



The American Veterinary Medical Association

Response to

The Final Report of the Pew Commission
on Industrial Farm Animal Production

Executive Summary

In the spring of 2008, the Pew Commission on Industrial Farm Animal Production issued the report *Putting Meat on the Table: Industrial Farm Animal Production in America*. Considering the importance of our food system and the ramifications of minor or major proposed modifications, the American Veterinary Medical Association (AVMA) believes it is crucial to closely and carefully examine the Commission's research and methodology and the implications of the report.

As a not-for-profit association established to advance the science and art of veterinary medicine, the AVMA's membership includes more than 78,000 members, representing approximately 86% of U.S. veterinarians, all of whom are involved in a myriad of areas of veterinary medical practice, including private, corporate, academic, industrial, governmental, military, and public health services. It is our public duty, therefore, to monitor and comment on the canon of literature pertaining to food animal production.

In our analysis of the Pew Commission's report, we found several areas of concern, beginning with the technical assemblage of academics to research and review the report. The Pew Commission purports to have utilized a process that melds the thoughts of top academics and diverse stakeholders into its grandiose examination of food animal production. However, the Pew Commission's process for gaining technical expertise in the technical reports was biased and did not incorporate the findings and suggestions of a significant number of participating academicians. We caution readers that we found disparities within the report, potentially due to the lack of incorporation of differing interpretations and conclusions offered by subject matter experts.

In terms of the report's meat and bones, the AVMA identified the points addressing antimicrobial resistance, the environment, and animal welfare as the most pertinent to veterinary medicine. While we believe there is value in some of the recommendations offered by the Pew Commission, we assert that many of the Commission's sub-points have significant shortfalls and lack in comprehensive idea development or in how the Commission would execute a new plan or program.

Both in substance and in approach, therefore, the Pew report contains significant flaws and major deviations from both science and reality. These missteps lead to dangerous and under-informed recommendations about the nature of our food system—and shocking recommendations for interventions that are scarcely commensurate with risk. The report is, in many ways, a prolonged narrative designed to romanticize the small, independent farmer, while vilifying larger operations, based simply upon their size.

The suggestions presented in the following analysis of the Pew Commission's report offer thoughtful insight into what we, as veterinarians, assert are critical research and programmatic needs as next steps in promoting the optimal health and welfare of our nation's animals and people. As always, we believe it is imperative to base our decisions on evidence and research that is grounded in the basic principles of scientific inquiry. By disregarding these elementary guidelines of thought, the Pew Commission's report is based on what is possible, rather than what is probable. The following analysis cautions against the propagation of these untruths, which could easily scare the American public and, ultimately, compromise the safety of our nation's food supply.

The American Veterinary Medical Association Response to the Report of the Pew Commission on Industrial Farm Animal Production

The mission of the American Veterinary Medical Association (AVMA) is to improve animal and human health and advance the veterinary medical profession. The AVMA is committed to public health and our mission, strategic goals, and highest priorities target optimal public health of our nation's citizens.

The AVMA has diligently evaluated the Final Report of the Pew Commission on "Industrial Farm Animal Production" because its recommendations directly affect the practice of veterinary medicine. The Veterinarian's Oath compels veterinarians to use our scientific knowledge and skills for "the benefit of society through the protection of animal health, the relief of animal suffering, the conservation of animal resources, the promotion of public health, and the advancement of medical knowledge."

The AVMA opposes seemingly simple but non-risk based broad bans on certain labeled uses of antimicrobials, such as disease prevention, growth promotion, and feed efficiency. Not all antimicrobials or their uses are equal in their probability of developing resistance or creating a risk to human health. The European Union's Scientific Committee on Animal Nutrition has agreed that there is insufficient data to support such bans, yet *possible* theoretical human health concerns continue to be the focus while *probable* and scientifically based benefits to human and animal health are largely ignored.

Passing legislation that would ban the use of these antibiotics before science-based studies and risk-based evaluations are done to determine if there is an actual risk to human health would be detrimental to animal and human health ...

The AVMA shares the concerns of the human medical community, the public health community, governmental agencies, and the public regarding the potential problem of resistance developing in animals and then being transferred to humans. However, we emphasize the importance and primacy of using these medicines to prevent and treat diseases before disease-causing bacteria enter our food supply. Passing legislation that would ban the use of these antibiotics before science-based studies and risk-based evaluations are done to determine if there is an actual risk to human health would be detrimental to animal and human health. Inappropriate reactions to the use of antibiotics could have unknown and unintended consequences that negatively affect animal health and welfare, and ultimately could create other public health risks, such as increased foodborne disease.

The AVMA supports the *Public Health Action Plan to Combat Antimicrobial Resistance*, which was released in January 2001 by the Federal Interagency Task Force on Antimicrobial Resistance. We believe the concepts developed by the task force are valid and should be adequately funded and implemented, whereas we assert that the Pew Commission's process lacked the inclusive, transparent, unbiased, peer-reviewed, and scientific process that the Action Plan utilized.

General Points

A scientific human/animal nexus, connecting antimicrobial treatments in animals with foodborne or environmentally contracted human disease, has not been proven. Based upon risk assessments conducted and epidemiological evidence obtained thus far, the risk to people of resistant infections from consuming animal products appears to be infinitesimally small, as the use of antimicrobials in animals is but one of the many factors, and is not even a primary factor, that impact antimicrobial efficacy in treating these infections. The main goal of mitigating risks to human health should be to decrease the spread of foodborne pathogens, rather than focusing upon a presumed source of antimicrobial resistance. Moreover, prior attempts to decrease use of antimicrobials in animals in other countries have not been shown to significantly decrease resistant infections in people. Thus, broad-based bans and other limitations on antimicrobial treatments in food animals cannot be expected to produce the desired result of enhancing human health. In addition, many antimicrobials used in food animals have no medically important counterpart in human medicine, so the concept of reducing these uses bears no impact at all on human infections.

