be called a subtherapeutic dose -- you could protect animals from the diseases that spread in crowded barns and feedlots. Those barns and feedlots becoming crowded because of this temptation to grow animals faster and faster. That's where we are today all around the world, hundreds of thousands of tons of antibiotics going into animals.

Dr. Mercola: That's true, but the story isn't as discouraging as you relate it because you have some very exciting new developments that is happening that's moving in a different direction. We'll talk about that later. There is hope. Don't get discouraged. It's not all of that story.

Maryn McKenna: Certainly. I feel like this is a story that has a positive turn at the end. Where does this story begin? It begins at the beginning of the antibiotic era. Now, most of us don't really realize, I think, that we haven't actually had antibiotics that long because all of these were born within the antibiotic era, which starts in 1928 when Alexander Fleming leaves a window open in his laboratory in London. Something blows into the plates of stashed bacteria he's working with and kills them. He discovers that what kills the bacteria is a compound excreted by the natural mold penicillium.

Out of that, we get the first antibiotic, penicillin, which becomes rolled out on the battlefields of World War II in 1943, enters the market in about 1945 for everyday people. It's so successful that other companies that were making what, at the time, would have been patent over-the-counter medicines, decide that they, too, want their own antibiotics. From 1945 to 1948, that's really when antibiotics come on the market, right at the end of World War II, and are of massive success.

Another interesting thing happens at the end of World War II, which is that the food system gets very fragile, partly because of the destruction of the war because flocks and herds have been disseminated, our land has been ruined by troop movements. We can't get protein out of the oceans because all the fishing fleets have been commandeered by navies. There's both a sense that the food

system is fragile, and also because the guaranteed market in the United States for feeding soldiers and sailors goes away with the end of the war.

There's a lot of over capacity that the food system has to account for. There's this push to save money. The way that food producers save money is by giving their animals cheaper feed. Then, they have to go look for a supplement that's also inexpensive to compensate for that feed being cheaper and less nutritious. In this search for supplements, a specialist in the dietary needs of chicken who happens to be working for one of those companies that's making one of the first antibiotics goes in a search for those supplements.

Casually, as one of the supplements he's trying uses the dried manufacturing leftovers from his company's drug, which is called Aureomycin. It's the first of the tetracycline class of drugs. To his amazement, the chicken starts the story, the baby chicks that get the dried Aureomycin leftovers grow more than twice as fast, put on twice as much weight as any of the other chicks in his experiment getting any other supplement.

From that, the worldwide industry of giving antibiotics to animals that's born within five years, American farmers are giving their livestock 500,000 pounds of antibiotics a year. Now, it's over 30 million pounds.

Dr. Mercola: That is a fascinating story, but let's paint the picture a little broader with respect to going back into history of chickens, and how they were just these scrawny little birds that no one would have ever thought to consume as a primary meal. Then, they've evolved essentially to the point where it's a primary meat source in the United States, and, in fact, most of the developed world. These are fascinating stories. If you could walk us through that, it would be great.

Maryn McKenna: Sure. It's true that chicken is the meat that we eat in the United States more than any other by far, more than ... I think it's up to now 91 pounds for every man, woman, and child in the United States. Chickens are growing fastest in consumption around the world because chickens are a very easy animal to raise. They don't take a lot of land. They can eat scraps. You can pack them in quite close.

Where does all that begin? Well, if we went back to the time of our grandparents and great grandparents, almost everyone, probably, raised chickens. Mostly, they were out the backdoor or in the barnyard. The reason they were there wasn't primarily to be a meat source. It was to be a source for eggs because eggs were very inexpensive, very easy to produce protein. For the most part, we ate chicken after hen's egg-laying days were done. If you imagine a hen that's been running around for a couple of years chasing chicks around the barnyard, flapping up into a tree to avoid the family dog, scratching for insects-

Dr. Mercola: Or predators.

Maryn McKenna: Or predators, foxes, and owls, and hawks, and so forth.

Dr. Mercola: Rattlesnake.

Maryn McKenna: That bird is going to be scrawny and muscular. Not very delicious. Probably with a very rich flavor from all of that muscular development, but not tender, and juicy, and soft the way our chickens are now. The only difference to that would have been if a farmer that is looking or even a householder who is looking for eggs doesn't really need a lot of roosters. Baby roosters, when they hatch out, would have been grown up, fed for a couple of months, and then sold. They were called spring chickens. They were considered uniquely delicious. If you look back in the history of menus in America in the 20th Century before World War II, you can see spring chickens as a delicacy.

That's where chickens were. Then, out of a really interesting confluence of accidents, chicken moves forward as a meat source, first, because it turns out that chickens are so easy to raise that farmers in Delaware, and Maryland, and Virginia, and the Delmarva Peninsula below Baltimore and Philadelphia convert from being truck farmers for vegetables to chicken farmers. Their market for these meat chickens that they're growing is New York City, which, at the time, possibly still, has the largest concentration of Jewish population in the world.

