Study shows pitfalls, potential of antibiotic-free broiler production

Poultry health experts examine ‘new challenges for a new era’

Cage-free layers: Happier, maybe, but they also bring more risks

Fieldale veterinarian John Smith reflects on his 40-year career and what’s needed to retool the US poultry industry
After 40 years of practicing medicine, Fieldale Farms veterinarian John Smith has hung up his rubber boots and coveralls. Well, almost.

In this exclusive interview with Poultry Health Today, Smith reflects on his four decades in veterinary medicine, the state of the US poultry industry and, most importantly, what it needs to do to ensure a healthier, more sustainable future.

Cover photo of John Smith by Joseph Feeks
A 14-month study involving more than 1.5 million birds and eight commercial broiler farms in Quebec compared the performance of 51 drug-free flocks with the performance of 51 traditionally raised paired flocks.

There’s no question that cage-free birds appear happier, but the approach to egg production raises health, welfare and food-safety concerns, cautions John Brown, DVM, at Zoetis.

A live infectious bursal disease vaccine based on the V877 strain can override maternal antibodies, doesn’t revert to virulence and has limited interactions with other live vaccines, a new study shows.

Lloyd Keck, DVM, ACPV, supports government initiatives to promote more judicious use of medically important antimicrobials. What’s not clear, he says, is how the industry’s efforts will be measured.

Growing demand for poultry raised without food-animal antibiotics has put more pressure on veterinarians to find alternative yet dependable disease-control options, according to a panel of nine experts at a recent roundtable, “Poultry health: New challenges for a new era.”

In this special report, Poultry Health Today presents highlights of this lively discussion, which included candid insights from production veterinarians at three leading poultry companies.
Target percentage for reducing propane consumption on poultry farms with a waste-recovery system developed at the University of Missouri.

Percentage of Americans who wash their hands after cracking eggs.

Theoretically, you may never have to vaccinate again.

Franklin West, University of Georgia, referring to a technology platform called shRNA, which selectively stops production of nucleic acids that cause Newcastle and other diseases.

Estimated economic impact in US dollars of necrotic enteritis to the world poultry industry.

Percent of federal funding for biodefense allocated to Department of Health and Human Services in 2014. By comparison, 1% of federal government funding for biodefense was allocated to USDA.

The choice of treatments or animal care should not be influenced by considerations other than the needs of the patient, the welfare of the client and the safety of the public.
S. enteritidis shedding more frequent among hens in conventional cages

Fecal shedding of *Salmonella enteritidis* was significantly more frequent among experimentally infected laying hens in conventional cages compared to hens housed in enriched colony cages, indicates a study from USDA and North Carolina State University researchers.¹

Animal-welfare concerns have initiated the development of alternatives to traditional caged housing for hens. Unknown is whether different housing systems affect the introduction, transmission and persistence of *Salmonella* in poultry, which can be a source of illness in people, poultry research microbiologist Richard Gast, PhD, of USDA’s Agricultural Research Service, said at the 2015 Poultry Science Association annual meeting.

Gast and colleagues monitored fecal shedding among laying hens in two trials. In each trial, they distributed 136 hens into conventional or enriched colony cages and then orally inoculated them with *S. enteritidis*. At weekly intervals, the researchers cultured samples of voided feces to test for the pathogen.

*S. enteritidis* fecal shedding after inoculation was detected for up to 8 weeks among hens in the enriched colony cages and for up to 10 weeks among hens housed in conventional cages, he said.

For both trials combined, the frequency of positive samples after inoculation in conventionally housed hens versus hens in enriched colony cages was 84.7% versus 71.5% 1 week later, 54.2% versus 31.3% 2 weeks later, 21.5% versus 7.6% 3 weeks later and 9.7% versus 2.8% 4 weeks later. The difference between the two groups was significant (*p* < 0.05), Gast said.

“These results demonstrate that the susceptibility of hens to intestinal colonization by *S. enteritidis* can differ between conventional and enriched cage-based production systems, although this effect does not necessarily translate into a corresponding difference in the longer-term persistence of fecal shedding,” he said.
Early feeding after hatch and the housing type can affect the response of broilers to immune challenges later in life, indicates a study from the Netherlands.\(^1\)

In the study, broiler chicks received feed and water either immediately after hatch or after a 72-hour delay, and were reared either on the floor or in a cage system.

At 4 weeks of age, researchers challenged the chicks intratracheally with *Escherichia coli* lipopolysaccharide/Human Serum Albumin (HUSA) — a non-infectious lung challenge — or a placebo. They then measured antibody titers up to 14 days after the challenge.

Chicks with delayed access to feed and water and that were housed on the floor had the highest antibody titers against HUSA, and showed the strongest sickness response and poorest performance in response to the challenge. The findings indicate that chicks with delayed access to feed might be more sensitive to an environment with higher antigenic pressure, reported investigators from Wageningen University.

Early feeding and housing should be taken into account when striving for a balance between disease resistance and performance in poultry, the investigators concluded in their study, published in the September 2015 issue of *Poultry Science*.

**SOUND SCIENCE REFERENCES**

1 Gast R, et al. Persistence of fecal shedding of *Salmonella enteritidis* by experimentally infected laying hens housed in conventional or enriched cages. 2015 Poultry Science Association annual meeting, Louisville, Ky.


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Chicks with delayed access to feed and water and that were housed on the floor had the highest antibody titers against HUSA, and showed the strongest sickness response and poorest performance in response to the challenge.

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**Early feeding, housing may affect broiler response to immune challenges**

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asymmetry scores (2.08 ± 0.13 mm versus 1.58 ± 0.11 mm).

Enriched colony birds also flapped more intensely during inversion than conventionally caged birds (5.22 ± 0.10 versus 4.25 ± 0.36 flaps/second), the researchers found in their study, presented at the 2015 Poultry Science Association annual meeting.

They pointed out that the most common type of layer selected for conventional housing in the US is the Hy-line W36 leghorn, which is the type of hen used for the study. Enriched colony systems may not be the best housing option for W36 leghorns, they said.

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Hens in enriched colony system appear more stressed, flighty
THE POULTRY SMITH

After 40 years of practicing medicine, Fieldale Farms veterinarian John Smith has hung up his rubber boots and coveralls. Well, almost.

In this exclusive interview with Poultry Health Today editor Joseph Feeks, Smith reflects on his career, the state of the US poultry industry and, most importantly, what it needs to do to ensure a healthier, more sustainable future.

For the full interview, go to poultryheathtoday.com/smith.

Photos of John Smith by Joseph Feeks
The biggest economic issue and the biggest ever-present disease threat we’ve got is coccidiosis and gut health. And ironically, that’s where we now have this interesting collision of science and public opinion and politics…
BREAKING INTO POULTRY

PHT:
John Lennon once wrote, “Life is what happens when you’re busy making other plans.” Does that describe your career in poultry medicine? Or was this something you always wanted?

JS:
I’d say John Lennon was right on the money. When I went to vet school, I never dreamed about being a chicken doctor. I had a previous career in ruminant medicine, in academia, specifically at Colorado State University. But after I got tenured and promoted, I decided I needed a change. I was from Georgia, the leading broiler state, and poultry looked like an interesting business — something that would give me more control over my time and my lifestyle and perhaps not be as hard on my body.