Veterinarians use pharmaceuticals, including antimicrobial agents, judiciously. Antimicrobials are a type of therapy that veterinarians need as a tool in their medical practice. It is important to recognize that veterinarians are the trained professionals who know when antimicrobials are indicated in animals and when they are not. At certain life stages in animals and under certain stressful circumstances, such as weaning, veterinarians use antimicrobials strategically to prevent or control disease; however, strategic use should not be banned as “routine use.”

We support microbial safety examinations of previously approved antimicrobials, with the order of examination prioritized according to potential human health risk. Although some microbial safety assessments of those drugs have already been performed by the Food and Drug Administration (FDA), the AVMA recognizes that more data are needed to complete a risk analysis on the public health significance of many other antimicrobial uses in livestock feeds. We seek input and support for a concerted and coordinated effort to obtain the data necessary to conduct those additional assessments to enable risk-based decisions concerning use. The AVMA requests that the FDA and other public health agencies as well as veterinarians, livestock producers, and pharmaceutical companies cooperatively support scientific studies needed to close the data gaps.

We also support access to such risk analysis data and actions necessary to conduct an accurate scientific risk assessment to facilitate risk-based decisions concerning the appropriate and judicious use of antimicrobials. Risk analysis should continue to evaluate the risks and benefits to animal health and welfare in addition to the risks and benefits to human health attributed to use in animals. Risk analysis includes risk assessment, risk communication, and risk management actions that are commensurate with the level of risk determined through risk assessment. Risk management options are not limited to withdrawal of approval for a drug product, but can also include continued approval of use, review by the Veterinary Medicine Advisory Committee, and limitations of use such as use in only certain species or changing to a Veterinary Feed Directive drug.

The recommendation of the Pew Commission to ban any new approvals of antimicrobials based upon a non-existent classification of drugs (i.e., nontherapeutic) is unfounded without the needed scientific analyses to support such a ban. Non-targeted/non-risk-based bans of animal antimicrobials can be expected to be deleterious to animal health and food protection mechanisms, with no expected benefit to human health as seen in

General Points (continued)

other countries with similar bans. It is also important to recognize that approval of animal antimicrobials is already more stringent than that of human-use antimicrobials.

All regulatory or legislative actions should be transparent and based on scientific risk analysis. If determined through a risk analysis, the use of such antimicrobials should be authorized by and under the control and direction of a veterinarian. Veterinarians are professionally educated, trained, and licensed and should retain primary responsibility for the use of important antimicrobials. The AVMA emphasizes the importance of the role of the veterinarian, the existence of a veterinarian-client-patient relationship, and the appropriate and judicious use of antimicrobials in animals.

In addition, the AVMA recognizes the importance of antimicrobials that are also used in human medicine. To further safeguard public health and to maintain the long-term effectiveness of antimicrobials, the AVMA supports a science-based veterinary medical evaluation to determine the appropriate use of such antimicrobials in food-producing animals. FDA Guidance for Industry #152 (GFI #152) offers a significant means by which antimicrobials are evaluated for their potential effects on bacteria of human health concern.

Pew Recommendations on Public Health

- 1) Restrict the use of antimicrobials in food animal production to reduce the risk of antimicrobial resistance to medically important antibiotics.

AVMA Response

- The Commission inappropriately focuses upon restrictions on the use of antimicrobials in food animals as the sole risk mitigating approach, without the benefit of information from a risk assessment.
- The AVMA does not support the implementation of broad risk management actions that have not been measured or that do not correspond to the actual level of risk, which is why risk assessment must precede risk management.
- Not all antimicrobials or their uses are equal in their probability of developing resistance or creating a risk to human health. The European Union's Scientific Committee on Animal Nutrition has agreed that there is insufficient data to support such bans, yet *possible* theoretical human health concerns continue to be the focus while *probable* and scientifically based benefits to human and animal health are largely ignored.
- The real issue is not the quantity of antimicrobials that are used but how a specific drug may or may not impact resistance in a specific bacteria, and how that bacteria may or may not impact human health. Antibiotic resistance development is dependent upon multiple factors, from overall ecology of the bacterial environment to serotype specific selection pressures as well as many other factors that have yet to be determined. Antibiotic resistance is not dependent upon volume of usage.

- a. Phase out and ban use of antimicrobials for nontherapeutic (i.e., growth promoting) use in food animals (see PCIFAP definition of "nontherapeutic").

AVMA Response

- Antimicrobial resistance in human medicine is a complex problem that is not easily solved by seemingly easy solutions, especially when the recommendation is not supported by assessments of the likelihood and magnitude of adverse impacts to human health and has not considered the consequences to animal health or welfare.

- Healthy animals provide healthy food, which is why a blanket ban on the use of antimicrobials severely limits our ability to protect human health. Prevention and control of disease in food animals to ensure that we have healthy animals entering the food supply is not only a necessity, but a very appropriate use of antimicrobials.
- It is important to understand that in any large population, including the human population, preventing a disease before it occurs and controlling the disease before it spreads to the entire population are core public health and population health components of an overall treatment plan for infectious diseases. This is the same approach veterinarians use in population medicine for food animals.
- The AVMA asserts that the report would have been more valuable in promoting public health if it had provided significant new information upon which to perform risk-based evaluations. We are disappointed that the technical paper on the subject, “Antimicrobial Resistance and Human Health,” did not give a thorough, balanced review of the available scientific literature.
- We contend that neither the Pew Report nor the technical report provide solid facts regarding the extent of the human antimicrobial resistance problem that is associated with uses in animals. We believe the reports assume that agricultural use equates to a problem and base much of the discussion on what theoretically might happen with very little factual information about how human health is currently being affected.

b. Immediately ban any new approvals of antimicrobials for nontherapeutic uses in food animals and retroactively investigate antimicrobials previously approved.