Observant Jews who want to observe the sabbath and want appropriately to have a lovely, exotic, luxurious meal for the sabbath can't eat pork, obviously. If they are observant, then in the years before World War II, it might have been hard to confirm whether the beef they were buying had actually been slaughtered in the appropriate manner, but a chicken was very portable. You could go into a live market and watch the chicken killed in front of you, and know that it was religiously appropriate.

Chicken becomes the meat of New York City. Out of that sense that there is a market there for meat chicken that no one has really appreciated, there begins to be -- Driven partly by this new movement to grow more chickens, this ability to grow more chickens because of using those growth promoter antibiotics -- there begins to be a new chicken industry in which chicken is marketed, not as a source of eggs, but as source of meat to the American public. People find it delicious, and portable, and easier to handle.

It has some limitations. There's not too many things that you can do with a chicken except roast, or bake, or broil a chicken. The chickens are eventually bred into a different shape of the shape that we know today by a nationwide contest called The Chicken of Tomorrow Contest from the last 1940s to the early 1950s in which chickens are reshaped by breeders to be the breast-heavy, docile, white-feathered, tender, not exercising herds that we know today.

There's this series of both historical accidents and technological innovations that get us to the point where, right now, compared to the chickens that were around in the 1950s, they get to twice the slaughter weight in half the time.

Dr. Mercola: Yeah, it's an enormous statistic. I don't think most people are aware of that, twice as heavy in half the time, which is certainly a great financial consideration from the growers and the distributors, but not necessarily best for the animal or the humans consuming that.

Maryn McKenna: That's right.

Dr. Mercola: Yeah, it's a great story. These super chickens, these breeds started going around. Then, it become ... Well, before we go there though, wasn't there a campaign prior to that? I believe it was Herbert Hoover with Chicken in Every Pot, which started to get people used to the idea that people should be eating chicken.

Maryn McKenna: The interesting thing about that Herbert Hoover campaign, that slogan that we've all heard, A Chicken in Every Pot, it's actually A Chicken for Every Pot. I went back, and I found the original ad. It wasn't said by Herbert Hoover. It was a campaign promised made on his behalf by a republican campaign group in the election. The subtext of that promise is that, at the time, chicken was rare and special. Chicken was a thing that you ate mostly on Sunday. It was by no means the meat that we eat every day as it is today.

One of the things that happened to change that was this making chicken more delicious by changing the shape of the chicken, which also made it easier for producers to cram more and more chickens into barns because, now, the chickens were docile and didn't flap around a lot.

Another thing that happened, another one of these historical accidents is that in 1977, for the first time ever, the US government started to tell its population what we should eat. One of the things it said in the first dietary guidelines for Americans, which are a periodic publication of the government that are vociferously argued over every time it's revised is that people should avoid saturated fat. It didn't actually say you should avoid red meat, but it was interpreted that way by most people. In that year, 1977, up to that point, we were eating way more beef than we were chicken. Right at 1977, you can see the two lines cross, and we eat more and more chicken every year and less and less beef.

One other thing happened to make that possible. That is that a very clever idiosyncratic scientist working up in upstate New York figured out how to do with chicken what farmers and householders have been doing with beef and pork for generations or centuries. That was to make chicken into different things. You didn't have to just roast the chicken, fry a chicken, cut a chicken up and bake it, or broil it. You could eat chicken Bolognese, chicken hotdogs, and

the most important thing, the thing that really changes the history of the chicken, chicken nuggets.

We think of them as being a creation of McDonald's, but before McDonald's in 1980, there was Robert Baker of Cornell University who, in 1963, published the first recipe for what he called a chicken stick, which is bits of chicken glued together with the excess protein, and breaded, and frozen, and deep fried. From that, what the industry calls further processed chicken, chicken that's not just chicken on the bone. That completely changed our relationship to chicken. It made it not just a ... It was already abundant, but, now, chicken was easy to eat as well. That's how it got to where it is in our diet.

Dr. Mercola: Now, let's go into the abundance issue too. I believe, at the turn of the century, around 1910, there's been 154 million chickens that were sold for meat. That increased nearly 600 million by 1949 when the growth promoted antibiotics as growth marketers kicked in. That's a big increase from 150 million, four times to 600 million. What is it now 60 or 70 years later?

Maryn McKenna: I think it would really shock people to know how many chickens we grow in the United States. In fact, the United States produces, just in meat chickens, almost nine billion, with a B, chickens a year. I've lived in Atlanta. Georgia is the number one chicken producing state in the United States. We produce about 1.4 billion chickens. If Georgia were an independent country, we would have a chicken economy that ranks somewhere up there with China and Brazil. It's really extraordinary to me, billions and billions of birds. I mean, that's a huge agricultural sector. We almost never see those chickens because of the way they're raised.