PHT:
How is it less physical?

JS:
Well, with poultry, there’s not as much emergency duty — nothing like pulling a calf in a ditch in the middle of the night. So mid-career, I went back and got my MAM (master’s of avian medicine) and moved back to Georgia. I’ve been in the field ever since.

THE WAR ON DISEASE

PHT:
Avian influenza is grabbing all the headlines these days — and for good reason. But is that really the biggest problem facing the broiler industry right now? Or are there other health problems that demand just as much, if not more, attention?

JS:
That’s a good question. The USDA has said avian flu was the biggest animal-health emergency that’s ever occurred in this country, so we can’t discount that. This virus is different, and it’s now in our wild-bird population. The prediction is that we’re going to be living with it for a while, so it’s been a rule-changing event.

So, yes, I’d have to say flu is the biggest concern. But on the other hand, it’s probably diverted attention from other ongoing health issues we face.

PHT:
And what would those be?

JS:
The biggest economic issue and the biggest ever-present disease threat we’ve got is coccidiosis and gut health. And ironically, that’s where we now have this interesting collision of science and public opinion and politics — specifically, what’s happening to our drug availability to manage these diseases. To me, it’s creating a real crisis — another rule-changing event that ranks right up there behind flu as an issue that’s going to impact this industry.

And, of course, infectious bronchitis (IB) keeps rearing its ugly head. Here I am, cranking up our lab again to make another autogenous vaccine for a new IB variant.

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GROUND ZERO FOR IB

PHT: I’ve heard several poultry veterinarians say that Fieldale Farms tends to be ground zero for any new IB variants. Why does it have that reputation?

JS: I guess because it’s true. We’ve debated that internally. I’ve examined it myself and said, “What am I doing wrong?” My broiler manager says, “You look harder than other people.”

PHT: Is that a reasonable explanation?

JS: I can’t say what others do. All I know is that Northeast Georgia is a very poultry-dense area. I don’t know about houses or head per square mile, if we’ve reached the density of the Delmarva Peninsula — probably not — but there’s a huge number of chickens produced here.

This corona virus, which causes IB, makes mistakes when it replicates itself — and it doesn’t proofread those mistakes very well. Most of those mistakes are probably not advantageous to the virus and they disappear. But if you just look at the sheer numbers of IB viruses that are being replicated in this population — Connecticut, Massachusetts, Arkansas, Georgia 98, 072, 08 — we’re pouring all these viruses into these millions and millions of chickens, and they’re being replicated. Just consider the numerical odds that something new is going to emerge and take off. The vaccine lab we built at Fieldale is emblematic of the struggles we’ve had with IB. We use a lot of vaccines.

PHT: Other than bird density, are there other factors contributing to the high challenge of IB?

JS: I think so. Maybe it’s because we’re antibiotic-free. We’re also smaller than many of our competitors, so I’m here almost all the time and I can drill deeper because I don’t have as many chickens to look over.

PHT: When we visited one of your growers, you examined some dead chicks and said they had signs of E. coli infection. Traditionally, that hasn’t been a problem in broilers. Are you seeing more E. coli these days?

JS: E. coli is a very common secondary invader that complicates any number of conditions, whether it be chick quality issues or IB. We’re not seeing more of it now, but we started seeing more of it when we took gentamicin out of the Marek’s vaccine. And in my opinion, that needed to be done. That was not a defensible or judicious use of a powerful antibiotic. Without the antibiotic in the vaccine, it shows up your warts a little bit more, and we see some other infections. You need to depend more on vaccination and good management.

LESSONS FROM AVIAN FLU

PHT: Let’s get back to avian flu. So far in the US, significant economic losses to avian flu have been limited to the layer industry and turkeys. What lessons have emerged from this experience? Have there been any silver linings in the avian flu cloud?

JS: Definitely. Avian flu underscored the need for greater biosecurity. It allowed me to sell a bunch of biosecurity procedures to our contract growers — ones they might have resisted in the past but procedures we should have been doing all along. The flu instilled enough fear in people that people bought in pretty readily. Like everyone else, we now have a lot of enhanced procedures in place that I’m hoping will benefit us with some of the other things we deal with, like bronchitis and mycoplasma.
PHT: What are the most significant changes you implemented with your growers?

JS: We developed this idea that the threat is not off the farm but right outside the door of the chicken house. And so the inside of that chicken house needs to be “the green zone” or “the clean zone.” Anything that goes in there needs to be clean and disinfected.

Over the past year, we’ve really beefed up our procedures with footbaths. We’ve got deep buckets now with brushes. We’re using what we think is a little bit more expensive but a better quality disinfectant. We’ve actually put physical lines on the floor that serve as a visual reminder that anything that crosses this line needs to be clean and disinfected. When you come back from town, you need to protect your chickens — disinfect your truck’s tires, change your clothes, wash your hands and have dedicated clothing and footwear. So it’s brought about a change in overall attitude.

EnviRonmental FaCtoRS

PHT: When you look at all the diseases that threaten broilers, what is the one factor that, more than anything, determines flock health and overall well-being?

JS: That’s a difficult question, but my first reaction is the birds’ environment. You know, if you look at it year after year, we usually do great in September and October, and then life becomes very difficult for us in February, March, April. And it’s always the environment — it’s the management of the birds and the houses.

PHT: But even in those off months, it seems today’s birds are still remarkably resilient and efficient. Production numbers are fairly constant.

JS: And they are. Generally speaking, when you look at the productivity of these birds today, it’s absolutely amazing. Most of that has been genetics, but management, house design, equipment design, certainly veterinary care and scientific nutrition, have all contributed. We’re putting out more pounds per square foot per day than ever, and the livability gets better and the condemnations lower. But even so, there’s still a tremendous amount of stress on the birds. We need to do a better job managing their environment.
The problem is economics. There’s a huge amount of infrastructure that’s been built, much of it with private contract growers. How do you disperse that without a bunch of people getting hurt economically? It’s a tough question.

PHT: Now, are you referring to the management of the birds on individual farms or are you talking about the US poultry industry as a whole?

JS: Well, both. Our industry has developed what some people call mega-farms — places like Northeast Georgia and Northwest Arkansas, with lots of different companies, managers and too many birds crammed into one region that are being turned too quickly. We could resolve a lot of disease issues if we could somehow ameliorate that.

The problem is economics. There’s a huge amount of infrastructure that’s been built, much of it with private contract growers. How do you disperse that without a bunch of people getting hurt economically? It’s a tough question.

PHT: How much of a factor is litter management? In Europe and Canada, they change it after every cycle. In the US, most producers use built-up litter for a year or more. Does that affect the health of birds?

JS: Yes, but not in the way you might think. In fact, from the standpoint of managing immunity and gut health, there are lots of advantages to reusing litter beyond the obvious economic and environmental advantages. Some of the worst coccidiosis and necrotic enteritis you’ll see is in birds on new litter.

Now, if a customer demands that we clean that house out more frequently than we’d like in order to meet certain production specifications, we can do that, but they’ll be more susceptible to enteric disease. That, in turn, increases the need for treatment. There are always tradeoffs.

