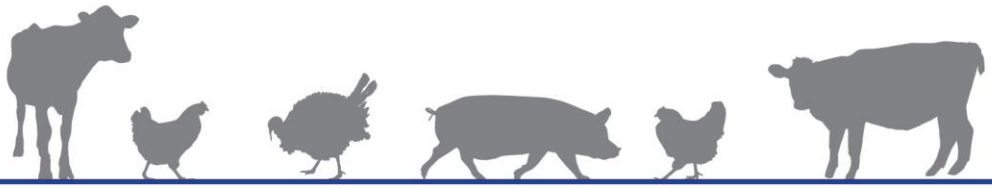
ADVANCES IN ANIMAL AGRICULTURE



WHAT THE CENTER FOR A LIVABLE FUTURE, PEW COMMISSION & OTHERS

AREN'T TELLING YOU ABOUT FOOD PRODUCTION

Animal Agriculture Alliance
Connect | Educate | Protect

Foreword

Toto, I have a feeling we're not in Kansas anymore

We must be over the rainbow …

Fifty years ago, I was a 16-year-old young man growing up in Loup City, Nebraska. In Loup City, gainful employment for 16-year-olds was primarily limited to sacking groceries or working on neighboring farms. I chose the latter. For three summers and Saturdays during three school years, I worked for two brothers who shared responsibilities for a dairy operation, a cow-calf operation and the usual assortment of hogs, chickens and sheep. They were diversified, but they only fed a few mouths, which was fine because back then the majority of rural Nebraskans were linked directly to agriculture.

As we have become a much more urban society over the last 50 years, farming has had to change by necessity to feed the city dwellers several generations removed from farming. American agriculture has also accepted the challenge of becoming more efficient in an effort to feed what is projected to be 9.1 billion residents of our planet. Why is that important? Because food insecurity not only causes children to die, it causes political unrest. Feeding the world is the right thing to do.

Farming also has to accept the challenge of educating those city dwellers as to the reasons the changes we are seeing in farming are not only necessary but are also improvements in food safety, animal well-being and environmental responsibility. This document is an important first step in bringing modern agriculture's improvements in animal health and productivity to the discussions about modern agriculture practices. Unfortunately, these discussions are sometimes led by those with ulterior agendas, like trying to reduce the number of animals raised for human consumption by limiting the tools available that are safe for both humans and animals.

These are tools such as selective breeding for maximum production and resistance to inclement weather; indoor feeding and growing facilities to limit exposure to vermin and parasites, extreme heat and cold, and wild birds serving as carriers of "bird flu;" maternity pens to protect submissive sows from dominant sows, assuring adequate access to feed and water; and better transportation systems, resulting in less stress for animals and promoting more humane handling.

Modern agriculture has biological tools unheard of by the brothers and my Grandfathers for whom I worked that include rbST to help a cow produce 14 percent more milk while consuming less grain and water and producing less methane gas emissions. Biological tools like beta-agonists that produce a market weight hog or steer in less time, again consuming fewer resources while keeping protein costs down and the environment healthier. Biological tools like antibiotics that help keep animals healthier by preventing or controlling disease as well as treating actual disease. This is not only good for growth production but also a humane practice by preventing diseases that could wipe out an entire flock or herd.

For those opposed to the Food and Drug Administration (FDA)-approved use of antibiotics for disease prevention and control in animals raised for food, I could provide hundreds of examples of how antibiotics are used in human medicine for these purposes, including prophylactically administering penicillin to hundreds of college dormitory residents when one student has been diagnosed with Neisseria Meningitis, or giving an

antibiotic before dental work to one who has an artificial heart valve. Why would some suggest animals don't deserve the same protection from a known risk?

Food safety in this country is the best it has ever been, and part of that is because of modern animal husbandry practices and food safety technologies. We no longer recognize Trichinosis from undercooked pork as a human health risk. We no longer see children dying from Tuberculosis and Brucellosis from drinking milk. *E coli O157:H7* illnesses in humans were at an all-time low in 2010.

While there are some who will continually question and criticize modern agriculture's practices, I suspect they have never had to put a hungry child to bed and that they have the resources to shop the niche markets. Yes, we can and should offer choices to those who are able and want to pay more for "raised without antibiotics," "hormone free," "all natural," etc., but those options will not feed the 14 million Americans who go to bed every night with an empty stomach.

Because of continuous improvement and research by those involved in raising animals for food, we have the safest, most affordable and most abundant food supply in the world.

Dr. Richard Raymond
Former Under Secretary
Food Safety and Inspection Service
United States Department of Agriculture

Executive Summary

Animal Care

Today's farm animals are raised by a broad community of dedicated people with different areas of expertise. Farmers and ranchers have an ethical obligation to care for animals raised for food, and they take that responsibility seriously. Animal well-being is critical to providing the best quality food products, and animal care is the highest priority both for large and small farms. Most importantly, it is simply not sustainable for farmers to mistreat animals—it costs more to grow stressed animals to market weight and lowers the quality of the meat. Livestock production has changed and evolved over the years, in part because farmers understand that it is in their best interest to adopt practices that lead to healthier animals. To further advance animal welfare and farming methods, each segment of the industry has brought together recognized animal agriculture specialists, such as Dr. Temple Grandin, and researchers to promote the highest standard of animal care and well-being. Each segment of the livestock and poultry industries have species-specific educational programs, guidelines and best management practices focused on proper care, handling and transportation of animals.

Continuous Improvement

Raising food is a way of life that requires dedication and a lot of hard work. Many farmers and ranchers, or the 2 percent of the population that actually raises the food, recognize that it's not only a duty, but a privilege to raise food for everyone, both domestically and abroad, that need to eat. The rewards of farming and ranching go way beyond financial success—livestock production provides a way of life for future generations and a food source for a hungry world. No one can deny that raising food looks much different than it did 50, 25 or even 5 years ago. To feed a growing population safely and efficiently and to prioritize the highest standards of animal care, the entire animal agriculture industry has worked tirelessly to identify areas for improvement and to evolve. Whether it's making sure that animals are getting the best care possible, using antibiotics judiciously or making major strides in food safety and sustainability, the entire livestock and animal agriculture industry has improved to continuously meet consumer expectations over the past five years.