Dr. Mercola: Now, they also go along with the Coca Cola's home bases in Atlanta. Georgia's got some interesting products that it's selling or responsible for selling. That's amazing, 9 billion chickens every year. That's a lot of chicken. We, essentially, went up almost 15 to 16 times since 1950, which is not surprising considering the aggressive industrialization and marketing campaigns that went behind this.

I think many of our viewers are somewhat familiar with the CAFO process and the absolutely inhumane conditions that these animals are raised in. We haven't touched on that yet, but I'm wondering if you could describe the history of how that evolved, and some of the really tragic injustices that are being done at these animals.

Maryn McKenna: Chicken production in the United States is an extraordinary business structure that subsumes whether it makes both animal welfare and the right of farmers secondary to the structure, the profits of the business.

If you think back to what we just talked about, the way the chickens physically changed from being the scrawny, feisty bird that fed itself, and ran around the barnyard, and then was changed by the routine administration of antibiotics

into a bird that can be produced faster and faster, it makes economic sense and it makes logistical sense that if you're going to start raising more and more chickens, you don't want them running all over the place.

Precision breeding brought chickens into a new format into which they didn't fly very much. They just sat up and down. They were very docile. They didn't want to roam around a lot. That made it preferable to pack them more and more into barns, which are called houses in the industry because the chickens really fight back. Chickens, actually, uniquely lend themselves to industrialization because they're small. They don't live very long. They don't fight back. You can breed new traits in very quickly.

Where we are today is that most meat chickens are raised in these giant houses, which are as long as the football field, 25 to 35,000 at a time. For most companies, the walls of the sheds are solid. They don't get any natural light. They live in an artificial day with an artificially shortened night. They mostly stay in the same place. They don't move very far. They don't flap very much. On average, they only live 42 days. A chicken, at the point of which we eat it, though it is a full-sized chicken of five or six pounds, is only barely a teenager, possibly less. Maybe still a child within what would be the normal evolutionary lifespan of a chicken.

The thing that is so extraordinary that's the backdrop of all of that is the business structure that grew up to enable these giant farms with these giant houses to happen, which is that uniquely among all other industries, the farmers who raise chickens don't actually own the chickens. They own their land, usually, although they're probably paying a mortgage on it. They pay to build those houses. They own their debt. They own the manure that comes out of all those houses.

The company they grow for, the company to which they're contracted -- they're called contract farmers -- buys the genetics from a genetics company, hatches the chicks, takes the chicks to the farmers, brings the feed to the farmers, picks the birds up six weeks later, takes them to a company-owned slaughtering plant, slaughters them, packages them, distributes them, and negotiates the whole sale and so forth contract.

Almost everything that's profit-making in the process of raising chicken belongs to the corporation. Almost everything that is difficult or economically perilous about it remains with the farmer.

Dr. Mercola:

Yeah, that's a classic distribution system that exist in so many areas. Thank you for expanding on that. One of the things we overlook was the collusion between these federal regulatory agencies like the FDA and industry. I think that the NIH in the '70s, actually, funded some research to show that effects of these growth antibiotics, these growth promoters, and it didn't come up positive. Yet, thanks to some lobbied congressmen who became as very prominent in the industry,

this information was pressed for decades until they died. It's a very interesting story. I want you to go over that.

Maryn McKenna: It's a sad, sad story. What happens is this. To be clear, the problem with giving antibiotics to the animals in the way that we're talking about is not ... I hope that people understand this because this is a really important point. We're not consuming antibiotics when we eat those animals. If they've been given so much antibiotics that there's actually antibiotic in their flesh, that is regulated by law in the United States. That's called antibiotic residue.

The peril here is that when we give antibiotics to animals, that process that causes them to put on weight more rapidly is the changing of their gut microbiome, the bacteria that live in the guts of them, and us, and every living thing. In the process of affecting that bacteria, some of those bacteria become antibiotic-resistant.

Now, those antibiotic-resistant bacteria are in the animals' guts. One of two things happen. Either they pass out of the animal in its manure. Then, that manure contaminates the farm environment. Those antibiotic-resistant bacteria pass through the environment on a variety of pathways. Or after the animal is dead when it's disassembled and slaughtered, the gut contents get on the meat, and antibiotic-resistant bacteria travel to us in home and restaurant kitchens. The peril here is the creation of antibiotic-resistant bacteria. That's the larger backdrop to the problem of the way that antibiotics created an artificial system of raising animals.

Dr. Mercola: Yeah. This is not an incident they can risk as I think you allude to earlier. There was nearly a million people die every year from these types of infections. How many would that be about in the United States-

Maryn McKenna: In the United States-

Dr. Mercola: ... from chickens, chickens alone. Any guess? Was it a few hundred thousand, they're dead? I mean, this is dozens of people every day, I'm sure. They're dying from this process.

Maryn McKenna: 23,000 people a year die from antibiotic-resistant infections in the United States. Further, something like 48 million people a year have food-borne illnesses in the United States. Some percentage of which is not very well measured are antibiotic-resistant.