ANTIBIOTIC-FREE PRODUCTION

PHT: One big tradeoff is antibiotics. Fieldale Farms has had an antibiotic-free program for over 15 years and has been almost totally antibiotic-free in recent years. Many other poultry companies are now experimenting with antibiotic-free production. Is this a good direction for the industry?

JS: You know, looking back, I think there are times when maybe this industry might have over-treated birds or was quick to pull the trigger on a disease. But today, with the pressures we’re under to reduce or eliminate antibiotics, the pendulum is swinging the other way. If we’re not careful, if we let it swing too far, that can negatively impact animal welfare in some situations. The industry needs a balanced approach; we can produce poultry without antibiotics for a portion of the market. But birds will get sick and if you
send sick birds to slaughter that should have been treated, there's greater potential for more carcass contaminations and potentially more pathogen contamination in that flock. We need to find a balance.

PHT: Opponents of using antibiotics in poultry have long maintained that if these birds were not raised in what they perceive to be crowded, unsanitary conditions, they wouldn't have a lot of these health issues in the first place and, therefore, would not need as many antibiotics. Do you agree with that argument?

JS: I obviously hesitate to say this, but unfortunately, I do, for the most part. I think that we could take care of a lot of health problems if we could spread out the birds — not just geographically, but also spread them out more in the house and give them more time between flocks. Again, the problem is economics; who will pay for it?

I'm not suggesting we abandon the integrated system, nor do I think we should abandon closed houses with tunnel ventilation and computer controls; those are great. It's the economics — and we've pushed them to the breaking point.

PHT: So, do you think lowering bird density is doable with the industry's current model?

JS: I've looked at it. We had a few houses that, because of a contract with a certain customer, we placed at a very loose density. Those birds performed phenomenally well. But to keep the contract grower profitable, to keep his yearly income intact, the extra pay that we had to give him totally wiped out the economic advantage in reduced health costs, so it was a wash. The point is that we could, as an industry, reduce bird density and antibiotic usage. But to do it all the time, in all flocks, we'd have to expand our operations about 20% — more square footage, more houses, more miles down the road with feed trucks.

So again, it's another example of pushing the poultry industry to the economic edge. The only way to fix it, short of government fiat, is getting consumers to pay for it — and I mean all of them, not just an elite few. And they're going to have to want it badly enough to pay more for a pound of chicken so more companies can go antibiotic-free and have a density of 1.25 feet of space per bird. Unfortunately, the general public has no grasp of the consequences.

PHT: You've understandably had some ups and downs with 100% antibiotic-free production, but overall it appears to have been a success. Based on your experience, is it economically feasible for the entire US poultry industry to one day raise all broilers without antibiotics?

JS: No, I don't believe so. These groups that want to ban all antibiotics — they're throwing out the baby with the bath water. A lot of the antibiotics used by the poultry industry are entirely harmless to human medicine, and they provide tremendous benefits to bird health and welfare, to the efficiency of production, and therefore to society. Ionophores, bacitracin and, in my opinion, virginiamycin — we shouldn't abandon those, particularly until we've got some other solutions. But we're living in an age of sound bites; people don't understand the complexity of the issue, so they won't listen.

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BACTERIAL RESISTANCE

PHT: The US now has a three-tiered market for chicken — birds raised without antibiotics, birds raised without human antibiotics and traditionally raised birds that get FDA-approved antibiotics under veterinary supervision. Yet, the National Chicken Council and others have made the point that all chicken meat is still “antibiotic-free” by the time it gets to the meat case or restaurant.

JS: True, but playing devil’s advocate here, it’s not just the question of whether there are antibiotic residues in poultry meat. We know there aren’t any. They’re asking whether using antibiotics promotes resistance in the bacteria that might be on that meat.

PHT: Well, you’re a veterinarian with two master’s degrees — one in medical microbiology and bacteriology. What’s your view? Do resistant bacteria found on poultry carcasses present a risk to humans?

JS: Anything’s possible when you’re dealing with bacteria, but there’s a bunch of hurdles that have to be crossed for that to occur. First, that antibiotic-resistant bug has got to persist through processing on the meat — and some of it can. Second, it’s got to be a foodborne pathogen, which some of it might be. Third, the meat has to be mishandled or not cooked properly. Fourth, a resistant bacterium has got to make somebody sick enough to seek medical treatment. And if that happens, there’s got to be treatment failure for resistance to become an issue.

So while it’s important, I think this threat has been blown way out of proportion, and I think the response needs to be in proportion — and, at present, it is not.

MEETING CUSTOMERS’ NEEDS

PHT: Let’s stop a moment and think about a few old but sound business expressions — “keep the customer satisfied” and “give the customers what they want.” Right or wrong, if customers are saying they don’t want antibiotics anymore, how should the poultry industry respond? Does it just forge ahead and pass on the cost to consumers?

JS: That’s clearly what some companies are doing, and, in some cases, they’re adding fuel to the fire by suggesting that one type of poultry is healthier or safer than another. Poultry has become a marketing arms race. What can I do to distinguish my product a little bit more than what the last guy did?

I also contend that going antibiotic-free on a large scale is going to increase the industry’s carbon footprint. If it takes more space, more feed, more time to raise these birds without modern technology, then you’re going to produce more manure, consume more corn and beans and take up more space.

PHT: Why, in your mind, has poultry become the lightning rod for all this? It doesn’t seem like activists are targeting beef or pork with the same ferocity.

JS: Well, beef has taken plenty of flak for things like E. coli O157 in ground beef, but you’re right — it does seem that poultry bears the brunt of it. There are a number of potential reasons, one being that all of our treatments are mass-administered.

continued
Poultry has become a marketing arms race. What can I do to distinguish my product a little bit more than what the last guy did?
PHT: No red barns, picket fences and rolling green pastures?

JS: Correct — and no little white farmhouses, either.

What most people don’t realize is that most chickens are still raised on family farms. As one of my colleagues used to say, this business has built a lot of nice little brick houses in Northeast Georgia on old, worn-out land. It also sent a lot of kids to college.

Think about it: Where else can someone who inherited 40 acres and maybe has a high school diploma go and borrow $1 million to start a business? Poultry is a business that, if you give it a reasonable effort, you’re not going to get rich, but you’re going to succeed. You’ll pay off that loan, that land and your house note.

It’s not a glamorous business, but if you want to stay on the farm and keep your land and build a business on it, poultry is not a bad way to go.

The Baytril (enrofloxacin) situation is a good example. We lost that drug for poultry but the beef guys still have it. It’s a fluoroquinolone and acts the same in both environments, but FDA wasn’t comfortable with it being mass-administered, even for a short period, which is what we have to do in poultry. With beef cattle, it’s injected as needed, one animal at a time.

The other issue is that beef cattle and pork are skinned, whereas many of our products are whole birds or parts with skin on. There’s naturally more risk for contamination.

Then there’s the way our industry is structured and how we’re perceived to be big industrial agriculture.

It’s not a glamorous business, but if you want to stay on the farm and keep your land and build a business on it, poultry is not a bad way to go.
Broilers raised in a drug-free program had a higher feed-conversion ratio (FCR), decreased mean daily weight and decreased mean live marketing weight despite administration of antibiotic alternatives, according to study results presented at the 2015 annual meeting of the American Association of Avian Pathologists (AAAP).