Responsible Antibiotics Usage

Farmers, ranchers and veterinarians take the issue of antimicrobial resistance and residues very seriously. Nothing is more important to the animal agriculture community than public health, animal health and well-being and a safe food supply. Although most scientists—and the Centers for Disease Control and Prevention—agree that improper use of antibiotics in human medicine is the greatest contributing factor in the formation of resistant bacteria affecting humans, the government, the animal health industry, farmers and ranchers have proactively implemented multiple steps to ensure antibiotic use in food-producing animals does not affect human health and to minimize the development of antibiotic resistant bacteria.

Antibiotic use practices in food animals are based on years of Food and Drug Administration (FDA) veterinary directives, practical experience, scientific analyses and risk assessments that work to ensure both animal health and public health.

In addition to industry efforts to judiciously use antibiotics that are necessary, the FDA has adopted Guidance for Industry 209, *the Judicious Use of Medically Important Antimicrobial Drugs in Food Producing Animals*, which calls for phasing out the use of medically important antibiotics for growth promotion. Guidance 209 will also expressly require veterinary oversight of medically important antibiotics, though it's important to note that

most farmers and ranchers already routinely consult with their veterinarian before using any antibiotics. Once this policy is fully implemented, all medically important antibiotics used in food animals will be used only for therapeutic purposes at the express direction of a veterinarian.

Food Safety Advancements

Many checks and balances are in place throughout the production chain to ensure the integrity and security of the food supply. The U.S. food system has earned a global reputation for the safety of its products, and governmental oversight is part of the reason for the success. Various federal, state and local entities contribute to the nation's food security safety net through regulation or inspection. The U.S. Department of Agriculture, Food and Drug Administration, Center for Veterinary Medicine, National Antimicrobial Resistance Monitoring System and the Food Animal Residue Avoidance Databank all share responsibility for various aspects of ensuring food safety.

According to Centers for Disease Control, human illness from *E. coli* from all foods is on the decline. In 2010, the illness rate dropped to less than 1 case in 100,000 people, meeting the Healthy People 2010 goal.

USDA Food Safety and Inspection Service (FSIS) federal inspectors are present at all times during operation in poultry, beef and swine processing plants and at all egg processing facilities. In a federally inspected slaughter operation, every animal is inspected and inspectors have the authority to slow or halt production for any violations, food safety or otherwise.

But more than government oversight, every farmer and rancher knows that his or her most crucial responsibility is to produce the safest, most wholesome and most affordable food possible. This is not only a responsibility but a privilege that our American farmers and ranchers take incredibly seriously.

The Sustainability Journey

Sustainability means using natural resources efficiently; caring for the land, air, water and wildlife; and producing safe, abundant food to nourish a growing population—the vast majority of whom enjoy a diet comprised, in part, of meat, poultry, milk and egg products. For generations, farmers have raised animals on farms and ranches across the country. American farmers have sought to farm not only in an ethical manner, but also in an environmentally sound and sustainable manner. After all, our farmers and ranchers want to ensure they can pass their farms on to the next generation.

Livestock production in the United States is a model for the rest of the world for several reasons: (1) we use advanced genetics; (2) we use advanced healthcare; and (3) we feed our animals optimal diets. All of the protein groups have made tremendous improvements in all areas of farming, including sustainability. Today, modern farms combine the best of traditional farming practices with the benefits of modern technology and agriculture science.

Individual Industry Reports

Poultry

Animal Care

Chickens (Broilers)

Today's chicken farmers and processors produce birds that benefit from modern technology, advances in nutrition, protection from predators and disease, 24-hour access to clean water and feed, adequate room to grow cage-free and professional veterinary attention. Before a baby chick is even hatched, it is vaccinated to prevent a number of diseases and illnesses that have the potential to be devastating to the bird's health.

Most farmers receive remote alarm notifications through their phones, pagers or other devices which alerts them if the chickens are too hot or cold or need more food or water.

To assist farmers and the companies who produce and process chickens for food, the National Chicken Council (NCC) developed the NCC Animal Welfare Guidelines and Audit Checklist, which have been widely adopted within the chicken industry. These guidelines, which will be updated in 2013, cover every phase of the chicken's life and offer science-based recommendations for humane treatment.

Eggs (Layers)

Over the past year or so it has become clear that the industry is in the beginning stages of transitioning to enriched colony cages. These cages have "enrichments" such as perches, a curtained off area for hens to lay their eggs, and a scratch area. These enrichments allow hens to perform some of their natural behaviors.

Hens under the United Egg Producers (UEP) Certified program are never fed hormones and farms are independently audited each year for compliance to the standards. Hens are fed nutritious feed several times a day and have continuous access to clean water; lighting and ventilation, as well as heating and cooling, are computer-controlled for optimum conditions.

The UEP Certified standards require that employees and contractors caring for the hens sign a code of conduct outlining their commitment to providing proper animal care and reporting any aberrations.

Turkeys

Each year, about 250 million turkeys are raised on about 2,000 independent farms across the United States. These turkeys are raised in scientifically-designed, heated houses that provide maximum space and that protects them from weather, insects, rodents, predators and people who might spread disease. Except for breeding and transportation purposes, turkeys are allowed to roam freely within their house.

The National Turkey Federation (NTF) published its first guidelines on the care of turkeys in 1990 and has continued to update its members with new information ever since. NTF has developed Animal Care Best Management Practices (AC-BMP) to encourage humane production and slaughter practices. The BMP manuals provide the industry with the tools needed to make improvements with the current state-of-the-art practices and to set the stage for enhancement in the future.

Continuous Improvement

A strengthened commitment to investments in science for food and agriculture is essential for maintaining the nation's food, economic and national security. The poultry industry has been on the forefront of sponsoring and supporting increased investments in science for food, animal health and agriculture. Among those efforts:

Increased funding for the National Poultry Improvement Plan (NPIP), which is a joint federal, state, and industry partnership to eradicate food safety threats to humans such as *Salmonella* and to test and monitor highly pathogenic diseases in poultry such as Avian Influenza.

U.S. Poultry & Egg Association research program is celebrating 50 years of funding research and has invested more than $24 million in research that incorporates all phases of poultry and egg production and processing.

U.S. Poultry & Egg Association recently updated its Carbon Footprint Estimation Toolkit. The toolkit was created to assist the poultry industry with adhering to EPA's greenhouse gas (GHG) reporting requirement and to reduce the burden of performing GHG emission calculations.

Responsible Antibiotic Usage

Contrary to some myths, growth-enhancing additives such as hormones or steroids are never used in chicken and turkeys, or for egg production. In fact, FDA bans the use of such hormones. Genetic improvements, better feed formulation and modern management practices are responsible for the increase in chicken and turkey size.