The problem of antibiotic resistant food borne illness is an enormous problem. It's actually how the issue of giving antibiotics to meat animals first was exposed as a danger, first, in England, and then in the United States. It was noticed in the 1960s and '70s, but there were suddenly very large outbreaks of antibiotic-resistant, food-borne illness, which is the same that had never existed in the world before.



As you mentioned, in the United States ... England, actually, successfully controlled this practice in 1969. A government commission told the English government, "We really should ban the use of growth promoters." In 1971, they did. They were the first government anywhere to do that. That directed attention to the United States because we, after all, were the historic home of growth promoters.

In 1977, it was the beginning of the Carter Administration, which was a very activist, reformist administration coming in as outsiders to Washington wanting to change a lot of things about the government. One of the people in that crew of reformers was a new FDA commissioner. His name was Donald Kennedy. He later went on to be the president of Stanford University. He came into office swearing that he was going to take away the licenses for growth promoters that the FDA had approved in the 1950s. He proposed to hold a hearing in 1977 in which he would challenge the drug manufacturers, the antibiotic manufacturer to prove that there was no risk from their products used in animals. If they could not prove that, he was going to take the licenses away.

As you mentioned, he never got to do that. A very powerful congressman who had oversight over the FDA's budget communicated via a back channel to the White House and said, "If this hearing goes forward, I will hold hostage the entire FDA budget." The Carter Administration, they were reformers, but they weren't dumb about politics. They knew they had a lot of other battles that they wanted to fight with regard to the things that the FDA has oversight over. They communicated back channeled to their own agency head and told him his own hearing could not go ahead.

That congressman, Congressman Jamie Whitten of Mississippi, actually put a rider on the Appropriations Bills that said that until he said otherwise, the FDA could not invest in research into whether antibiotics used in animals were a risk. That went on until the 1990s when Congressman Whitten retired, the longest serving member of the House of Representatives at the time.

The government's hands were tied, even though from that point, decade after decade, every major scientific body, the National Academy of Sciences, the Institute of Medicine, the AMA, even academic researchers funded by the NIH all said time and time again antibiotics used freely in meat animals are a grave risk to human health.

It took more than 30 years before we finally got some movement on this issue in the United States. In fact, that happened just in 2017, just as the Obama Administration was going out of office. They created a set of rules that changed how we use antibiotics in animals in the US.

Dr. Mercola:

Yes, indeed. Some definitely positive steps in the right direction. All this has been some doom and gloom. Many people all know bits and pieces of this story, but I'm sure you expanded their information quite significantly. Let's talk about the good news now because there is some indeed very good news. Some

progressive sellers and large sellers of chickens that are actually taking steps in the right direction. Then, there are some other sellers who continue to deceive the public, and advertise them sells as natural, totally abusing the term, and having some of the worst standards in the industry in their chickens. Maybe we should expose them first before you go to the good guys.

Maryn McKenna: The issue that we're talking about here to remind is the problem of antibiotic-resistant bacteria issuing from chicken. There is one major chicken company in the United States that has been saying that backing away from antibiotic use is not important for human health. They actually call it a gimmick. The company is Sanderson Farms, which-

Dr. Mercola: The worst of the worst.

Maryn McKenna: ... is a very major chicken company that exists across the south. You can actually see their commercials on YouTube in which their characters in their commercial speak to the consumer and say it's a gimmick. The reason they say it's a gimmick is they say that any chicken in the marketplace, any chicken in your supermarket is antibiotic-free because it has no antibiotic residue in its meat. That is both true and also beside the point because the whole aspect of regulation, and the thing that good companies have been doing is not based on residue. It's based on reducing the bacteria because it's the bacteria that's actually a threat to us.

That's the bad side, but there is good side. There's actually a couple of good sides. The companies first since we're talking about companies. In 2014, out of nowhere, that the company Perdue Farms, this is the company that for people of a certain age will remember Frank Perdue who was the face of his company. He was the son of the founder. He, for years, and years, and years, had this commercial that said, "It takes a tough man to make good tender chicken." He looked like a chicken himself.

The company now is run by his son, the grandson of the founder, Jim Perdue. Jim Perdue summoned a press conference in 2014 in Washington DC, and announced out of nowhere that his company planned to go antibiotic-free. In fact, they already substantially were, he said. At this point in 2018, they are more than 99% antibiotic-free, and has completely shocked the rest of his industry, and really forced the rest of the industry to follow in Perdue's steps.

After Perdue came Tyson, and Cargill, and Mcdonalds, and Subway, and Taco Bell and many, many both food production and food circus companies followed because Perdue, which is the fourth largest chicken company in the United States, made it possible for the market to open up to antibiotic-free chicken.

Now, the reason, I think, that Perdue felt they could do that is they were really being pressured by their consumers. They have told me that they would get more than 3000 comments a month from consumers through phone, and email, and Facebook, and so forth, asking them about antibiotic use in their chickens. I

think that's a signal of something really, which is that all of these companies felt that it was possible to change. The Obama Administration felt it was possible to create these rules that I mentioned because a consumer movement was rising.