The 14-month study involved over 1.5 million birds and was conducted on eight commercial broiler farms in Quebec. The Canadian researchers compared the performance of 51 drug-free flocks with the performance of 51 traditionally raised paired flocks, reported Martine Boulianne, DVM, PhD, chair of poultry research at the University of Montreal.

**Antibiotic Alternatives**

For the drug-free flocks, the researchers replaced anticoccidials and so-called performance antibiotics — that is, antibiotics with claims for increased feed conversion and weight gain — with coccidiosis vaccination, improved brooding conditions, water acidification and an in-feed antibiotic alternative. The antibiotic alternative was one of three commercially available essential-oil-based products, the veterinarian said of the study, published in the August 2015 issue of *Poultry Science*.

Improved brooding for the drug-free flocks included 3 to 4 inches of fresh bedding, preheated housing and clean, flushed and sanitized water lines — all accomplished before chicks were placed. Stocking density ranged from 26 kg of live chickens per square meter (57.3 lbs per 3.2 square feet) to less than 31 kg per square meter (68.3 lbs per 3.2 square feet).

The drug-free flocks also had additional paper feeders and feed boxes and even new light bulbs (60 to 100 lux) to ensure appropriate lighting conditions above feeders and drinkers for the first 48 hours after placement. The researchers monitored chick body temperatures and crop filling 24 hours after chick placement and adjusted ambient temperatures as needed, she said.

**Traditional Program**

Traditionally raised flocks in the study received anticoccidials and performance antibiotics in feed according to their respective feed mill’s program, but there were no specific recommendations given regarding brooding protocol or water acidification, Boulianne said.

Producers and others involved in the study were blinded about the alternative products administered to minimize potential bias about the results, she noted.

Although the drug-free broilers had a statistically significant lower mean daily weight gain, lower mean final weight and a higher FCR, their livability, age at marketing or percentage of total condemnations did not differ significantly from the traditionally raised birds (Figure 1), Boulianne said.

**NE Outbreaks**

More than 27% of the 51 drug-free flocks experienced a clinical necrotic enteritis (NE) outbreak and more than 49% developed subclinical enteritis, while none of the traditional flocks had enteritis-related clinical signs. Flocks with NE were rapidly treated with essential-oil-based products in water, and for severe NE outbreaks, antibiotic therapy was administered, Boulianne and colleagues noted in their published report.

“It is noteworthy…that from the eight participating farms, recurrent NE outbreaks were observed for all drug-free flocks from two specific farms,” they said.
"Even with standardization of rearing methods and other parameters, rearing drug-free birds had a negative impact on gut health for many farms."
The 3.37% increase in FCR for birds in the drug-free group is slightly higher than what’s been reported in European studies but could be explained by the continued use of ionophores in Europe, the researchers said. *Clostridium perfringens*, which can occur secondary to coccidiosis, is thought to be less of a problem when ionophores are used since the drugs contribute to better overall gut health by keeping coccidia in check.

**ADDITIONAL FINDINGS**

Mean microscopic intestinal lesion scores and the prevalence of *Campylobacter* colonization were not statistically different between the drug-free and traditionally raised broilers, but the researchers isolated higher rates of *C. perfringens* from the drug-free birds.

They found no significant differences among the three essential-oil products used in the study.

Litter-moisture control was an ongoing challenge in drug-free flocks and was especially problematic the last 2 weeks of rearing. Wet litter may be linked to an altered digestive function and be a consequence of clinical and subclinical NE, they noted.

In other ways, however, drug-free flocks in the study had fewer performance losses than reported in previous studies among birds raised without antibiotics, which might be explained by the use of a coccidiosis vaccine, the essential-oil-based products as well as early feeding, which was facilitated by improved brooding conditions, the researchers said.

At the AAAP meeting, Boulianne said the results underscore the importance of optimal brooding. However, “Even with standardization of rearing methods and other parameters, rearing drug-free birds had a negative impact on gut health for many farms.

“While we feel that we might have a part of the solution to control [or] reduce NE, further investigation is warranted to better understand the role [and] involvement of *Clostridium perfringens* in the pathogenesis of subclinical enteritis,” Boulianne said.

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A live infectious bursal disease (IBD) vaccine based on the V877 strain can override maternal antibodies, doesn’t revert to virulence and has limited interactions with other live vaccines, indicate a series of studies.1,2

The vaccine is safe but is best used when sufficient levels of maternally derived antibodies (MDA) are present, said Harm Geerligs, PhD, one of the investigators in the study and associate director, veterinary medical research and development, poultry biologicals, Zoetis.

IBD infection, first identified in the Gumboro, Delaware, area of the US, remains a serious and highly contagious viral disease of young chickens. Birds are particularly susceptible between 2 and 4 weeks of age. IBD has the potential for causing severe economic losses for poultry producers, Geerligs said.

When IBD infection pressure is high and chickens have high MDA to the IBD virus, most poultry operations use so-called “intermediate-plus” IBD vaccines. However, not all intermediate-plus IBD vaccines have good efficacy in the presence of MDA, Geerligs cautioned.

‘Revert to virulence’

In addition, some may cause severe bursal atrophy, resulting in immunosuppression that leads to poor immune response to other vaccines. “There is also concern that intermediate-plus vaccines may revert to virulence,” he added.

One of the commercial intermediate-plus IBD vaccines used in the poultry industry is Poulvac Bursa Plus (known as Bursine Plus in the US). Introduced to the poultry industry in the early 1980s, it contains the V877 IBD strain derived from a classic Australian field isolate, he said.

To test the efficacy of this vaccine in chickens with high MDA, investigators conducted a controlled study in commercial broilers. They determined the MDA titer of individual 6-day-old birds and then assigned them to a low, average or high MDA group accordingly.

Researchers vaccinated the birds with Poulvac Bursa Plus administered in water at 10 days of age. Using an eye dropper, they then challenged the birds with D6948, a very virulent IBD strain, at 38 days of age. Some birds were unvaccinated and challenged; others were unvaccinated and not challenged and served as controls, Geerligs continued.

Break through MDA titers

The researchers used ELISA testing to determine IBD antibody titers throughout the study until the birds were 45 days of age. On day 48 of age, they collected bursae of Fabricius and then weighed and examined them for histologic lesions. They also calculated the bursa-to-bodyweight ratio for each bird.

The V877-based IBD vaccine was able to break through a MDA flock titer higher than 1,100 as determined by IBD ELISA
The V877-based IBD vaccine was able to break through a MDA flock titer higher than 1,100 as determined by IBD ELISA...and there was only a minimal decrease in vaccine efficacy as MDA increased.
All vaccinated chickens remained healthy after challenge, and the vaccine protected the bursa of Fabricius in chickens with high MDA as compared to unvaccinated, challenged controls, which had complete depletion of lymphoid tissue 10 days after challenge.
Vaccine interaction

Vaccination challenge studies were also conducted to determine if the V877 IBD vaccine interacted with other vaccines. Researchers administered a live Newcastle disease (ND) LaSota vaccine alone or in combination with the V877 vaccine and then challenged birds with a virulent ND strain. They considered birds protected if ciliary movement occurred in at least nine of 10 tracheal sections (Table 2).

Use of the vaccines together had no negative impact on the efficacy of the ND vaccine nor on the antibody response to the ND challenge, he said.