... The Danish ban has not resulted in decreased antimicrobial-resistant human infections in Denmark and has not improved human health ...

AVMA Response

- We support FDA’s science-based approach in approving antimicrobials for use in animals and we believe this recommendation undermines the FDA’s current authority.
- When Denmark banned antibiotic use for growth promotion in pork and poultry, animal deaths and disease rose, requiring more therapeutic antibiotic use to treat the resultant diseases (DAMAP 2007, <http://www.danmap.org/>). As a result, increases in animal disease and death (particularly weaned swine) and decreased welfare could be expected under those restrictions. The restrictions proposed by the Pew Commission would go beyond restrictions implemented in Denmark, and the European Union’s Scientific Committee on Animal Nutrition has agreed that there is insufficient data to support such bans. Moreover, the Danish ban has not resulted in decreased antimicrobial-resistant human infections in Denmark and has not improved human health.
- Similarly, the Netherlands has also instituted a ban on growth promoting antibiotics that has not resulted in the intended benefit of decreased resistance in humans. In addition, animal health and welfare have suffered and increased therapeutic use of antibiotics has become a necessity to protect the food supply. The recent report from the Netherlands concludes that therapeutic use of antibiotics in food animals has nearly doubled in the past decade and one of the likely determinants of that increase is the ban on growth promoters.
- While the AVMA supports a retroactive evaluation of antimicrobials according to human health priority, we assert that risk assessment must be performed before any risk management plan is considered.

c. Strengthen recommendations in FDA Guidance #152 to be enforceable by FDA, in particular the investigation of previously approved animal drugs.

AVMA Response

- The AVMA agrees that the GFI #152 is not mandatory according to its current language, but FDA refers to GFI #152 heavily in considering new antimicrobial drug applications. It is extremely doubtful that FDA will approve a new antimicrobial drug for food animals without application of GFI #152. The Pew Commission asserts that GFI #152’s language should indeed be modified to be legally enforceable by FDA.

Pew Recommendations on Public Health (continued)

- The FDA Center for Veterinary Medicine's pre-approval risk assessments are done prior to approval, per GFI #152.
- For those antimicrobials approved prior to GFI #152, academic researchers have performed risk assessments on the use of some antimicrobials and have reported extremely small or insignificant risks to people (Hurd S, et al. Public Health Consequences of Macrolide Use in Food Animals: A Deterministic Risk Assessment. J Food Protection 2004;67:980-992. Alban L, et al. A human health risk assessment for macrolide-resistant *Campylobacter* associated with the use of macrolides in Danish pig production. Prev Vet Med 2008;83:115-129). In addition, the FDA currently is investigating the previously approved penicillins and tetracyclines.
- We support GFI #152 while recognizing that:
 - Its focus is the protection of human health without consideration of benefits to animal health and welfare.
 - It adds additional difficulty for the approval of animal drugs by ranking antimicrobial drugs according to their importance in human medicine (including treatment of human diseases that are not in any manner associated with food animals).
 - Under GFI #152, the FDA would have great difficulty approving antibiotics for use in feed or water or for treatment of groups of animals if those antibiotics are also used in humans. Treatment of groups of animals is often a necessity in veterinary medicine to prevent and control the spread of infectious disease.

d. To facilitate reduction in IFAP use of antibiotics and educate producers on how to raise food animals without using nontherapeutic antibiotics, USDA's extension service should be tasked to create and expand programs that teach producers the husbandry methods and best practices necessary to maintain the high level of efficiency and productivity they enjoy today.

AVMA Response

- There have been significant advancements in animal health that have taken place because contemporary animal production environments optimize productivity and growth potential. This recommendation assumes that producers are not using antimicrobials appropriately and therefore are contributing to resistance. The AVMA supports judicious use of antimicrobials by producers and supports ongoing development of husbandry methods and best practices.
- Funding for agricultural programs and research is currently limited and should be expanded. The AVMA would join Pew in support for funding of programs such as any new extension programs that teach producers best practices in achieving optimal animal health, irrespective of size or intensity of production.

- 2) Clarify antimicrobial definitions to provide clear estimates of use and facilitate clear policies on antimicrobial use.
 - a. The Commission defines as nontherapeutic any use of antimicrobials in food animals in the absence of microbial disease or known (documented) microbial disease exposure; thus, any use of the drug as an additive for growth promotion, feed efficiency, weight gain, routine disease prevention in the absence of documented exposure, or other routine purpose is considered nontherapeutic.
 - b. The Commission defines as therapeutic the use of antimicrobials in food animals with diagnosed microbial disease.
 - c. The Commission defines as prophylactic the use of antimicrobials in healthy animals in advance of an expected exposure to an infectious agent or after such an exposure but before onset of laboratory-confirmed clinical disease as determined by a licensed professional.

Antimicrobials that enhance “growth promotion” through disease prevention should not be confused with performance-enhancing drugs ...

... it is noteworthy that use in animals is 10 times less than use in people on a per capita basis ...