That said to food companies, "We no longer want to spend our dollars for meat that was raised with routine use of antibiotics. We don't feel that this is safe." This was said by a very large catering departments and hospitals who said, "This puts our vulnerable patients at risk." It was said by very large food systems in school districts. The first was the Chicago School District, which is the third largest in the country who said, "We don't want to feed these to our kids." Then, farmers, and chefs, and family members of people who had drug-resistant infections all joined into a consumer movement that both said to companies, "You have to change or you're not getting our money." It, also, showed companies that if they did change, there would be a market waiting for them.

Dr. Mercola: Well, even better than that because Perdue is a large company, as you mentioned, the fourth largest chicken breeders in the United States, and they're not going to make some stupid chivalrous move that's going to bankrupt them. They study this thing for years-

Maryn McKenna: They did.

Dr. Mercola: ... which is fascinating. The result of their study was, yeah, it worked initially, but it's not making a damn big difference now. It's just where they were able to stop. Why don't you expand on that story?

Maryn McKenna: When Perdue did studies in a number of their farms ... Remember, they have all these contract farms where farmers are under contract to them. Each farm probably has a number of houses where chickens are being grown. In a bunch of different ecosystems, in a bunch of different states, they chose farms that had two houses that were built in about the same time, so the conditions would be the same. On each of those farms, they gave the usual antibiotic-laced feed to one flock of chickens, and an antibiotic-free feed to the parallel house. Then, they tested to see whether there really was a gain anymore, the gain in weight that researcher had perceived back in the late 1940s. They just looked at that-

Dr. Mercola: No one look at it since then, right? I mean, just the-

Maryn McKenna: Right, no one had looked. Everyone had assumed that this is the just the way it worked, that you always did this because they knew it worked, and no one had inquired into it. What they discover was that it just doesn't work anymore the way it used to probably because back in the 1950s, nutrition was not as precise, genetics were different, farms were probably not as clean. Antibiotics would have been a crutch for lesser cleanliness, and not as good animal welfare.

As those things came up, the crutch of growth promoters could be taken away. They realized, the company, Perdue, realized that they could sacrifice growth

promoters. They could save some money, and they wouldn't lose anything. Then, the thing that's really interesting is they went from growth promoters to that more interesting question of giving antibiotics to prevent disease in animals crowded together. Remember, 25 to 35,000 birds in a barn. They realized that they could do other things to stimulate the immune systems of their chickens that didn't involve antibiotics.

As a journalist, it's an odd situation to be in, to be giving praise to a big company because we're supposed to be taking a hard look at them. I give them a lot of credit for being so creative in what they looked at, because they did things, now, like they give herbs to their chickens routinely, and probiotic, and prebiotics, and metal salts, all kinds of things that do not stimulate the development of antibiotic-resistant bacteria. They purify the birds' diets. It used to be a routine to feed both industrialized bakery leftovers, and also rendered protein from slaughtering other animals to chickens. They took all of that out, and they manage to do all this, making their chicken antibiotic-free, and increasingly healthy without changing and without affecting their bottom line.

The thing that I especially love about that is that the last step that they took, which is being very influential in the industry, is they realized that another way to stimulate the immune systems of chickens was to let them do the things the chickens had always done that industrialization had taken away from them. They started cutting windows in the walls of the barns, so that the chicken could get natural light, sunlight on their feathers, which would induce some vitamin protection. They gave them things to hop up on, and things to flap their wings around, and stuff that allowed them to exercise. They are starting to reduce the overcrowding. They are still raising a lot of chickens, but not in quite as close quarters as they used to.

The thing that's especially magic about that to me is that all of the stuff I just described, giving them a different diet, letting them exercise, letting them to have sunlight, those are not only things that stimulate the immune system, they're also things that create flavor. There are things that should, as they're pursued, change the taste of chicken back to the way chicken used to taste before we started this big journey into industrialization.

Dr. Mercola:

Yes. Yes, indeed. I have a great admiration respect for Perdue for doing this, and being a leader in this field, and really taking the initiative, and going forward with it, and being the first to do it. However, I just want to emphasize that there are still some problems. I wouldn't eat a Perdue chicken for a number of reasons.

One is that chickens have to eat grain. They just can't eat grass. It just doesn't work that way. They eat insects ideally. They're usually always giving grain. The grain that they're fed is raised with basically GMO grain that's sprayed with glyphosate. You're going to get massive glyphosate residues in any type of commercially-CAFO produced chicken, including Perdue. They are indeed an unquestionably progressive company. I would hope, at some point, they

consider taking it as the next step, and even maybe a sub-brand of organic, non-GMO grain that's given to these chickens because it's not that much harder to do it. They're already there.

Maryn McKenna: In fact, Perdue, I think is. this is quite odd to think of such a big company as being in this position, but because they bought a couple of companies that were organic producers, they are now the largest producer of organic chicken in the US. The organic rules, as you know, rule out GMO.