A study conducted similarly with a live QX-like infectious bronchitis (IB) vaccine demonstrated that the V877 vaccine did not adversely affect the efficacy of the QX-like vaccine. Although the V877 vaccine had a negative effect on the antibody response of the QX-like IB vaccine, a clear antibody response was detected.

Determine MDA titers

“MDA levels should be determined in a sampling of flocks to establish what age to apply the V877 vaccine...”

Vaccination challenge studies were also conducted to determine if the V877 IBD vaccine interacted with other vaccines. Researchers administered a live Newcastle disease (ND) LaSota vaccine alone or in combination with the V877 vaccine and then challenged birds with a virulent ND strain. They considered birds protected if ciliary movement occurred in at least nine of 10 tracheal sections (Table 2).

Use of the vaccines together had no negative impact on the efficacy of the ND vaccine nor on the antibody response to the ND challenge, he said.

A study conducted similarly with a live QX-like infectious bronchitis (IB) vaccine demonstrated that the V877 vaccine did not adversely affect the efficacy of the QX-like vaccine. Although the V877 vaccine had a negative effect on the antibody response of the QX-like IB vaccine, a clear antibody response was detected.

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Growing demand for poultry raised without food-animal antibiotics has put more pressure on veterinarians to find alternative yet dependable disease-control options, according to a panel of nine experts at a recent roundtable, “Poultry health: New challenges for a new era.”

“We know all veterinarians in the poultry industry are committed to providing optimal care and welfare,” Lloyd Keck, DVM, ACVP, a technical services veterinarian for Zoetis, told Poultry Health Today after moderating the roundtable.

“The goal of this forum was to develop a better understanding of the new health challenges poultry companies face as they try to reduce or eliminate these FDA-approved antibiotics from their health programs.”
Although it still accounts for a small fraction of the poultry market, antibiotic-free production is clearly on the upswing as producers respond to increased demand from consumers and large food vendors. According to published reports, dollar sales of poultry raised without antibiotics increased by 25% during the 52 weeks ending January 25, 2015.

Veterinarians on the panel involved with antibiotic-free production cited increases in 7-day mortality as well as total bird mortality. They also expressed concern about the long-term sustainability and welfare implications of raising birds without antibiotics on a large scale, and the potential impact of antibiotic-free production on food safety.

7-day mortality

At one major antibiotic-free operation, 7-day broiler mortality due to withdrawal of antibiotics in the hatchery increased 0.5% on average, according to Practitioner 1, a veterinarian at a major US poultry company. Prior to that, mortality was consistent with industry averages — less than 1% in the summer, a little more than that in winter and about 0.9% to 1% year-round.

Panelists suspect that increased 7-day mortality is due to bacterial disease such as Escherichia coli.

“I have no data to support this, but I would hypothesize that eliminating the use of antibiotics in the hatchery might [also] have longer-term consequences and be associated with problems such as bacterial chondronecrosis with osteomyelitis, septicemia, vertebral osteoarthritis and infectious process,” the veterinarian added.

Practitioner 2, who represented another leading US poultry company, reported seeing comparable upswings in 7-day mortality in
antibiotic-free flocks: “We run about 1% mortality with antibiotics in the hatchery and about 1.40% without them.”

After 8 weeks on an antibiotic-free program, a veterinarian from the third US poultry company represented on the panel reported seeing only a slight increase in mortality — 0.3% at 7 days — but added that the season might have helped minimize losses. “Of course, it was summer, which is normally the best time of the year for 7-day mortality. We’ll see how this coming winter goes,” Practitioner 3 reasoned.

Total flock mortality

According to Practitioner 2, total flock mortality for antibiotic-free production is usually twice as high as it is in commercial flocks that receive FDA-approved antibiotics for disease management.

“If you look at 2014 data, antibiotic-free production averaged 10% total mortality, while the average conventional company had 5% total mortality. Antibiotic-free production doubles mortality. It’s killing 100% more chickens,” Practitioner 2 said.

Turkey producers face similar challenges, according to David Rives, DVM, formerly with Prestage Farms, a major US turkey producer, and now a technical services veterinarian for Zoetis, which sponsored the roundtable.

“Even on the best-managed farms, it’s very difficult to grow a flock of [antibiotic-free] toms for 20 weeks without facing some disease challenge. Mortality can easily reach twice that of conventionally raised turkeys,” Rives said.

In fact, he added, growing turkeys without antibiotics may be even more challenging than it is with broilers simply because turkeys are in the field longer.

continued
CAN WE LEARN FROM DENMARK?

Proponents of antibiotic-free production often cite the experience in Denmark as “Exhibit A” in their argument against the use of antimicrobials in poultry and livestock feed.

They note that Denmark banned the use of antibiotics for growth promotion in food animals more than 20 years ago. The roundtable panel raised strong objections to this example, however.

“That’s like comparing apples to oranges,” said NC State’s Dennis Wages. European producers can still use ionophores for managing coccidiosis; ionophores aren’t classified as antibiotics in the EU as they are in the US.

In addition, Wages said, producers in Denmark still have numerous antibiotics for treating disease — many of which are also used in human medicine — that can be added to birds’ drinking water that US producers don’t have access to, including multiple fluoroquinolones and other antibiotics. It’s not fair to compare the Danish model to the US, he insisted.

THERAPEUTIC USE UP

UGA’s Charles Hofacre pointed out that in Denmark, therapeutic use of antibiotics increased dramatically after in-feed antibiotics for growth promotion were banned. Now a program is being instituted in Denmark to control the amount of therapeutic antibiotics used.

To date, Wages added, initiatives in Europe to reduce antibiotic-resistant infections in humans haven’t been very successful, and it remains to be seen if they will have the intended impact. “The trend line for antibiotic resistance in Denmark or throughout Europe overall hasn’t changed,” he said.

Globally, the only documented cases where reducing antibiotics has led to fewer resistant infections in people have been in hospital settings involving hospital-acquired infections, where halting use of a certain antibiotic had an effect on the resistance of a known pathogen, Wages added.

Hofacre noted the FDA wants to figure out why fluoroquinolone resistance to Campylobacter in people isn’t changing and in some years has gone up, even though fluoroquinolones haven’t been used in US poultry for years.

He and Wages agreed that reduced antibiotic use in food animals must be followed over time to determine if it has any impact on human resistant infections.

“To try and give a snapshot view of what reduced antibiotic use in animals does for resistant infections in humans is going to be extremely difficult,” Wages said. “All other countries that have tried it have failed.”

Coccidiosis pressures

The biggest impact of antibiotic-free production has been its adverse effect on gut health, particularly regarding management of coccidiosis, Practitioner 1 said. Farms that want to produce birds without antibiotics need to avoid ionophores — which are classified as antibiotics by FDA even though they are used by the poultry industry as antiparasitics to prevent coccidiosis, not to manage bacterial disease.

While coccidiosis vaccines have shown potential in some production schemes, they have not proved to be dependable replacements for ionophores, veterinarians on the panel said. Without ionophores, producers must rely on synthetic or chemical anticoccidials, which easily develop resistance, and on vaccines, which have been shown to be less effective in seasons with higher coccidiosis pressure.