Producers rely on vaccination, biosecurity, good hygiene, best management practices and placing chicks certified free of specific infections (NPIP) to help prevent disease, and only utilize antibiotics when needed. The vast majority of the antibiotics approved by the FDA for use in poultry and egg production are not used in human medicine, and therefore have little to no effect on the contribution to antibiotic resistance in humans.

Food Safety Advancements

One of the pathogens monitored by FSIS is *Salmonell*a, whose prevalence is monitored on a routine basis both by FSIS and by the poultry and egg industry. And the data for chicken shows tremendous strides made over the past several years:

- Since FSIS began testing chicken for Campylobacter during the third quarter of 2011, the industry has reduced incidence by 34%.
- From the first quarter of 2008 through the first quarter of 2013, the chicken industry has reduced the occurrence of *Salmonella* in ground chicken by 50%.
- For the first quarter of 2008 through the first quarter of 2013, the industry has reduced the occurrence of *Salmonella* on whole chickens by 64%.

From January 2010 through June 2012, the prevalence rate of *Salmonella* in turkey declined another 3 percentage points, even as collected samples nearly tripled. The decline happened as examination was even more focused on *Salmonella* contamination.

Egg producers with cage, cage-free, free range and organic housing systems have been working toward reducing pathogens like *Salmonella Enteritidis* (SE) on the farm for more than 10 years. After the initial

inspections in 2011, only approximately 2.5 percent of the environmental samples nationwide were positive for SE for egg producers.

The Sustainability Journey

Back in the early days of the commercial poultry industry—around the 1940s—each chicken required approximately 16 pounds of feed to achieve a four-pound weight. Today, that amount of feed has been reduced by more than half—less than seven pounds of feed—to grow the same size bird, all without the use of growth hormones or steroids. Similar gains have been achieved in turkey production. It once took 29 weeks for a tom turkey to reach a live weight of 35 pounds. Today, the male turkey tips those scales in just 15 weeks.

Lower feed requirements reduce the demand for corn and soybeans. This efficiency also aids in lowering the fuel consumption and exhaust emissions of the tractors and trucks that harvest and bring the grain to market.

A study was initiated by the egg industry aimed to formally quantify production performance gains and overall reduction in environmental impact. The study, titled “A comparative assessment of the environmental Footprint of the U.S. Egg Industry in 1960 and 2010,” undertaken by the Egg Industry Center (Iowa State University, IA), is now complete and will soon be rolled out. In developing the 2010 and 1960 models, the following changes in production performance of pullets and laying hens in the United States were observed over time. Compared with 1960 laying hens, 2010 laying hens have 26 percent less daily feed use, 27 percent higher hen-day egg production, 42 percent better feed conversion, 57 percent lower mortality, 32 percent less direct water use per dozen eggs produced. The total supply of 77.8 billion eggs produced in the U.S. in 2010 was 30 percent higher than the 59.8 billion eggs produced in 1960. However, the total environmental footprint for 2010, in million metric tons of emissions, is 63 percent lower for GHG emissions.

Poultry litter is properly managed to ensure that run-off into nearby waterways does not occur. Farmers recycle the litter in a controlled, environmentally-responsible manner. Poultry farmers have been advancing effective control of nutrients for more than a decade, assisted by credible USDA and EPA-recognized best industry practices. Formal “nutrient management plans” for farmers are also required by state and federal environmental regulations.

A recent study by the University of Delaware not only found that the amount of nutrient runoff supposedly caused by chicken litter is much less than EPA’s outdated and overstated estimates but that the concentrations of nitrogen and phosphorous on the litter are far lower, too. The study concluded that new management practices, better growing environments, feed technology and genetics have improved efficiencies over the last 30 years.

U.S. Poultry & Egg Association’s Family Farm Environmental Award program annually recognizes exemplary environmental stewardship by family farmers engaged in poultry and egg production.

Swine

Animal Care

The industry's flagship education program for farmers and their employees is the National Pork Board's Pork Quality Assurance® Plus (PQA Plus®). As of August 2013, more than 56,000 farmers and farm employees were PQA Plus certified.

Pigs can be raised completely outdoors, completely indoors or a combination of the two. Experts agree that a pig's environment is important to its health and well-being and decisions regarding optimal housing systems should be considered on a farm-by-farm basis.

Farmers want all pigs to receive adequate food and water and be free of injury, so gestation stalls were introduced as a means to help protect and nurture each pig. Likewise, farrowing stalls allow the sow to be protected from other sows and they provide a safe environment for piglets as they are farrowed (born) and begin nursing.

The nation's leading veterinarians say individual sow housing is humane and acknowledge there are advantages and disadvantages to any sow-housing system.

Continuous Improvement

The entire pork industry also has worked diligently to fund research into several key areas over the past several years. These areas include: animal welfare, food safety, public health, animal science, swine health and environmental sustainability.

Over the past 10 years, the National Pork Board has invested more than $1.5 million of farmer funds into swine-housing research and more than $3 million in general research to improve animal well-being.

The U.S. pork industry over the past five years has invested more than $1.3 million in research to support issues associated with pork safety. In 2011, the National Pork Board funded four studies at renowned animal science institutions—Iowa State University, Kansas State University and the University of Minnesota—designed to shed light on ways to better understand and improve food safety.

Through the Pork Checkoff, the National Pork Board has funded research at the University of Arkansas's Applied Sustainability Center to identify and quantify the baseline carbon footprint for pork production.

In 2006, the U.S. pork industry committed $6 million to fund the pork portion of the National Air Emissions Monitoring Study, which was conducted by Purdue University under the supervision of the U.S. Environmental Protection Agency. The study was conducted specifically to collect scientifically valid data to: 1) accurately assess emissions from livestock operations and compile a database for estimating emission rates; and 2) promote a national consensus for emissions-estimation methods/procedures from livestock operations.

Responsible Antibiotic Usage

Pork producers, with the guidance of their veterinarians, use a variety of tools such as vaccinations, housing, ventilation and antibiotics, when necessary, to keep their animals healthy. The Pork Quality Assurance® Plus (PQA Plus) certification program and the We Care initiative underscore pork producers' commitment to practices that protect human health, including managing the use of antibiotics. Pork producers work with veterinarians on evaluating the use of antibiotics as part of their herd health program. This includes evaluating their use to protect animal health, optimize their effectiveness and minimize the risk of developing antibiotic

resistance, thereby protecting public health. Specifically, PQA Plus emphasizes five key principles and six guidelines that form the basis of all decisions that producers make regarding antibiotic use.