This, I think, is where the next really big question has to be asked because in the process of reporting this book that we've been talking about, I went to chicken production systems in a couple of different countries. I spent time with producers who do work on very, very small farms with very tight government rules in France, and also very large farms that are very industrial, but also are antibiotic-free and very high welfare in the Netherlands. Well, GMO feed, and GMOs in general are not legal in the European Union.

All of these chicken production systems, both the very small ones and the very large ones, are managing to exist without the use of GMOs. If they can do it -- the Netherlands is the largest exporter of meat in Europe, I believe -- then, certainly we can learn to do it too. It seems to me that if consumers keep pressing for change, then that's where attention is going to go next.

Dr. Mercola: Which is really inspiring to know that we can make a difference and had made a difference. The issue is just to push forward, and continue with the needed changes. One of the other types of antibiotics that was a problem is a chemical substance called ionophores. I'm wondering if you could describe what those are, and mention the importance of eliminating them from the feed too because they're still used. You can remove the antibiotics, but it may still have ionophores in there.

Maryn McKenna: Right. Ionophores, just to define our terms here, ionophores are a class of antibiotic that, in chickens, are used to eliminate a particular parasitic disease that's called coccidiosis. It's always impossible to avoid coccidiosis in one of those big crowded chicken houses. It's not so much a problem for pasture-raised birds. Coccidiosis, that parasitic infection, opens birds up to a lot of other very serious health problems.

When the European Union banned growth promoters in 2006, they actually gave ionophores a pass in chicken. They banned them in cattle because, in cattle, they do act as a growth promoter. In the United States, some companies that have moved away from antibiotics in their chicken are holding on to ionophores, or they're doing things in steps. For instance, when Tyson followed Perdue, and said, "We are going to go antibiotic-free," this would have been in late 2014 or possibly early 2015, they initially said, "We're going to keep ionophores because we need that interim step." In 2017, they announced that they too had done away with ionophores.

Now, ionophores are not so much a risk for consumers of chicken because we don't use ionophores in human medicine. There's no risk that something will become resistant to ionophores, infect a human, and then we cannot treat it. What it says to me is that consumers have to be really careful when they're buying meat to ask a lot of questions. I mean, this is the thing that I ask people to do is, first, look for chicken that has an antibiotic-free label. Then, ask your market, or your butcher, or wherever you're buying that bird, "What does this really mean? What do you know about the practices of the producer?", because under that label of ways without antibiotics and no antibiotics ever, there may be some footnotes the people need to know about.

Dr. Mercola: Yes, indeed. The devils in the details, and you need to pay attention to that. Let's go into some of the other companies now that are really doing good things. You mentioned Perdue, of course. There's also retailers like Chick-fil-A, which I think led the charge, and others that had followed, even McDonalds that are adopting this, or creating a demand for this type of meat. Can you expand on that?

Maryn McKenna: Sure. The landscape of wholesale and retail around chicken with the antibiotic issue was really interesting because, of course, for years, before any of this became a political issue, there were some retailers who, right from the start, said, "We're going to be antibiotic-free." Whole Foods is a great example. There were some food service companies that, right from the start, said, "We're going to be antibiotic-free." Chick-fil-A there is a great example.

The movement of companies that you wouldn't really expect into the antibiotic-free space is one of the things that's exciting about this story, about the evidence of change. The greatest example of that is Chick-fil-A, which, for people who don't know about it, is a fast food chain that is based here in Atlanta, but is very, very common across the US, and is very common on college campuses. They make an addictive chicken sandwich with a breaded fried chicken breast, and a bun, and a couple of pickle slices, and people are obsessional about these sandwiches.

Chick-fil-A, also, it's a privately held company. It's very explicitly Christian, which is not the social stratum where people usually expect reform in the food system to come from. They take a look at what they were doing, and they said that they felt out, of their religious belief, that they had an obligation to be stewards of the earth. They felt that the pressure they were getting from their customers to reduce antibiotic use or to buy chicken that was raised without antibiotics, that could be folded under what they felt as a religious obligation.

I love the story because there's always the sense, when you're talking about the food system, that there's only certain people who are going to create change in the food system. What's happening with antibiotics is that the pressure for change was coming from all sides. It's coming from hospitals. It's coming from schools. It's coming from churches. It's coming from college campuses where there are very activist kids forcing meat production companies to change. It

crosses political lines. It crosses sociocultural lines. Everyone sees that there really is a risk here. The reason that that's so great is that we've only been talking about chicken. There's still a lot of change that has to happen-

Dr. Mercola: Absolutely.

Maryn McKenna: ... to pork and to beef for us to get to a really trustworthy, safer meat production system. Pork and beef are hard because pigs live longer than chickens do, and cattle live longer than chickens do. They, also, in their raising, get moved around a lot.