AVMA Response

- Antibiotics labeled for feed efficiency or growth promotion often prevent or treat sub-clinical disease, and therefore, the animal’s overall health is improved resulting in increased growth. In the same way average heights of human populations have increased as nutrition, disease prevention, and overall health have improved, animals given the same advantages will achieve their maximum potential for growth.
- Antimicrobials that enhance “growth promotion” through disease prevention should not be confused with performance-enhancing drugs.
- An important recognition is that the quantity of antimicrobial treatments for animals (i.e., antimicrobial use) does not necessarily cause increased risk of antimicrobial resistance in people. This underscores the importance of conducting a thorough risk analysis and gathering sound scientific evidence rather than relying upon speculation to arrive at conclusions and proposed solutions. However, since use is typically discussed, it is noteworthy that use in animals is 10 times less than use in people on a per capita basis.
- It is important to recognize that there are circumstances in both human and veterinary medicine wherein therapeutic antimicrobial therapy must be initiated based on clinical judgment and in the absence of a laboratory-confirmed microbial diagnosis. In addition, clinical signs are often more apparent in an individual long before they are apparent in the entire herd or flock.
- When discussing antimicrobial terms, definitions used by U.S. and international animal health organizations should be used. Specifically, Codex Alimentarius Commission (an organization governed by two United Nations organizations—the World Health Organization and Food and Agriculture Organization), FDA, and AVMA classify “treatment,” “prevention,” and “control of disease” as therapeutic uses. The term “nontherapeutic” is not scientific. It is ill-defined and consequently is used by different organizations to mean different things.

- 3) Improve monitoring and reporting of antimicrobial use in food animal production in order to accurately assess the quantity and methods of antimicrobial use in animal agriculture.
 - a. Require pharmaceutical companies that sell antimicrobials for use in food animals to provide a calendar-year annual report of the quantity sold. Companies currently report antibiotic sales data on an annual basis from the date of the drug’s approval, which makes data integration difficult. FDA is responsible for oversight of the use of antimicrobials in food animals and needs consistent data on which to report use.
 - b. Require reporting of antimicrobial use in food animal production, including antimicrobials added to food and water, and incorporate the reported data in USDA’s National Animal Identification System (NAIS). The FDA-CVM regulates feed additives but does not have the budget or personnel to oversee their disposition after purchase. In addition, CVM and USDA are responsible for monitoring the use of prescribed antimicrobials in livestock production but rely on producers and veterinarians to keep records of the antibiotics used and for what purpose.
 - c. Institute better integration, monitoring, and oversight by government agencies by developing a comprehensive plan to monitor antimicrobial use in food animals, as called for in a 1999 National Research Council (NRC) report (NAS, 1999). An integrated national database of antimicrobial resistance data and research would greatly improve the organization, amount, and types of data collected and would facilitate necessary policy changes by increasing data cohesion and accuracy. Further, priority should be given to linking data on both antimicrobial use and resistance in the National Antimicrobial Resistance Monitoring System (NARMS). This could be accomplished by full implementation of Priority Action 5 of A *Public Health Action Plan to Combat Antimicrobial Resistance*, which calls for the establishment of a monitoring system and the assessment of ways to collect and

Pew Recommendations on Public Health (continued)

protect the confidentiality of usage data (CDC/FDA/NIH, 1999). Since USDA already provides antimicrobial use data in fruit and vegetable production, it seems logical that usage information can be obtained from either agricultural producers and/or the pharmaceutical industry without undue burden.

AVMA Response

- The Animal Drug User Fee Amendments of 2008 already require the FDA to collect antibiotic sales data on a calendar basis from companies and to make a summary of that data publically available. The provisions were designed to provide better information to researchers conducting risk assessments and should be allowed to yield information before further action is taken.
- The National Animal Health Monitoring System also provides a great deal of information regarding the use of antimicrobials in animal agriculture.
- The AVMA has continually advocated for improved, more robust monitoring and feedback systems for foodborne disease and antimicrobial resistance such as FoodNet and the National Antimicrobial Resistance Monitoring System (NARMS). More research on how antimicrobial resistance is generated and spread is needed—this is why Pew’s recommendations to ban antimicrobials are contrary to current science.
- The Pew Commission’s recommendations for such significant resources going into collection of use data from pharmaceutical companies seems to imply that volume of usage is critical, whereas AVMA contends that the real issue is not the quantity of antimicrobials that are used, but whether or not the use of a specific drug impacts the development of resistance in a specific pathogen and the significance of that resistance in human health relative to the benefits of use.
- The Pew Commission’s assertions that antimicrobial use data should be incorporated into the NAIS demonstrate the Pew Commission’s lack of understanding of the system’s purpose and functionality. Reporting of drug usage is outside the disease surveillance and animal movement tracking activities of the USDA database. Earmarking NAIS resources to go to use data would cause the NAIS to fail.
- Like the Pew Commission, we support NARMS and recognize the need for additional NARMS funding, as long as data resulting from it are used appropriately. Currently, human and animal antimicrobial resistance trend data from NARMS are often compared. Since the data are collected under the same programmatic name of NARMS, people wrongly believe that there must be a causal relationship between resistance patterns in humans and animals. Furthermore, without consideration of how the data is obtained and the potential for non-representative sampling and biased data, inappropriate conclusions are drawn. Therefore, we do not support linking antimicrobial use data with NARMS data due to the further potential for confounding, inaccurate inferences, and inappropriate conclusions. In no way should association or correlation be misconstrued as cause and effect.
- The AVMA also supports integration between FoodNet and NARMS. Currently, there exists an animal NARMS located at the Russell Agricultural Laboratory in Athens, Ga., as a cooperative program of FDA’s Center for Veterinary Medicine (CVM), the U.S. Department of Agriculture (USDA), and the Centers for Disease Control and Prevention (CDC). Animal NARMS tests organisms submitted from diagnostic laboratories (diseased animals) and abattoirs (healthy animals). The retail meat arm of NARMS and the animal arm of NARMS provide a more comprehensive view of antimicrobial sub-populations than the human data that are collected. The NARMS sample collection design ensures that resistant animal isolates are overrepresented.

... people wrongly believe that there must be a causal relationship between resistance patterns in humans and animals ...