Food Safety Advancements

Pork producers ensure safe food by focusing on three main areas: (1) using good management practices; (2) managing the health of the herd; and (3) employing new and better technology.

The PQA Plus program includes a component to promote uniform food safety practices on farms throughout the country. The industry's 10 Good Production Practices (GPPs) are the foundation of PQA Plus.

A study referenced cited by USDA's Food Safety Inspection Service, has found *Salmonella* on just 1.66 percent of hog carcasses. This compares with 6.9 percent in 1997-1998.

The Sustainability Journey

The relative contribution from swine production to the overall national greenhouse gas inventory is extremely small—about one—third of 1 percent, according to figures from the U.S. Environmental Protection Agency's annual greenhouse gas reports.

By using natural manure fertilizer, farmers not only reduce their environmental footprint by decreasing the use of petroleum-based fertilizers but also greatly improve soil quality. According to a recent survey of hog farmers, more than 60 percent say that crop production is part of their farm's overall operation.

In 1959, it took eight pigs—including breeding stock—to produce 1,000 pounds of pork. Today, it takes just five pigs. And hog farmers today use 78 percent less land and 41 percent less water than they did 50 years ago.

The Environmental Stewards Award Program, launched in 1995, recognizes individual farmers for their outstanding efforts in environmental management and conservation.

Beef Cattle

Animal Care

Proper animal care is the responsibility of everyone in the beef community. Cattlemen recognize ensuring animal well-being is the right thing to do and critical to the success of their individual operations.

The Beef Quality Assurance Program (BQA) was created in 1987 and includes research, training and certification that help farmers and ranchers provide the best care to their cattle.

The handling and care of more than 90 percent of cattle in feedyards today are influenced by the farmer- and rancher-created and veterinarian endorsed BQA program.

Continuous Improvement

Greater than 80 percent of research funded by America's beef producers is used throughout the beef supply chain on a daily basis to enhance the safety of beef and beef products.

Farmers and ranchers have invested in a first-of-its-kind comprehensive sustainability assessment to establish a benchmark and continuously identify areas of improvement.

Producers' time-honored traditions of animal care and stewardship are constantly expanding to include the most recent scientific advancements that keep cattle healthy and the beef supply safe.

Responsible Antibiotic Usage

Cattlemen consult with veterinarians to develop a health program for cattle designed to keep the herd healthy and protect the future use of antibiotics for human and animal health. The future effectiveness of these animal health tools is just as important to cattlemen as it is to consumers.

The National Cattlemen's Beef Association Producer Guidelines for "Judicious Use of Antimicrobials" have been in place since 1987 and specifically outline the appropriate use of these products.

The New Animal Drug Approval process requires a sponsor to submit more than 75 different studies to prove an antibiotic's safety. More than 75 percent of cattlemen say that appropriate use of animal health products such as vaccines and antibiotics are a vital asset to maintaining and improving the health of their cattle.

Food Safety Advancements

Cattle farmers and ranchers are committed to food safety and have invested $30 million since 1993 in food safety research programs. The industry as a whole invests approximately $550 million annually in beef safety research and technology implementation.

Cattle farmers and ranchers proposed the development of the Beef Industry Food Safety Council (BIFSCo) in 1997 to unite the beef community around the common goal of improving beef safety. The scientifically-validated safety practices that are part of how beef is raised today, coupled with strict government requirements, allow the beef industry to control foodborne pathogens in the beef supply more effectively than ever.

The Sustainability Journey

Beef today is environmentally and nutritionally efficient. U.S. farmers and ranchers raise 20 percent of the world's beef supply with just 7 percent of the world's cattle. Each serving requires less land, water and energy than in the past while providing 10 essential nutrients to the diet. For example, approximately 85 percent of U.S. grazing lands is unsuitable for producing crops. Grazing cattle on this land more than doubles the area that can be used to raise food. Moreover, open space, primarily managed by cattlemen, provides habitat for 75 percent of America's wildlife.

To continuously improve, the beef community also completed a first-of-its-kind life cycle assessment (LCA) — certified by NSF International — that provides benchmarks on economic, environmental and social contributions in the United States and a roadmap for the journey toward more sustainable beef. After two years of data collection and research, the beef community has proven it's on the right path forward with a 7 percent improvement in environmental and social sustainability from 2005 to 2011 and we're committed to finding ways to continuously improve.

Dairy Cattle

Animal Care

Professional nutritionists help dairy farmers develop a balanced and nutritious diet for their cows. Many dairy farms feature “freestall” barns that allow cows to walk around as they please and to eat, drink and sleep whenever and wherever they choose.

The National Dairy FARM Program: Farmers Assuring Responsible Management™ (FARM program) provides consistency and uniformity to best practices in on-farm animal care and quality assurance through a nation-wide, verifiable program. Today, that participation level has risen above 70 percent of the nation’s milk supply.

Continuous Improvement

Through industry funding and collaborations with allied industry, universities and state and federal government agencies, the dairy industry has a long tradition of cutting edge research on the science and continuous improvement of animal welfare, food safety, nutrition, environmental stewardship and sustainability. In 2010, the dairy industry established the Dairy Research Institute® under leadership of the non-profit Dairy Management Inc. to expand the commitment of the U.S. dairy industry in scientific research.

In 2002, the National Milk Producers Federation and USDA’s Natural Resource Conservation Service (NRCS) released The Dairy Environmental Handbook. The handbook is a comprehensive resource of the environmental best management practices available to dairy producers. In 2006, the U.S. dairy industry committed $6 million to fund the National Air Emissions Monitoring Study, conducted under the supervision of the U.S. Environmental Protection Agency, to collect scientifically valid data on air emissions from dairy farms.

In 2009, the National Milk Producers Federation with support from Dairy Management Inc. launched the National Dairy FARM Program: Farmers Assuring Responsible Management™ as a nationwide, verifiable program that addresses animal well-being. Today, more than 70 percent of the nation’s milk supply is enrolled in the education, evaluation and verification components of the FARM Program.

In September 2013, the U.S. dairy industry established a voluntary framework and guidelines for traceability of dairy products through the dairy supply chain from the farm through domestic and global distribution outlets. Already, 20 percent of U.S. dairy manufacturers are implementing the voluntary traceability framework and guidelines with an industry goal of 80 percent participation in the next year.

Responsible Antibiotic Usage

Recognizing that lactating dairy cows are occasionally treated for diseases and to ensure that no animal medications enter the milk supply, all milk is screened before it is accepted into a processing plant.