Chickens, between day one and day three of their life, when they're a little fluff balls, they get dumped in that barn, and they don't leave until the night that they are picked up to be slaughtered. The pigs move at least between two barns in the course of their lives, and cattle move to different properties. The more they move around, the more they're exposed to disease risks. The more they're exposed to diseases risks, the harder it is to reduce antibiotic consumption.

All of these consumer pressure coming from all this different axis now needs to turn to pork producers and to beef producers to show them that this is really what a modern consumer wants is to have all of their meat, no matter what the type, be antibiotic-free.

Dr. Mercola: Yes, indeed. Your book does an excellent job of really detailing the enormous success, probably the biggest success in food production I've ever seen that's happened as a result of consumer pressure. If we've done it for the number, admittedly, for somebody, it's for the reasons you cited, but it's still the number one source of food or meat that people are consuming, we should be able to do it for cattle and pork. Do you have any recommendations to those listening as to what they could do to catalyze and speed up this process?

Maryn McKenna: Just keep asking. I think that we are aware of where we are because all of these very large consumer movements, these aspects of the consumer movement. Big buyers like hospitals and school systems. It's where they want the chapters of organizations, the animal welfare organizations on college campuses, things like the Human League, and US Pirg, and so forth all said, "We're just not going to do this anymore. You have to change your practices, or you don't get our money." I think it's possible to create that pressure as well.

Now, the thing that we really need to look at though is that as much as we can change the meat production system in the United States, there's a big world out there. The United States and Western Europe that we have controlled some antibiotic use, we're still just a rounding error compared to the growing economies of the developing world, which as they develop, larger middle classes are struggling to seek and to buy much more meat. It would be reasonable for those economies to turn toward the very intensive antibiotic-fueled production systems that we created here in the United States.

One of the big global goals for the next couple of years is to try to convince these developing economies that they shouldn't make the mistakes that we did. It's going to take some international action, like international action on climate change, in order to really move the whole world toward antibiotic-free meat production. We got one of the first steps here in the United States, and that's something that we really should be excited about, even though there's still a long way to go.

Dr. Mercola: Yes, indeed. It's a really great success story. Now, in the book, you also ... In the process for the book, you got to visit some farmers. These are the farmers that I actually visited. Will Harris, not too far from you in South Georgia.

Maryn McKenna: Fantastic.

Dr. Mercola: The White Oak Pastures, I believe.

Maryn McKenna: Pastures, yes.

Dr. Mercola: Yeah. Great farm. It's large. I've done an interview with him. It's on the site. He produces 10,000 eggs a day. His chickens are just incredible. I mean, he's got the predators there and the guard dogs keeping hawks away and shotguns.

Maryn McKenna: They are an amazing family.

Dr. Mercola: Yeah, it is. It was like one of the best trips I've ever had was visiting Will's farms. Maybe you can expand on your experience a bit.

Maryn McKenna: One of the things that is so great about the move toward antibiotic-free meat is, I think, that it opens up the market for small and medium-sized producers to compete in a way that they couldn't compete when the question was just price. Perdue and Tyson have such economies of scale. They could always make things cheaper than a medium size producer like Bell & Evans in Pennsylvania, who's in a lot of wholefoods on the East Coast, or a pasture-based producer like White Oak Pastures.

Now, White Oak Pastures is not a small place. It's 3000 acres. It's got a beautiful story. It's, now, fourth and fifth-generation family farm. The sixth generation has actually just been born. Will Harris, whom you mentioned, is the fourth generation, Will Harris III. His family story, his family arc is that farm in deep southwest Georgia went from an assistant's farm in one generation, to a tract farm in the second generation, to a very modern post-World War II, fully industrial, full technological cow cattle operation in the third generation using antibiotics, and hormones, and just every technological innovation, everything that said, "We trust in science. Nothing is ever going to go wrong."

Will, the fourth generation, was supposed to continue what the previous generations have built, and enlarge this with monoculture of cattle supported



by completely artificially maintained fields. Then, he changed his mind, and he built instead. He took away the herbicides and pesticides. He took away the hormones and the antibiotics. He realized that his farm was out of balance when he did that. He started bringing in other species.

Now, he has a 10-species rotational grazing, restorative agricultural property, the largest organic property in the Southeastern United States in which they raise five species with four legs and five species with two legs. Their grass-fed beef is sold through Whole Foods. In my area, their chickens are sold through Whole Foods. Their eggs are delicious.

Will, who I described this evolution of his farm in the book, he's very candid that this is costly. Doing things like this has a much higher labor cost than anyone would expect to see on a big industrialized property. Now that the meat market is turning away some from antibiotic use, I think that consumers, when they can, are going to start making choices on the basis of ethics and animal welfare, and clean meat, purity. People like him can compete on those terms when they can't compete on pure price.

When I can, when my budget allows it, I buy his chicken because it's delicious, and I know it has been raised to the absolutely highest standards. They have a ranking from the Global Animal Partnership. The Global Animal Partnership's rankings go from one to five, and his is five plus.