- A system for reporting and monitoring antimicrobial use in humans or animals does not exist in the United States. The AVMA asserts that as the profession continues to suffer from a critical workforce shortage, additional requirements for veterinary reporting—without a clear, defined purpose—have the potential to be overly burdensome to the practice of medicine and detract from the preservation of animal health and food safety.

- 4) Improve monitoring and surveillance of antimicrobial resistance in the food supply, the environment, and animal and human populations in order to refine knowledge of antimicrobial resistance and its impacts on human health.
 - a. Integrate, expand, and increase the funding for current monitoring programs.
 - b. Establish a permanent interdisciplinary oversight group with protection from political pressure, as recommended in the 1999 NRC report *The Use of Drugs in Food Animals: Risks and Benefits*. The group members should represent agencies involved in food animal drug regulation (e.g., FDA, the CDC, USDA), similar to the Interagency Task Force (CDC/FDA/NIH, 1999). In order to gather useful national data on antimicrobial resistance in the United States, the group should review progress on data collection and reporting, and should coordinate both the organisms tested and the regions where testing is concentrated, in order to better integrate the data. Agency members should coordinate with each other and with the NAIS to produce an annual report that includes integrated data on human and animal antimicrobial use and resistance by region. Finally, the group should receive appropriate funding from Congress to ensure transparency in funding as well as scientific independence.
 - c. Revise existing programs and develop a comprehensive plan to incorporate monitoring of the farm environment (soils and plants) and nearby water supplies with the monitoring of organisms in farm animals.
 - d. Improve testing and tracking of antimicrobial-resistant infections in health care settings. Better tracking of AMR infections will give health professionals and policymakers a clearer picture of the role of antimicrobial-resistant organisms in animal and human health and will support more effective decisions about the use of antimicrobials.

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AVMA Response

- We are concerned that Pew's fear-invoking assertions are going to have an equivalent outcome to the "Y2K" crisis that never happened on January 1, 2000. The Pew's conclusion that antimicrobial use in animals impacts human health is not based upon analyses from hypothesis-driven and designed experiments. The design of an experiment must be based on testing of a hypothesis. We support the scientifically valid and meaningful collection and review of data for all uses of antimicrobials used in humans and animals, including tracking of human infections. This type of meaningful data collection and review allows scientists to discern whether there are epidemiologic links between antimicrobial use and resistance that would trigger further investigation to determine the level of associated risks. However, we urge that such data be collected in concert with other data necessary to explain or inform fluctuations in use (e.g., disease prevalence, regional data, populations of animals). While AVMA supports research on the field of antimicrobial resistance, we urge caution in the interpretation of the results gained from scientific studies. Data collection through surveillance and monitoring should be used as an indicator for further investigation rather than as a basis for causal inferences and the implementation of broad-based restrictions.
- This recommendation does not posit a rationale for collection of such environmental profiles, consider the environmental fate of human use antimicrobials, or demonstrate a linkage between environmental profile results and human health concerns. Yet

Pew Recommendations on Public Health (continued)

it appears to have a pre-determined endpoint, despite that there are confounding factors in the data collection and the presence of antimicrobial resistance appears random. For instance, high resistance can be found in high-use areas yet high levels of resistance have also been found in minimal to no-use areas as well. Conversely, non-existent or low levels of resistance have been documented in areas where antimicrobial use has been high. Therefore, it is impossible to conclude that use has directly caused resistance. In addition, sample collection solely from farms with no comparison to other areas such as an urban or suburban area is based upon a presumption that data from farms would yield a particular result. Such samples provide data that may be valuable for monitoring and surveillance, but do not provide any information indicative of causality and would likely bias the results of the study.

- We agree that interdisciplinary and intersector oversight is needed, and this underscores the need for collaboration across government, industry, and non-profit sectors. The 2001 version of the *Public Health Action Plan to Combat Antimicrobial Resistance* was created by a Federal Interagency Task Force on Antimicrobial Resistance. That Action Plan reflected a broad-based consensus of federal agencies and stakeholders on actions needed to address antimicrobial resistance and provided a blueprint for specific, coordinated federal actions that included the full spectrum of antimicrobial use: human medicine, veterinary medicine, and animal agriculture. We are disappointed that the Action Plan was not adequately funded and prioritized by Congress. We are also concerned that the new Action Plan under development appears to not be as collaborative, broad based, and acceptable to the diverse community of stakeholders. We contend, however, that if the original *Public Health Action Plan to Combat Antimicrobial Resistance* were fully funded and implemented, a permanent oversight group would not be warranted.
- The AVMA also asserts that linkage of such an oversight group with NAIS would not be recommended. Because the NAIS is currently underfunded and is designed for a different purpose, linking NAIS with an antimicrobial-use reporting system would be deleterious to its success.

- 5) Increase veterinary oversight of all antimicrobial use in food animal production to prevent overuse and misuse of antimicrobials.
 - a. Restrict public access to agricultural sources of antimicrobials.
 - b. Enforce restricted access to prescription drugs. By law, only a veterinarian may order the extralabel use of a prescribed drug in animals, but, in fact, prescription drugs are widely available for purchase online, directly from the distributors or pharmaceutical companies, or in feed supply stores without a prescription. Without stricter requirements on the purchase of antimicrobials, extralabel (i.e., nontherapeutic) use of these drugs is possible and even probable. For that reason, no antibiotics should be available for over-the-counter purchase.
 - c. Enforce veterinary oversight and authorization of all decisions to use antimicrobials in food animal production. The extralabel drug use (ELDU) rule under the Animal Medicinal Drug Use Clarification Act (AMDUCA) permits veterinarians to go beyond label directions in using animal drugs and to use legally obtained human drugs in animals. However, the rule does not permit ELDU in animal feed or to enhance production. ELDU is limited to cases in which the health of the animal is threatened or in which suffering or death may result from lack of treatment. Veterinarians should consider ELDU in food-producing animals only when no approved drug is available that has the same active ingredient in the required dosage form and concentration or that is clinically effective for the intended use (1994). North Carolina State University, the University of California-Davis, and the University of Florida run the Food