The U.S. dairy industry conducts almost 4 million tests each year on all milk entering dairy plants. Milk that tests positive for antibiotic residues is rejected for human consumption and appropriately discarded. The dairy farmer responsible for a positive result must then pay for the entire load of milk. This costs approximately $12,000, so there is a large financial incentive to make sure that no antibiotic-treated dairy cows are milked. In addition, all milk from that dairy farm is then withheld until a negative antibiotic test result is obtained from the farm.

In 2012, only 0.017 percent of all milk tanker samples tested positive for residues of animal medications. Milk tanker samples testing positive declined by 84 percent from 1996-2012, indicating that the program is effective at both detecting and deterring animal medications in milk.

Food Safety Advancements

Because milk is one of the most highly regulated food products in the United States, 14 dairy foods are the lowest among major food groups in causing foodborne illness.

Of 13,405 foodborne disease outbreaks summarized by the Centers for Disease Control and Prevention (CDC) from 1998-2008, 161 were attributed to dairy product consumption (1.2 percent). Most foodborne disease outbreaks associated with dairy product are due to the consumption of raw (unpasteurized) milk or raw milk cheeses that have not been properly aged.

The Sustainability Journey

The U.S. dairy industry supports socially responsible, economically viable and environmentally sound dairy food systems that promote the current and future health and well-being of our consumers, communities, cows, employees, planet and businesses.

One landmark achievement in that effort is the dairy industry's ground-breaking greenhouse gas (GHG) life cycle assessment (LCA) for fluid milk—the first for a major agricultural commodity.

In conjunction with other studies, this study helps validate that the U.S. dairy industry contributes less than 2 percent of total U.S. GHG emissions.

Conclusions

In 2008, the PEW Commission on Industrial Farm Animal Production released a report titled "Putting Meat on the Table: Industrial Farm Animal Production in America." The Commission repeatedly stated in the report that its goals were to "understand the impacts of [livestock production] and propose recommendations to address them in ways that can ensure a safe system of animal agriculture."

In the five years since the report's initial release, the animal agriculture community has continued to collaborate, fund research, and evolve to meet the highest food safety and animal care standards while feeding an even larger population. The animal agriculture community continually improves—and does so of its own accord, and in spite of animal rights and anti-modern agriculture activist groups and other detractors who use fear and misinformation to confuse the public about livestock and poultry production.

What precedes this conclusion are the very briefest of highlights of an industry that has made great strides in the areas of animal care, food safety and sustainability. This summary document provides a glimpse into how each specific industry—from cattle to poultry to swine—has continued to enhance its programs to ensure they are using antibiotics judiciously, caring for their animals humanely and producing the safest products possible.

Some may argue the preceding document is a biased account of food production. But, the results speak for themselves. According to Centers for Disease Control, for example, human illness from *E. coli* from all foods is on the decline. In 2010, the illness rate dropped to less than 1 case in 100,000 people, meeting the U.S. Department of Health and Human Services Healthy People 2010 goal. In terms of sustainability, the United States is a model for sustainable livestock production. More importantly, less than 3 percent of all U.S. greenhouse gas emissions are attributed to livestock production. Researchers, veterinarians, animal behaviorists and economists agree it's not about a farm's size; it's about how a farm is managed.

In addition to the vast improvements made by the animal agriculture community, the landscape has also changed in crucial areas since the initial release of the Pew report. Recently, for example, the FDA adopted Guidance for Industry 209, the Judicious Use of Medically Important Antimicrobial Drugs in Food Producing Animals, which calls for phasing out the use of medically important antibiotics for growth promotion. Guidance 209 was adopted with wide support from every segment of the animal agriculture community.

The landscape of food production has also vastly changed in terms of how individual farmers and ranchers have embraced technology – not only to improve the quality of life of their animals, but also to reach outside their communities and tell their story. Today, farmers and ranchers are using social media to try and give the 98 percent of the American population that is at least four—if not more—generations removed from the family farm a glimpse of real livestock and poultry production.

In 2050, the farmers and ranchers in America—and around the world—will be facing a global food crisis. Between now and then, those same farmers and ranchers will be struggling to determine how to best feed a growing population, a population expected to reach 9.1 billion in just 37 years, with fewer resources. To meet this challenge, the entire industry must continue to evolve, to grow, to become more efficient—all without sacrificing animal well-being, food safety and the environment. This challenge is something the industry has

been preparing for, for years. It's why the industry has invested in research in critical areas and has made large-scale changes that span entire segments of livestock production.

While the industry has been working to improve, groups like the PEW Commission on Industrial Farm Animal Production and the Center for a Livable Future have been issuing reports and calling certain production practices into question while offering no real solutions. These reports are based on emotional appeals and misinformation, rather than sound science and practicality.

Certainly, the industry must do a better job communicating the finer details of modern animal agriculture. However, we invite consumers to get engaged, ask questions about food production. But go to legitimate sources for information. Don't just trust, but verify. Farmers and ranchers are trying harder than ever to connect and answer legitimate questions about food production. At the Animal Agriculture Alliance, we're also working connect consumers with their food and answer questions. We strive to correct misinformation and assuage fear promulgated by groups with a decidedly anti-modern agriculture agenda.

As Americans we're blessed with an abundance of choices on the grocery store shelves every day. The animal agriculture community will continue to provide as many different options as the marketplace—and consumers - demand—while still maintaining the highest food safety and quality standards. The Alliance wholeheartedly supports consumer choice—and production choice, as we are blessed with a wide range of members, who utilize a wide variety of production practices.

The varied landscape of animal agriculture today is responsible for the abundance of choices we have as consumers. And looking ahead to 2050, that same varied landscape of livestock and poultry production—farms of all shapes, sizes and production styles—will be responsible for feeding the 9.1 billion people.

Kay Johnson Smith
President and CEO
Animal Agriculture Alliance

Additional References

About the Animal Agriculture Alliance

The Animal Agriculture Alliance, a 501(c)(3) non-profit organization, is a broad-based coalition of individual farmers and ranchers, producer organizations, veterinarians, scientists, suppliers, packer-processors, private industry and retailers. The Alliance's mission is to communicate the important role of animal agriculture to our nation's economy, productivity, vitality, security and that animal well-being is central to producing safe, high-quality, affordable food and other products essential to our daily lives. Find the Alliance on Facebook, Twitter, Youtube and Pinterest.