“When you go 100% antibiotic-free across the board, it becomes very difficult to use a coccidiosis vaccine effectively [year-round],” Practitioner 1 said, adding that vaccines are usually less effective in the cool, wetter months of fall, winter and spring, when there tends to be more coccidiosis pressure in broiler houses.

“In fact, I’ve found it exceedingly difficult [to use a coccidiosis vaccine effectively]. So, you suffer the consequences, which are coccidiosis and secondary infections like necrotic enteritis,” the veterinarian said.

Other complications

Initially, the most obvious impact of enteric disease is reduced growth rate and poor feed conversion, but there are other consequences, Practitioner 1 added. “Litter condition may suffer, which can affect footpad quality and respiratory health. That becomes an economic and animal-welfare issue.”
Charles Hofacre, DVM, MAM, PhD, University of Georgia, said that coccidiosis vaccines might be suitable replacements for ionophores if they were administered by eye drop to ensure every bird gets a full dose, but that’s impractical when thousands of birds need to be vaccinated.

As things are now, “We don’t have good coccidiosis control in antibiotic-free production, and so Clostridium [a cause of necrotic enteritis] has the opportunity to flourish,” Hofacre added.

Steve Davis, DVM, pointed to studies by his company, Colorado Quality Research (CQR), which showed that flocks given ionophores to prevent coccidiosis often had a lower incidence of necrotic enteritis than birds that only received an antibiotic indicated for necrotic enteritis prevention. “That’s because the more you can prevent coccidiosis, the less pressure you’ll have from enteritis,” he explained.

**Combatting disease pathogens**

Davis expressed concern about antibiotic-free production compromising food safety. “No one’s talked about higher condemnations for antibiotic-free flocks, but it’s been my experience that there are more sick chickens getting to processing age that did not receive antibiotics compared to those that received ionophores,” he reported. “Any time you have sicker flocks going into the plant, there’s a greater chance that sick birds will end up in the food chain due to human error.”

Davis said other changes may be necessary as antibiotic-free production gains momentum. “If the trend continues,” Davis said, “we’re going to have to concrete all the floors in our chicken houses. We’re going to have to go heavily with formaldehyde [to kill disease pathogens].”

While formaldehyde is an approved disinfectant for poultry houses, two of the panelists said some consumers might find it more objectionable than using animal antibiotics to prevent common poultry diseases.

“In addition, we’re going to have to better control the humidity of our chicken houses,” Davis added. “We’re not going to be able to use cool-cell pads; we’re going to have to go to air conditioning, because you’re going to have to have a dry environment in those chicken houses if there’s any chance of remaining sustainable without in-feed ionophores or antibiotics in the water.”

Practitioner 3 said scaling back on bird density might lessen the incidence of necrotic enteritis, but it would have to be done “dramatically” to have an impact. Lower bird density would lead to higher production costs per bird, which would be passed on to consumers.

**Antibiotic alternatives**

When moderator Keck asked if healthy gut microflora could be maintained with alternatives to antibiotics, the panelists acknowledged their potential but said switching was easier said than done.

“We’re finding that two [alternative] products can look identical on paper, yet one can be very efficacious in our necrotic enteritis model; the other one is not only ineffective, but makes necrotic enteritis worse in terms of lesion scores and/or mortality,” CQR’s Davis said. “We’re probably dealing with issues of consistency.”

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He cautioned that when producers opt to use non-drug replacements, they quickly discover there’s a fine line between what works and what doesn’t. “It might vary from batch to batch and you might see good results or you might make the situation worse. This is something we’ve found quite surprising in our research,” Davis said.

With the growing demand for poultry raised without antibiotics, Practitioner 1 observed that treatment alternatives were “coming out of the woodwork” and compared the situation to “the Wild West” because these additives are not subjected to the same regulatory scrutiny as antibiotics. For example, organic acids, probiotics and pathogen-associated molecular-pattern products are not drugs by definition and do not have to be submitted for FDA approval.

‘Real conundrum’

Most of the companies selling these alternatives provide pen-trial data to show their efficacy, but testing these products in real-world situations has been a real conundrum, Practitioner 1 continued. “Based on the few thorough trials I’ve been able to do, I’ve not found one of these products yet that I’m using in antibiotic-free production.”

Practitioner 3 echoed similar experience. “We’ve tried several of these [alternative] products, and we still had a lot of necrotic enteritis in our birds raised without antibiotics.”

On a brighter note, Rives said some direct-fed microbials, yeast cell-wall products and saponins had shown some promise in young turkeys. Effective prevention and control of protozoa other than coccidia may be the bigger challenge with turkeys.

Gut health is critical for turkeys just as it is in broilers, the turkey veterinarian emphasized. “There are other substances that can mimic performance antibiotics, and it’s going to require the right combination of probiotics, prebiotics and other alternatives to maintain optimal microflora in the gut at each stage of growth. This is especially critical for turkeys in the brooder house.”
Tall order

Dennis Wages, DVM, ACPV — a professor at North Carolina State University focused on disease prevention — acknowledged that maintaining intestinal health in poultry flocks while meeting demand for birds raised without antibiotics was a tall order for producers.

“The challenge for the US poultry industry will be to effectively control gut populations [of pathogens] in other ways, either through immunomodulation or with some of the natural products or with vaccines,” Wages said.

Georgia’s Hofacre noted that experience with antibiotic alternatives might improve as [US] producers gain more experience with them in different housing systems or times of year.

“No matter what’s thrown at it, the poultry industry always seems to find a way to solve these problems,” he said. “There are lots of alternatives to antibiotics that we may find don’t work as well as antibiotics, but they might prevent antibiotic-free birds from suffering and having 100% greater mortality.”

Regulatory wish list

The simplest and most effective way to control gut disease, reduce mortality and improve welfare in antibiotic-free production would be to adopt Europe’s approach and classify ionophores as antiparasitics, not antibiotics, the panel said.

“It would be the Holy Grail for the [US] poultry industry if we could have ionophores reclassified,” said Ashley Peterson, PhD, vice president of science and technology, National Chicken Council.

“As it is now, you either do or you don’t use antibiotics — and there’s not a lot of gray area because consumers may not understand the importance of ionophores in poultry production and how they do not lead to resistance [in humans].”

Although Peterson sees opportunities for discussions with FDA about this issue, she could not predict if the agency would be receptive.

“It would help if we could get some consumer groups to join in,” she said.

It’s her impression that FDA is convinced antibiotic use in food animals is “rampant” and that there’s a definite link between human resistance and antibiotic use in livestock.

‘Judicious use’ label?

Practitioner 2 said that while preserving antibiotics for human medicine was paramount, consumers and producers needed to find middle ground to ensure the health and welfare of poultry and livestock under veterinarians’ care.

“This all-or-nothing approach [to antibiotic management] is not sustainable, and the data say it’s pretty onerous for the chickens. It’s double mortality.”

One solution might be a “judicious use” label from the USDA Food Safety and Inspection Service — something to assure consumers that antibiotics were used properly and under veterinary supervision to ensure flock health and welfare — that could be put on the package if specific guidelines for antibiotic management were followed by producers, Practitioner 2 suggested.
What’s best for food-marketing campaigns is not what’s best for our patients — the chickens...

STEVE DAVIS, DVM

Panelists expressed frustration over what they said are sometimes misguided marketing strategies that are fueling the antibiotic-free production trend.