Animal Residue Avoidance Databank (FARAD) (<http://www.FARAD.org/>), which includes useful information for food animal veterinarians, including vetGRAM, which lists label information for all food animal drugs. To be effective, AMDUCA and ELDU must be enforced. In addition, as technology allows, the FDA-CVM should compel veterinarians to submit prescription and treatment information on farm animals to a national database to allow better tracking of antibiotic use as well as better oversight by veterinarians. Veterinary education for food animal production should teach prescription laws and reporting requirements.

d. Encourage veterinary consultation in these decisions. AMDUCA requires the veterinarian to properly label drugs used in a manner inconsistent with the labeling (i.e., extralabel) and to give the livestock owner complete instructions about proper use of the drug. Further, ELDU must take place in the context of a valid, current veterinarian-client-patient relationship—the veterinarian must have sufficient knowledge of the animal to make a preliminary diagnosis that will determine the intended use of the drugs. The producer should be encouraged to work with the veterinarian both to ensure the health of the animal(s) and to conform to antibiotic requirements. For example, the National Pork Board Pork Quality Assurance program encourages consultation with veterinarians to maintain a comprehensive herd health program (NPB, 2005).

AVMA Response

Veterinarians are medical professionals with the training and expertise to promote the health and welfare of their patients. Veterinarians are in the best position to prescribe and administer the most appropriate antimicrobial- or non-antimicrobial-based therapies for their patients. The end goal is the same for all medical professionals—good health—and veterinarians have historically advocated for disease control and prevention as an integral component of herd health. Veterinarians have been trained to “do no harm” as they make therapy recommendations, and they have the duty to utilize such agents to promote animal health and welfare in such a way that safeguards the public health.

- It is important to recognize that larger farms employ veterinarians and, therefore, have greater veterinary oversight over animal disease and antimicrobial usage. In part due to critical workforce shortages, particularly in food animal medicine, small farms often have less veterinary involvement and oversight. Reports available from the USDA National Animal Health Monitoring System show that veterinarians are involved in these decisions more frequently in larger operations. 83 percent of the larger beef operations used veterinary services, compared with 49 percent of the smallest operations. In feedlots, all of the large operations and nearly all (96.5 percent) of the small operations used the services of a veterinarian. This is also true for swine operations—a higher percentage of large and medium sites (88 percent and 85 percent, respectively) used a veterinarian, compared with small sites (61 percent).
- The AVMA believes that a veterinary consultation should occur and that a veterinarian should be involved in the decision-making process prior to the implementation of any therapeutic regimen, including but not limited to the use of antimicrobials.
- Healthy animals make healthy food; for veterinarians to be effective in protecting the food supply, the appropriate tools for preventing, mitigating, and treating disease, which include antimicrobials, are paramount for veterinarians to be able to utilize. The continued availability of safe, effective antimicrobials for veterinary medicine, including the retention of currently approved drugs and future approvals of new drugs, are critical components of both a safe food supply and optimal animal health and welfare.
- The AVMA believes the Pew Commission’s recommendation to restrict producer access to all FDA-approved products is an unnecessary reaction to over-the-counter availability of antibiotic products. Not all antibiotics are the same, and thus, not all antibiotics have the same impact on resistance. We find no evidence that over-

Healthy animals
make healthy
food ...

Pew Recommendations on Public Health (continued)

It is important to note extralabel drug use is not misuse or overuse, as this practice is tightly regulated by the FDA ...

the-counter antibiotic products pose a specific risk to human health. In fact, FDA's risk assessment of virginiamycin, an over-the-counter antibiotic, did not support a withdrawal of the product. This is yet another example that illustrates how a risk analysis prior to risk mitigation strategies provides important, relevant information for the decision-making process.

- Little evidence exists that further restrictions on the availability of antimicrobials in food animal production would enhance human health. This underscores the fact that current science does not illustrate what is causing antimicrobial resistance of public health importance. Antibiotic products approved by the FDA for feeding to animals must be used according to label directions per the FDA. Label restrictions may include availability limitations such as a Veterinary Feed Directive that requires direct veterinary involvement.
- The AVMA has always supported the Animal Medicinal Drug Use Clarification Act (AMDUCA) and the FDA's regulation of the Act. The AMDUCA provides extralabel drug use as a tool for veterinarians to utilize to relieve animal pain and suffering. It is important to note extralabel drug use is not misuse or overuse, as this practice is tightly regulated by the FDA. Further, we urge the Pew Commission to report any illegal or illicit procurement of human and animal drugs to the FDA and state pharmacy boards, rather than implying that there is a willful deviation of AMDUCA regulations by the veterinary profession.
- The AVMA would be supportive of a pilot program to explore the feasibility of prescription and treatment submission programs to a national database. For it to be successful in precise data collection, such a database would require a substantial reporting system, a complete change in drug marketing and distribution at all levels, extensive paperwork for distributors/veterinarians/producers, development and implementation of an extensive electronic database (issues of functionality, confidentiality, and accuracy), and comprehensive animal drug records from veterinarians and producers.