About the Dairy Research Institute

America's dairy farmers have long been dedicated to sound, scientific research to better understand and promote the value of dairy products. To expand the impact of that commitment in product, nutrition and sustainability research, the Dairy Research Institute® was established in 2010 under their leadership through Dairy Management Inc.™ (DMI), the nonprofit organization that manages the dairy checkoff program.

About the National Cattlemen's Beef Association (NCBA)

The National Cattlemen's Beef Association is the national trade association representing U.S. cattle producers, with more than 28,000 individual members and sixty-four state affiliate, breed and industry organization members. Together NCBA represents more than 230,000 cattle breeders, producers and feeders. NCBA works to advance the economic, political and social interests of the U.S. cattle business and to be an advocate for the cattle industry's policy positions and economic interests.

About the National Chicken Council

The National Chicken Council (NCC), based in Washington, D.C., is the national, non-profit trade association representing the U.S. chicken industry. NCC is a full-service trade association that promotes and protects the interests of the chicken industry and is the industry's voice before Congress and federal agencies. NCC member companies include chicken producer/processors, poultry distributors, and allied industry firms. The producer/processors account for approximately 95 percent of the chickens produced in the United States.

The National Chicken Council was first established in 1954 in Richmond, Virginia, as the National Broiler Council. NCC headquarters moved to the nation's capital in 1965 and the new name, National Chicken Council, was adopted in 1998, to better describe the industry and its products.

About the National Dairy Council

National Dairy Council (NDC), the non-profit organization funded by the national dairy checkoff program, is committed to nutrition education and research-based communications. NDC provides science-based nutrition information to, and in collaboration with, a variety of stakeholders committed to fostering a healthier nation, including health professionals, educators, school nutrition directors, academia, industry, consumers and media. Established in 1915, NDC comprises a staff of registered dietitians and nutrition research and communications experts across the country. NDC has taken a leadership role in promoting child health and wellness through programs such as Fuel Up to Play 60. Developed by NDC and the National Football League (NFL), Fuel Up to Play 60 encourages youth to consume nutrient-rich foods and achieve at least 60 minutes of physical activity every day.

About the National Milk Producers Federation

The National Milk Producers Federation (NMPF), established in 1916 and based in Arlington, VA, develops and carries out policies that advance the well-being of dairy producers and the cooperatives they own. The members of NMPF's 30 cooperatives produce the majority of the U.S. milk supply, making NMPF the voice of more than 32,000 dairy producers on Capitol Hill and with government agencies.

NMPF provides a forum through which dairy farmers and their cooperatives formulate policy on national issues that affect milk production and marketing. NMPF's contribution to this policy is aimed at improving the economic interests of dairy farmers, thus assuring the nation's consumers an adequate supply of pure, wholesome, and nutritious milk and dairy products.
The policies of NMPF are determined by its members from across the nation. Therefore, the policy positions expressed by NMPF are the only nationwide expression of dairy farmers and their cooperatives on national public policy.

About the National Pork Producers Council

The National Pork Producers Council conducts public-policy outreach on behalf of its 43 affiliated state associations, enhancing opportunities for the success of U.S. pork producers and other industry stakeholders by establishing the U.S. pork industry as a consistent and responsible supplier of high-quality pork to the domestic and world markets. NPPC's mission is to fight for reasonable legislation and regulations, develop revenue and market opportunities and protect the livelihoods of America's 67,000 pork producers. Public-policy issues on which it focuses are in the areas of agriculture and industry, animal health and food safety, environment and energy and international trade. In addition to working on legislation, regulations and trade initiatives, NPPC gets involved in the political process through its political action committee, PorkPAC. The PAC educates and supports candidates at the state and federal levels who support the U.S. pork industry.

NPPC often works closely with the National Pork Board and has formed joint task forces with it on some issues, such as an animal identification system, animal well-being and food safety.

NPPC staff is located in Des Moines, Iowa, and in Washington, D.C., its public-policy office.

About the National Pork Board

Today's pork checkoff is at work for pork producers. U.S. pork producers and importers pay $0.40 per $100 of value when pigs are sold and when pigs or pork products are brought into the United States. Responsible. Sustainable. Professional. Profitable. The National Pork Board harnesses the resources of all producers to capture opportunity, address challenges and satisfy customers.

About the National Turkey Federation

To conduct activities aimed at strengthening the turkey farmers' ability to responsibly provide wholesome products, and to raise awareness about the many health benefits associated with eating turkey. For nearly 75 years, the National Turkey Federation (NTF) has served as the national advocate for the turkey farmer and processors—representing their point of view to Congress and federal agencies. NTF also tracks trends and identifies challenges unfolding in the public, legislative, regulatory, and news media that could potentially impact the entire industry. NTF's professional staff helps members successfully bridge an understanding between the public and the producer.

About the United Egg Producers (UEP)

United Egg Producers is a Capper-Volstead cooperative of egg farmers from all across the United States and representing the ownership of approximately 95 percent of all the nation's egg-laying hens. Of the total farm members, 34 serve on the Board of Directors and they along with several others serve on various committees. We, therefore, think of UEP as an organization of "Leadership By Egg Farmers - For Egg Farmers." UEP is impossible for any individual egg farmer, no matter how large, to keep up to date, react, and respond to every legislative, regulatory and advocacy issue and that is where UEP provides the greatest value. Through a unified voice and working together we can be heard in addressing most every issue and offer positive solutions. UEP is and has been very proactive and progressive in developing on-farm programs to assist our farm members while also recognizing the benefits these programs provide to our customers and consumers.

We pride ourselves on working with government agencies such as USDA, FDA, EPA and others to solve problems and create programs that will move our industry forward. These web pages will acquaint you with our efforts and programs regarding food safety, environment, animal welfare and others.

About U.S. Poultry & Egg Association

U.S. Poultry & Egg Association is an all-feather organization representing the complete spectrum of today's poultry industry, with a focus on progressively serving member companies through research, education, communication, and technical assistance. Founded in 1947, U.S. Poultry & Egg Association is based in Tucker, GA.

About National Pork Producer's Council Pork Quality Assurance Program (PQA Plus)

The pork industry has taken proactive steps to support and promote proper, humane animal care. The industry's flagship education program for farmers and their employees is the National Pork Board's Pork Quality Assurance® Plus (PQA Plus®). Individuals can become certified in PQA Plus by successfully completing the program's course, which is administered by a trained, independent advisor (a veterinarian, an Extension specialist or an agriculture educator). As of August 2013, more than 56,000 farmers and farm employees were PQA Plus certified. To help ensure implementation of the program, on-farm site assessments are a key component of

PQA Plus. To date, more than 16,000 farms have been assessed, representing more than 75 percent of all pigs produced in the United States. For more information, please visit: http://www.nppc.org/issues/animal-health-safety/pork-quality-assurance-plus-pqa-plus/

About the National Pork Board's Good Production Practices

The National Pork Board's Good Production Practices include the following.