“We’ve got to get [these restaurants and retailers] who are beating their chests about not allowing antibiotics to be used in animal production to understand that they’re going to be buying sick chickens — unless they allow the targeted use of so-called shared-class drugs to keep chickens reasonably healthy. That’s the humane and sustainable plan they should be promoting,” Practitioner 2 said.

CQR’s Steve Davis maintained that food vendors promoting chicken raised without antibiotics don’t want to hear about the perils of antibiotic-free production. “What’s best for food-marketing campaigns is not what’s best for our patients — the chickens — especially when their mortality is doubled.”

MCDONALD’S POLICY

McDonald’s USA’s new policy permitting the use of ionophores in chickens it buys was lauded by some of the experts, but they also said the fast-food giant didn’t get it quite right.

“(McDonald’s USA) will allow ionophores but not allow treatment, control or prevention with other antibiotics that are approved by FDA,” Practitioner 2 argued. “So, if you treat
sick chickens, McDonald’s [USA] is not going to buy them. That’s its US policy. Its global policy allows for treating sick animals.”

NC State’s Dennis Wages said some of the antibiotics prohibited by McDonald’s USA’s policy, such as bacitracin and virginiamycin, have no significant use in human medicine and they’re sorely needed in poultry to prevent and control clostridia, but they won’t be used in chickens going to McDonald’s. “I think it’s a shame,” he added.

VOCA L MINORITY

Practitioner 2 pointed out that antibiotic-free production accounts for only 15% to 20% of poultry production in the US. The veterinarian believes those who promote this type of production want to impose their agenda on consumers who want the same, affordable, safe products the industry has been providing all along with the judicious use of FDA-approved medications.

The typical McDonald’s customer probably isn’t thinking about antibiotic use in food animals when searching for an affordable meal. “But McDonald’s sales are down, they’ve got a new CEO, they’re trying to make a difference and wanted to make a splash. We’re getting whipsawed in that marketing game,” the veterinarian said.

IN D U S T R Y C U L P A B I L I T Y

UGA’s Charles Hofacre agreed the US poultry industry has some culpability for the emergence of this two-tiered poultry market. “We’ve done it to ourselves,” he said, referring to some industry and retailer marketing practices. “We’ve led the public to believe through marketing that if we can raise 20% of chickens without antibiotics, we can do it with 100%.”

If the industry continues in this direction, Hofacre added, it’s going to steamroll so that even companies that don’t want to will be forced to raise chickens without antibiotics. Production techniques will be driven by the preferences of consumers who know very little about chicken production, not what’s best for flock health and welfare.

Moderator Lloyd Keck pointed out that Zoetis’ market research has demonstrated that with education, consumers develop a better understanding of antibiotics and, in turn, become more accepting of them — especially when they learn that veterinarians are involved. He asked the panel if it might be possible to educate consumers on a broad scale about the health and welfare problems created by antibiotic-free production.

Hofacre said it’s probably futile to try and convert a certain small segment of US consumers that have already formed strong opinions about antibiotics in agriculture. “We need to just forget about them.”

That said, he agreed the vast majority of US consumers still don’t understand the role of antibiotics in poultry production and that education would be helpful.

FOC U S O N V E N D O R S

Practitioner 3 suggested that instead of trying to educate consumers, producers should consider educating food vendors — a smaller group of decision makers with a vested interest in food safety.

“We’ve been bringing [in] our customers, who are large food vendors — the ones who make the decisions about the type of chicken their companies buy…We let them go through our facilities, including our hatcheries and farms.

“I have a window of opportunity when I give a presentation on antibiotic usage. I tell them that I’m a veterinarian and I have a family. I always show a picture of my family and say, ‘You know, I feed my two small children conventional chicken.’ And then I talk about the oath, the veterinary oath, and it seems to resonate.” Practitioner 3 said.
The recent announcement from McDonald’s USA that it will eventually transition to buying all its eggs from cage-free hens really grabbed the industry’s attention.

Cage-free hen housing: How far will the pendulum swing?

"...the recent announcement from McDonald’s USA that it will eventually transition to buying all its eggs from cage-free hens really grabbed the industry’s attention..."
Consumer demand is pushing the pendulum toward cage-free egg production, but just how far that pendulum will swing remains to be seen.

In a law that took effect in January 2015, California mandated increased space for egg-layers. Several other states have since passed laws regulating hen housing. Yet, as of March 2015, organic and cage-free shell egg production accounted for only 6.4% (19.2 million hens) of the table egg-layer flock.

However, the recent announcement from McDonald’s USA that it will eventually transition to buying all its eggs from cage-free hens really grabbed the industry’s attention, especially considering the fast-food giant buys about 2 billion US eggs annually. Other large food vendors such as Starbucks and Kelloggs have similar plans in the works.

Benefits to hens

For hens, the trend toward cage-free housing certainly has some benefits. If you’ve ever been in a cage-free poultry operation, you can observe birds exhibiting many of the same natural activities you’d expect to see wild birds demonstrate — short flights, dust bathing, wing flapping, running around and grooming, to name a few. The birds appear happy.

Nevertheless, there are risks that come with this more open environment — the same risks that many years ago prompted producers to move hens from the floor into cages. Moving hens out of cages could also have a negative impact on food safety, the environment and on producer and consumer costs.

Increased disease

One of the major risks for cage-free hens is bacterial disease. Hens that are on the floor or allowed outdoor access come in contact with manure and can be at greater risk for exposure to pathogens, particularly Escherichia coli and Salmonella.

Parasitic disease is another risk for cage-free hens, with coccidiosis topping the list. As all poultry producers are well aware, coccidia, the cause of coccidiosis, are present in virtually all poultry operations and they’re prolific — 10 coccidial oocysts (eggs) can produce over 500,000 progeny in just days.

Cage-free hens on the floor or ground are far more likely to ingest oocysts compared to caged hens, resulting in intestinal damage that can lead to poor nutrient absorption, poor shell quality and even mortality.

Food safety

Egg quality hasn’t been found to differ much between eggs from cage-free and caged systems, but eggs laid by hens on the floor instead of in nesting boxes are at increased risk for bacterial contamination, which could adversely affect food safety.

This was demonstrated by USDA researchers who compared the microbiological impact of conventional cage, enriched-colony cage and cage-free systems. They concluded that “floor eggs have the greatest opportunity for exposure to high levels of microorganisms and human pathogens so flocks should be managed to prevent the occurrence of floor eggs.”

Welfare risks

There are welfare concerns with cage-free systems, where feather pecking and cannibalism are common. A study by the Coalition for Sustainable Egg Supply (CSES), which represents a group of animal-health scientists, egg suppliers and major food companies, found that mortality in a cage-free system was double that of other housing systems, in part due to excessive pecking and cannibalizing, despite beak trimming.

Bird strains prone to cannibalism in cages are prone to cannibalism in cage-free operations. Geneticists at breeder companies are trying to select for less aggressive strains as well as strains more prone to laying eggs in nests instead of on the floor. Still, all birds by nature tend to be aggressive and cannibalistic to some degree. In a cage-free operation, where all birds in the house can interact with each other, a more exaggerated pecking order may develop because there are more opportunities for “boss” birds to dominate weaker, more timid birds.