- 6) Implement a disease-monitoring program and a fully integrated and robust national database for food animals to allow 48-hour trace-back through phases of their production.
 - a. Implement a tracking system for animals as individuals or units from birth until consumption, including movement, illnesses, breeding, feeding practices, slaughter condition and location, and point of sale. Use the same numbering system as for USDA's NAIS (see above), but expand it to provide more information to appropriate users (NAIS tracks animals based only on their movement).
 - b. Require federal oversight of all aspects of this tracking system, with stringent protections for producers against lawsuits. The tracking arm of the NAIS, which has not yet been implemented, is designed to be administered by private industry in collaboration with state governments. NAIS has garnered support from both, but the program should be expanded significantly and monitored by a separate federal agency to enhance confidentiality for producers. The British Cattle Movement Service (www.bcms.gov.uk) could serve as a model for this system.
 - c. Require registration of premises and animals by 2009 and implement animal tracking by 2010. USDA's APHIS has created a voluntary animal ID system in collaboration with the farm animal industry, so implementation of a mandatory federal system should be feasible within a relatively short time frame.
 - d. Allocate special funding to small farms to facilitate their participation in the national tracking system, which would have a much greater financial impact on them, particularly the costs of the identification method (e.g., ear tag, microchip, retinal scan). Such funding should be made available concurrent with the announcement of mandatory registration.

AVMA Response

- The United States has disease-monitoring programs specific to diseases of human concern and animal health that have federal oversight. Expanding the NAIS tracking system to include “illnesses, breeding, feeding practices and slaughter condition” would introduce substantial levels of complexity in designing and standardizing reporting categories, confirmation mechanisms, and producer privacy issues.
- The AVMA contends that any tracking systems put into place for animal illnesses, breeding, feeding practices, slaughter condition and location, and point of sale should be voluntary and market driven, unless a clear need for federal oversight has been identified through a science-based process. Earmarking NAIS resources for these factors would cause NAIS to fail, given the significant funding needs of the program.
- The AVMA supports an effective NAIS that contains the following key elements:
 - USDA implementation of all species working group reports that were submitted to the NAIS Subcommittee of the Secretary’s Advisory Committee on Foreign Animal and Poultry Diseases.
 - USDA development of minimum standards for an NAIS.
 - Rapid implementation of a mandatory NAIS.
 - Implementation benchmarks and timelines established in federal regulation to achieve the NAIS goals identified in the strategic plan.
 - Implementation that continues to engage all stakeholders in providing input through the NAIS Subcommittee of the Secretary’s Advisory Committee on Foreign Animal and Poultry Diseases and other designated forums.
 - Databases that are accessible 24 hours a day and 7 days a week by animal health officials.
 - System cost that does not detract from effective implementation.
 - A system that is workable for producers of all sizes.
 - Exception from freedom of information disclosure laws for data collected in support of the NAIS.

- 7) Fully enforce current federal and state environmental exposure regulations and legislation, and increase monitoring of the possible public health effects of IFAP on people who live and work in or near these operations.
- a. Because IFAP workers—farmers, caretakers, processing plant workers, veterinarians, federal, state, and private emergency response personnel, and animal diagnostic laboratory personnel—are exposed to and may be infected by zoonotic, novel, or other infectious agents, they should be a priority target population for heightened monitoring, annual influenza vaccines, and training in the use of personal protective equipment. IFAP workers who have the highest risk of exposure to a novel virus or other infectious agent should be priority targets for health information and education, pandemic vaccines, and antiviral drugs.
 - b. IFAP employers and responsible health departments need to coordinate the monitoring and tracking of all IFAP facility employees to document disease outbreaks and prevent the spread of a novel zoonotic disease.
 - c. Occupational health and safety programs, including information about risks to health and about resources, should be more widely available to IFAP workers. Occupational safety and health information must also be disseminated in ways that allow people with little or no education or English proficiency to understand their risks and why precautions must be taken. Because of the well-documented health and safety risks among IFAP workers, the Occupational Health and Safety Administration should develop health and safety standards for IFAP facilities as allowable by law.
 - d. Current legislation and regulations concerning surveillance and health and safety programs should be implemented and should prioritize IFAP workers.

Pew Recommendations on Public Health (continued)

AVMA Response

- ... conclusions should not precede scientific experiments that test specific hypotheses ...
- No evidence exists that suggests the need to preferentially target larger farms ...
- No scientific evidence exists that shows greater risks to employees at larger farms compared with smaller farms. Science-based criteria are needed to determine the relative risks of personnel in various farm-associated employment so that proper applications can be developed if this recommendation is adopted.
 - This recommendation seems to be based on a pre-developed presumption that larger farms confer a greater health risk to farm workers than smaller farms. The AVMA again would like to remind the Pew Commission that conclusions should not precede scientific experiments that test specific hypotheses. The AVMA would support scientific research that would discern relative risk of workers in various farm settings.
 - The AVMA recognizes the importance of emerging zoonoses, and we see value in ongoing study of zoonoses and other possible environmental and occupational hazards to employees on farms. We agree that veterinarians and other workers may be at greater risk than the general public for emerging zoonotic diseases and should receive preferential training with personal protective equipment and prophylactic vaccines. Increased awareness for employees may be beneficial, and educational materials should be made available in English and other languages. Any equipment and educational materials should be made available for employees of both large and small farms.
 - Health departments, the CDC, and other organizations already coordinate monitoring and tracking of zoonotic disease as well as occupational hazards, including those that could come from workers of large and small farms. No evidence exists that suggests the need to preferentially target larger farms. All surveillance should be scientific, and such data collection should be followed by hypothesis-driven experimental design and analysis.