Dr. Mercola: Yeah, no question. For last Christmas, I had one of his ducks for Christmas dinner. It was just great.

Maryn McKenna: That's fantastic. I did too.

Dr. Mercola: Yeah, the-

Maryn McKenna: I wasn't there for Christmas.

Dr. Mercola: Yeah, but you know what's even better than duck though? I've never had it before prior. He has a restaurant in his farm. It was that goose meat. The goose meat is the best. I thought I like duck, but goose is far superior. It is just unbelievable.

Maryn McKenna: That's fantastic.

Dr. Mercola: Yeah. That was one of the best meals I've had in a long, long time after visiting his farm. He's got a great restaurant there. Anyway, we're tying things up now. Great book, very inspiring and empowering to know that we have made a pretty massive or have had a pretty massive influence just by continuing with voicing our concerns. In my recommendation, and I'll let you echo yours, is to be persistent and diligent, and know that this has worked in the past.

This is a tried and proven strategy. Even though it may seem like an enormous waste of time, which you don't have a lot of extra time, but to do the hard work of contacting and going through the chain, not just trusting the butcher, going to the manager, going to the store owner, and ultimately connecting with the producer. Then, if he's not providing the type of meat that you think, then letting the store owner or manager know that this is your preference. Then, get some of your friends to do the same thing. When a lot of people start making those comments, there's going to be change.

Maryn McKenna: That's absolutely right. I mean, it's my belief that that is why this change in meat production in the United States happened. It would never have happened without consumer pressure. Yes, the Obama Administration did create new rules that banned growth promoters, but not prevented antibiotics in the United States. There's supposed to be some controls about preventative antibiotics. I think we still have to wait and see if they're really going to work or not, but it's my firm belief that both the administration and the meat production companies felt safe moving because they knew that the consumer movement was waiting for them.

We can't rest on what we've gotten so far. We have to go forward to say to pig producers, to cattle producers, to fish producers. Fish farming, and especially in the developing world, shrimp farming are huge consumers of antibiotics, which is even more influential for the ecosystem of the ocean than it is for the ecosystem of the land. As pointless as it seems to send the message through a company's Facebook page or to go talk to the customer service desk at a supermarket, all of those messages add up. They really didn't create change. People can create more change if they just persist.

Dr. Mercola: Absolutely. Then, finally, just to be clear, even though the whole book is about chicken, I personally don't eat much chicken. I hardly eat any chicken at all, but I am just so beyond ecstatic and delighted to see the progress in this area because it gives us so much hope for penetrating the other areas. Really, not even just meat production, but just the whole system to know that we can make a change, even though there's pernicious, and I'd go so far to say evil influences on the federal regulatory agencies to confuse, and manipulate, and deceive people that some of these processes are safe when, in fact, they aren't like glyphosate, or GMOs, or genetic engineering. That's another story.

I think meat is great if you have a healthy source. I don't think we need to eat a lot. Maybe two to three ounces. Maybe four if you're a big guy. You don't need a lot. One chicken would feed a few people, especially these big chickens. I mean, maybe four people. I just don't think you need to eat. It's actually going to wrack havoc on your health long term. You can do it occasionally, but you don't want to do that long term. Okay. Any final words?

Maryn McKenna: I hope that people really will take this to heart, and look for antibiotic-free meat when they do their grocery shopping, or they ask other family members to do their grocery shopping. Just look for a label that says, "Raised without

antibiotics," no antibiotics ever. Don't rely on being organic because here's the thing, the US organic standard for chicken starts on day two of the chicken's life. That chicken, a chicken raised by an organic producer that thinks they're doing everything right could have been given antibiotics, either injected into the shell or in the first day of life to protect them in transit to the organic producer.

For me, it's as important to see no antibiotics ever or raised with antibiotics as it is to see organic, which covers so many other benefits for the animal. I really think if people just keep pressing, and keep pressing, we're going to see more change.

Dr. Mercola: That has a convenient acronym, I believe. N period, A period, E period, all caps, right?

Maryn McKenna: No antibiotics ever, NAE.

Dr. Mercola: Yeah. You look for NAE. Then, you're not going to be deceived by that little window of opportunity where they go and just snuck them in there. It's great. One last comment on my part too, one of the reasons I avoid chicken, I don't eat a lot of meat to begin with, but pretty much the only opportunity I get, since I don't purchase it personally, is when I'm traveling, on a plane, on a restaurant. You can almost guarantee, unless you're on a specialty restaurant, that that chicken is not organic. No way. Maybe they will be different in the future, but it's not, which is one of the reasons I avoid it because I know it's such an inhumanely raised animal and poorly treated. Just avoid chicken, unless you're absolutely confident that you found a good source.

Maryn McKenna: Know what your sources are. That's really important.

Dr. Mercola: Okay. All right. Well, thanks again for writing such a good book, and providing us with these loads of information to, not only open our eyes in this area, but to inspire us to go in further.

Maryn McKenna: Thank you so much for having me.