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Giving birds access to the outdoors might be one solution to crowding, but that makes them vulnerable to predators and to diseases such as avian influenza, which is transmitted primarily by waterfowl.

In addition, cage-free hens are also more likely to sustain broken bones from flying and landing mishaps. The CSES study found that between 9% and 21% of flights in an aviary ended in failed landings, which may have contributed to a higher level of keel-bone breakage.

The same study — criticized by animal-welfare advocates because it was in part industry backed — further found indoor air quality was poor in a cage-free system, where hens stir up dust while walking around in manure, resulting in elevated ammonia levels.

**Impact on producers, environment**

For producers, I know of no advantages to cage-free egg-laying systems. The challenge in transitioning from a caged to cage-free operation is making the switch without compromising flock health and welfare.

Producers will have to become more aware of potential disease due to exposure to droppings. They’ll have to be diligent about vaccination, particularly against *E. coli* and *Salmonella*. This is especially true for operations with brown-egg layers, which are known to have more issues with bacterial infections.

Increased monitoring for coccidia will be vitally important in cage-free systems, as well as the routine use of coccidiosis vaccines, synthetic anticoccidials and ionophores.

Biosecurity is critical in any poultry operation, especially considering all the concerns about avian influenza. The aviary-style housing commonly being built these days has no more stringent biosecurity requirements than a traditional cage system, but if hens are given access to the outdoors — a requirement for organic-egg labeling — biosecurity will be more problematic since it is more difficult to protect hens from predators and infectious disease.

Cage-free hens eat more because they move around more, so producers will need to feed more grain, and more land is required to grow that grain. More space — and land — is needed to house hens. The result is a bigger “carbon footprint.”

It should be no surprise that producers transitioning to a cage-free operation can expect higher costs; the CSES study found cage-free systems cost 36% more to operate, and the higher cost of cage-free eggs must be passed on to consumers.

**Consumer choices**

Despite these difficulties, I think the pendulum is swinging toward more cage-free egg production. How far and fast this segment of the market expands will depend on economics and, in part, on the industry’s ability to meet the demand for cage-free eggs.

Should production costs and the cost of eggs increase significantly and the economy doesn’t improve, more consumers may opt for the cheapest egg available rather than the more expensive cage-free egg, and that could slow down cage-free market growth.

Consumers with more disposable income who favor cage-free eggs may continue to buy cage-free eggs, never mind the cost.

We don’t know yet if the consumer demand will be affected by the environmental impact of the additional grains needed for the hens, the additional land needed for housing and grain production, and the additional carbon footprint. We’ll have to stay tuned to find out.

What I think the industry has learned from the experience so far is that we have to respond to the needs of the consumer.

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Judicious antibiotic use: How should the poultry industry be judged?

Beginning in January 2017, FDA will require veterinarians to issue a veterinary feed directive, or VFD, for any medically important antibiotics administered through poultry or livestock feed. That’ll mean a little more paperwork and recordkeeping for veterinarians, feed mills and producers, but it’s a minor inconvenience if it helps ensure long-term antibiotic efficacy for both humans and animals.

Moreover, the new rule applies to less than 15% of the feed medications used in US poultry. The rest — ionophores, synthetic anticoccidials, bacitracin and bambermycins — are not deemed medically important by FDA and therefore won’t require a VFD.

Keeping score

As a veterinarian, I fully support government initiatives to promote more judicious use of medically important antimicrobials. What’s not clear is how these efforts will be evaluated.

While moderating a recent discussion among poultry health specialists (see pp. 25-33), I asked how the industry should be graded for its efforts to use antibiotics judiciously. The panel didn’t provide a definitive answer, but it did agree that “snapshot” views of antibiotic consumption or resistant organisms would be misleading.

Collecting and interpreting data

Poultry Health Today’s editor recently asked the same question of FDA. According to health communications specialist Megan Bensette, FDA is working with USDA, CDC and the major animal-health companies to improve data collection on resistance patterns and antimicrobial usage.

“Gathering information on the way medically important antibiotics are used is essential to measuring the impact of GFI #213,” she said. “With this in mind, FDA recently held a joint public meeting with USDA and CDC to obtain input from the public on approaches for collecting on-farm antimicrobial use and resistance data.”

In addition, Bensette reported, FDA has partnered with four states to perform whole-genome sequencing on samples provided by the National Antimicrobial Resistance Monitoring System. The data “will provide unprecedented details on changes in resistance genes from animals and animal-derived foods.”

There’s no question more data will help measure our success. The question now is how it will be analyzed and interpreted.

More complete picture

Bensette acknowledged “there is currently no appropriate method to analyze associations between changes in antimicrobial use and shifts in resistance patterns on a national level.” The agency and USDA are therefore collaborating with a Cornell University researcher to create a workshop group to develop a new mathematical model that targets the “most valuable” data.

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“Together, these sources of information will help provide a more complete picture of the relationship between antimicrobial use in food-producing animals and resistance,” Bensette said. That, in turn, would help evaluate the impact of GFI 213.

It will be important for all industry stakeholders — veterinarians, producers and feed-mill managers — to pay close attention to this evaluation process and make their voices heard.

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**Preventing infection, dehydration help ensure good chick quality**

Good chick quality is a prerequisite for broilers to perform well throughout growout. Too often, however, poor chick quality goes unnoticed until excessive first-week mortality is reported. Phil Stayer, DVM, of Sanderson Farms, provides tips for avoiding this costly scenario.

**Changes ahead: Everything you need to know about the new guidelines for oral antimicrobials**

New guidelines for using oral antimicrobials kick in January 1, 2017. Will you be ready? This in-depth report presents the highlights of what FDA calls GFI 213 and how it will change the poultry industry’s approach to disease prevention, control and treatment.

**Environmental risk analysis helps ensure best results with in ovo vaccination**

Hatchery hygiene takes on even greater importance when in ovo vaccination is utilized because if there are pathogens in the environment, they could be injected directly into eggs and embryos, according to Tarsicio Villalobos, DVM, of Zoetis. This problem can be avoided if a risk analysis is performed before in ovo technology is implemented.
Check out these and other articles at poultryhealthtoday.com. While you’re there, you can also sign up for our free weekly updates.

Understanding how IB viruses are tested, typed is first step to control in poultry

New variants of infectious bronchitis virus (IBV) continually emerge. The more you understand how we screen samples for IBV, the better you can understand the complexity of the disease and the need for strategic vaccination programs, says Mark Jackwood, PhD, University of Georgia.

Sustainability: What on earth does it really mean? And does it apply to poultry health?

You can’t pick up a farm or business journal these days without being assaulted by what could easily be the buzzword of the decade: Sustainability. In this special report, Poultry Health Today editors cut through the rhetoric, sought opinions from scientists and examined the numbers to learn how the concepts of sustainability apply to day-to-day, flock-health programs.

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• Poultry Health Today will soon be introducing the VFD News Center — a special edition of the website to help the US poultry industry better understand and prepare for FDA’s Veterinary Feed Directive initiative.
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There’s no one-size-fits-all model for effective Infectious Bronchitis prevention. That’s why the Poulvac® IB vaccine portfolio helps give you the parts you need: personalized expert service, field-tested approaches and the broadest line of vaccines in the industry. We’ll help you put it all together and help build the optimum solution for your operation.

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