- Establish and implement an efficient and effective herd health management plan
- Use a veterinarian-client-patient relationship as the basis for medication decision-making
- Use antibiotics responsibly
- Identify and track all treated animals
- Maintain medication and treatment records
- Properly store, label and account for all drug products and medicated feeds
- Educate animal caretakers on proper administration techniques, needle-use procedures, observance of withdrawal times and methods to avoid marketing adulterated products
- Follow appropriate on-farm feed processing and commercial feed processor procedures
- Develop, implement and document an animal caretaker training program
- Provide proper care to improve swine well-being

About the National Poultry Improvement Plan

The National Poultry Improvement Plan was established in the early 1930's to provide a cooperative industry, state, and federal program through which new diagnostic technology can be effectively applied to the improvement of poultry and poultry products throughout the country. The development of the NPIP was initiated to eliminate Pullorum Disease caused by Salmonella pullorum which was rampant in poultry and could cause upwards of 80% mortality in baby poultry. The program was later extended and refined to include testing and monitoring for Salmonella typhoid, Salmonella enteritidis, Mycoplasma gallisepticum, Mycoplasma synoviae, Mycoplasma meleagridis, and Avian Influenza. In addition, the NPIP currently includes commercial poultry, turkeys, waterfowl, exhibition poultry, backyard poultry, and game birds. The technical and management provisions of the NPIP have been developed jointly by Industry members and State and Federal officials. These criteria have established standards for the evaluation of poultry with respect to freedom from NPIP diseases.

Following is a list of slaughter plants participating in the National Poultry Improvement Plan's H5/H7 Avian Influenza Monitored program authorized to export to specific countries.

About the Egg Safety Center

The Egg Safety Center works to educate consumers on ways to further reduce the incidence of food-borne illness related to egg products; provide producers with the most up-to-date information available; and act as a food safety resource for retailers and food service companies in the U.S.

About the Dairy Environmental Handbook

The Dairy Environmental Handbook is a comprehensive resource of many of the environmental best management practices available to dairy producers. This book is the product of a joint National Milk Producers Federation and USDA's Natural Resource Conservation Service (NRCS) effort to provide dairy producers and professionals with initial environmental management guidance for dairy operations.

This handbook was made possible through the generous financial support of the Phillip Morris Family of Companies, the USDA and several sponsors. It is available for producers either directly from NMPF or from member dairy cooperatives. Producers do not need to be a member of a dairy cooperative to receive the book.

About the U.S. Dairy Traceability Commitment Guidelines

On Sept. 10, 2013, the Innovation Center for U.S. Dairy® — established under the leadership of America's dairy producers through the dairy checkoff program — announced voluntary, enhanced dairy traceability best practices. The practices were designed by processors, for processors, to increase global competitiveness, help satisfy future requirements of the Food Safety Modernization Act (FSMA) and, in the rare event of a safety issue, quickly isolate products to protect public health and prevent brand damage.

Five processors, accounting for more than 20 percent of U.S. milk production, committed to adopting and applying the traceability best practices when they were announced. They are Darigold, Glanbia Foods, Hilmar Cheese Company, Leprino Foods and Michigan Milk Producers Association.

In the coming months, all processors will be asked to agree to the "U.S. Dairy Traceability Commitment." The goal is to see processor commitments cover at least 80 percent of the U.S. milk supply by Sept. 2014. The U.S. Dairy Traceability Commitment says:

> (Name of processor) commits to adopt and apply the recommended best practices for traceability outlined in the Innovation Center for U.S. Dairy's "Guidance for Dairy Product Enhanced Traceability." The best practices include these three pillars of dairy traceability for processors:
>
> - Modeling physical plants to know where new lots enter and where products transform
> - Creating a lot identifying mark that will be recognized and used by customers
> - Utilizing enhanced record-keeping that will assist in expedient and effective recall capability

"Our 80 percent goal by September 2014 is ambitious but attainable," said Dermot Carey, vice president of the Ingredients Division at Darigold and the chairman of the Innovation Center's Traceability Subcommittee. "We want U.S. dairy to be the global leader for traceability."

About the See It? Stop It! Campaign

Reaffirming their strong commitment to animal care and well-being, farmers, ranchers, processors and the Center for Food Integrity – a not-for-profit corporation that builds consumer trust and confidence in the U.S. food system – in 2013 launched an initiative to encourage the immediate reporting of animal abuse, neglect, mishandling or harm. The See It? Stop It! initiative provides tools for farms to affirm that proper animal care is the responsibility of all employees and that animal abuse is not acceptable or tolerated. Farm workers are encouraged to report abuse. As a condition of employment, many farm operations require workers to sign policy documents that confirm their roles and responsibilities for animal care, including the reporting of any animal abuse they witness. Such policies usually include disciplinary action, including termination, for failure to report abuse. The U.S. pork and dairy industries provided initial funding for the initiative. For more information on the initiative, please visit: http://www.seeitstopit.org/

About Animal Care Review Panels

The Center for Food Integrity created Animal Care Review Panels for the pork, dairy and poultry industries to provide a balanced analysis of undercover video investigations. This process engages recognized animal care specialists to examine video and provide expert perspectives for food retailers, the agriculture industry and the media. The panels include a veterinarian, an animal scientist and an ethicist to assure various perspectives are represented.

About the Beef Quality Assurance Program (BQA)

The Beef Quality Assurance Program (BQA) was created in 1987 and includes research, training and certification that help farmers and ranchers provide the best care to their cattle. Through multiple beef community-led initiatives, including BQA and the Producer Guidelines for Judicious Use of Antimicrobials, cattle farmers and ranchers work hand-in-hand with veterinarians to select and use antibiotics carefully and only when needed. Moving animals quietly, caring for them and making them comfortable is both an art and a science, achieved through training, best practices and generational experience. For more information, please visit: http://www.bqa.org/

About the National Dairy Farmers Assuring Responsible Management (FARM) Program

Animal Care Checklist and Reference Guide: At the heart of the National Dairy FARM program are the Animal Care Quick Reference User Guide, and the Animal Care Manual. The user guide focuses on 48 key on-farm practices that should be in place on participating dairy farms. The manual details best management practices for a variety of animal care issues including animal health from birth to end of life, facilities/housing, nutrition, transportation and handling. NMPF worked with dairy animal care experts to update the documents to reflect current practices, animal-health concerns, innovations and technology. These materials are available for download on the website in both English and Spanish.

Supplemental Training Materials: Producers can access educational materials that include a comprehensive animal care manual, a quick-reference user guide, animal care videos, and other educational materials (materials are available, in English and Spanish, at www.nationaldairyfarm.com).

Third-Party Verification: Annual third-party program verification system assures credibility and demonstrates effectiveness. Third-party verification protects the integrity of the program and provides quantifiable verification that producers are meeting their ethical obligations to provide appropriate care for their animals.

Additional Initiatives: The FARM Program will introduce efforts designed to protect the quality, safety and wholesomeness of dairy products. The most recently added area of focus is residue prevention. The *Milk and Dairy Beef Drug Prevention Protocol* manual is available online, free of charge, at www.nationaldairyfarm.com.

About FDA Guidance 209

Antimicrobial drugs have been widely used in human and veterinary medicine for more than 50 years, with tremendous benefits to both human and animal health. The development of resistance to this important class of drugs, and the resulting loss of their effectiveness as antimicrobial therapies pose a serious public health threat. Misuse and overuse of antimicrobial drugs create selective evolutionary pressure that enables antimicrobial resistant bacteria to increase in numbers more rapidly than antimicrobial susceptible bacteria and thus increases the opportunity for individuals to become infected by resistant bacteria.

Because antimicrobial drug use contributes to the emergence of drug resistant organisms, these important drugs must be used judiciously in both animal and human medicine to slow the development of resistance. Efforts have been made to promote the judicious use of these drugs in humans (see: http://www.cdc.gov/getsmart/index.html), as well as in animals (see http://www.avma.org/issues/default.asp). Using these drugs judiciously means that unnecessary or inappropriate use should be avoided. The focus of this document is on the use of medically important antimicrobial drugs in food-producing animals. Based on a consideration of the available scientific information, FDA is providing a framework for the voluntary adoption of practices to ensure the appropriate or judicious use of medically important antimicrobial drugs in food-producing animals. This framework includes the principles of phasing in such measures as 1) limiting medically important antimicrobial drugs to uses in food-producing animals that are considered necessary for assuring animal health; and 2) limiting such drugs to uses in food-producing animals that include veterinary oversight or consultation. Developing strategies for reducing antimicrobial resistance is critically important for protecting both public and animal health. Collaboration involving the public, the public health, animal health, and animal agriculture communities on the development and implementation of such strategies is needed to ensure that the public health is protected while also ensuring that such strategies are feasible and that the health needs of animals are addressed.

For more information, please visit:
http://www.fda.gov/downloads/animalveterinary/guidancecomplianceenforcement/guidanceforindustry/ucm216936.pdf

About FDA Guidance 213

This draft guidance is intended for sponsors of approved applications for new animal drugs and new animal drug combination products containing medically important antimicrobials for use in or on medicated feed and water of food-producing animals. The draft guidance contains information for sponsors of such new animal drugs and combination products to facilitate voluntary changes to the conditions of use for such new animal drugs and combination products consistent with FDA's recommendations included in the guidance document entitled "The Judicious Use of Medically Important Antimicrobial Drugs in Food-Producing Animals" (Judicious Use Guidance, GFI #209). In particular, the purpose of this draft guidance is to provide sponsors with specific recommendations on how to supplement their approved new animal drug applications to align with FDA's GFI #209.

For more information, please visit:
http://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/UCM299624.pdf

About the Fight! BAC Program

There are four core practices that help keep food safe. Right now, there may be an invisible enemy ready to strike. He's called BAC (bacteria) and he can make people sick. In fact, even though consumers can't see BAC - or smell him, or feel him - he and millions more like him may already be invading food products, kitchen surfaces, knives and other utensils.

But consumers have the power to Fight BAC!® and to keep food safe from harmful bacteria. It's as easy as following these four simple steps:

- CLEAN – Wash hands and surfaces often.
- COOK – Cook to proper temperature. Use a meat thermometer.
- SEPARATE – Don't cross-contaminate.
- CHILL – Refrigerate promptly.
-

For more information, please visit: http://www.fightbac.org/safe-food-handling

About the U.S. Department of Agriculture

The U.S. Department of Agriculture's Food Safety Inspection Service (FSIS) has regulated meat and poultry processing for more than a century. The centerpiece of its meat and poultry food-safety regulation is the 1996 Hazard Analysis and Critical Control Point (HACCP) rule. The agency works to enhance public health by protecting consumers from foodborne illness and by ensuring that the nation's meat, poultry and egg products are safe, wholesome and correctly packaged. The systematic preventive approach to food

safety identifies physical, chemical and biological hazards in production processes that can cause the finished product to be unsafe, and it designs measurements to reduce risks to a safe level.

About the National Animal Identification System

NAIS is a streamlined information system that helps producers and animal health officials respond quickly and effectively to animal disease events in the United States. Its work is carried out through a voluntary state-federal-industry partnership.

About the Food and Drug Administration

Under the Department of Health and Human Services, the FDA is responsible for regulating more than $1 trillion worth of consumer goods. Areas of regulation that affect the livestock and poultry industries are related to food safety and veterinary products.

About the Center for Veterinary Medicine

CVM is the branch of FDA that regulates food, food additives and drugs that are given to animals, including food animals and pets. Its primary focus is to ensure medications that are used for food animals do not affect the human food supply.

About the National Antimicrobial Resistance Monitoring System

USDA, FDA and the Centers for Disease Control and Prevention run the National Antimicrobial Resistance Monitoring System (NARMS) to monitor resistance trends in certain bacteria in humans, animals and retail meats to help ensure that animals are not a significant pathway of resistant bacteria to humans through the meat supply. While NARMS monitors many bacteria, the bacteria of most importance to human health are those that can make people sick – zoonotic pathogens, such as Salmonella and Campylobacter.

About the Food Animal Residue Avoidance Databank

FARAD is a national, USDA-sponsored cooperative project with a primary mission to prevent or mitigate illegal residues of drugs, pesticides and other chemicals in foods of animal origin. The computer-based system is designed to provide livestock producers, Extension specialists and veterinarians with practical information on how to avoid drug, pesticide and other environmental contaminant residue issues.