- 8) Increase research on the public health effects of IFAP on people living and working on or near these operations, and incorporate the findings into a new system for siting and regulating IFAP.
- a. Support research to characterize IFAP air emissions and exposures from the handling and distribution of manure on fields—including irritant gases (ammonia and hydrogen sulfide, at a minimum), bioaerosols (endotoxin, at a minimum), and respirable particulates—for epidemiological studies of exposed communities near IFAP facilities. Such research should include characterization of mixed exposures, studies of particulates in rural areas, and standardization and harmonization of exposure assessment methods and instrumentation to the degree possible.
 - b. Support research to identify and validate the most applicable dispersion models for IFAP facilities and their manure emissions. Such modeling research must take into account multiple IFAP facilities and their manure management plans in a given area, meteorological conditions, and chemical transformation of pollutants, and should be evaluated with prediction error determined through comparison of predicted values with actual monitoring data. Such models would be useful to state and federal regulatory agencies to determine the results of best management practices, to assess health impacts on exposed populations, and to model setback distances before the construction of new facilities. There is a further need for models that enable evaluation of concentration/exposure scenarios after an event that triggers asthma episodes or nuisance complaints.
 - c. Support research on the respiratory health and function of populations that live near IFAP facilities, including children and sensitive individuals. Such studies are powerful epidemiological approaches to assess the impact of air pollutants on respiratory health and must include appropriate exposure assessments, exposure modeling, and use of time-activity patterns with personal exposure monitoring to better calibrate modeling of exposures. Exposure assessment data need to be

linked with measures of respiratory health outcome and function data, including standardized assessment of respiratory symptoms and lung function, assessment of allergic/immunological markers of response, and measurement of markers of inflammation, including the use of noninvasive approaches such as tear fluid, nasal lavage, and exhaled breath condensate.

d. Support systematic and sustained studies of ecosystem health near IFAP facilities, including toxicologic, infectious, and chemical assessments, to better assess the fate and transport of toxicologic, infectious, and chemical agents that may adversely affect human health. Systematic monitoring programs should be instituted to assess private well water quality in high-risk areas, supplemented by biomonitoring programs to assess actual exposure doses from water sources.

AVMA Response

- The AVMA is supportive of research to assess risk to public health and to establish best management practices.
- Research should be hypothesis driven. We would caution that correlations should not be confused with causality. Cause and effect cannot be drawn from correlations and can only be determined through an experimental study with a clearly defined hypothesis. Studies need to be specific and targeted, yet unbiased.
- Relative risk can only be determined when evaluated in conjunction with some other source of comparison. It cannot be assumed that individuals living or working near large farms are at any greater risk for a specific condition than those near small farms or no farms. In fact, the relative risk for a particular disease condition may be much greater in an urban area. For example, if a thorough risk assessment for asthma in children were to be conducted, the relative risk for a child living near a large farm could be much less than the risk of a child living in a densely populated urban area.
- Following a thorough risk analysis, any interventions that would be established for people living or working near farms should be commensurate with risk.

Studies need to be specific and targeted, yet unbiased ...

- 9) Strengthen the relationships between physicians, veterinarians, and public health professionals to deal with possible IFAP risks to public health.
- a. To better understand the cross-species spread of disease, expand and increase funding for dual veterinary/public health degree programs.
 - b. Fund and implement federal and state training programs to increase the number of practicing food animal veterinarians (2007b).
 - c. Initiate and expand federal coordination between Health and Human Services (HHS), FDA, CDC, and USDA to better anticipate, detect, and deal with zoonotic disease. NARMS is not extensive enough to be effective for outbreak detection; it serves a general monitoring function. Include all the data from the various federal agencies in the IFAP clearinghouse (outlined among the environment recommendations) for use by a newly created Food Safety Administration (Recommendation #10) and the states.
 - d. Promote international coordination on zoonotic diseases and food safety. As an increasing amount of US food is imported, it is vital to hold this food to the same standards as domestically produced food.
 - e. Provide more training through land-grant universities and schools of public health to producers, community health workers, health professionals, and other appropriate personnel to promote detection of disease as a first line of defense against emerging zoonotic diseases and other IFAP-related occupational health and safety outcomes.

Pew Recommendations on Public Health (continued)

We agree that coordination between veterinarians, physicians, and public health professionals is paramount ...

AVMA Response

- We agree that coordination between veterinarians, physicians, and public health professionals is paramount. We also believe it is important to acknowledge the importance of environmental scientists in the paradigm of One Health. These relationships are important for all risks to public health and should be utilized beyond agriculture. We also agree that surveillance and coordination between federal agencies should be fully integrated. This is why AVMA's leadership in One Health to bring all applicable health entities together is so noteworthy.
- It is also important to recognize that veterinarians already have significant public health education, yet Master of Public Health (MPH) degree education provides even more extensive public health knowledge. We agree that since veterinarians provide the first line of defense, they should receive continuing education to ensure their ability to identify new emerging and re-emerging diseases, particularly zoonoses. However, all farm employees (at both large and small farms) should also receive training.
- We agree that federal and state training programs should be implemented to increase the number of food animal veterinarians. In fact, one of the AVMA's Strategic Goals targets workforce expansion needs, which recently was also a large subject of discussion within a U.S. Government Accountability Office report. The AVMA has worked diligently to advocate for a number of food supply veterinary programs:
 - Veterinary Public Health Workforce Expansion Act
 - Centers of Excellence
 - National Veterinary Medical Services Act funding
 - USDA Animal and Plant Health Inspection Service's planned two-tiered accreditation programs
- The AVMA asserts that the mention of NARMS as defective in detecting disease outbreaks indicates a misunderstanding by the Pew Commission of the purpose of NARMS. It is a system to monitor trends of resistance and potentially stimulate the identification and development of hypotheses for further investigation; it is not a disease outbreak detection system. Rather, disease outbreak detection is a function of local and state health authorities in cooperation with FoodNET, PulseNet, and other programs within the CDC.
- The AVMA believes there is already significant international coordination on zoonotic diseases and food safety. We support scientific, risk-based decisions on the importation of animals and animal products. We also assert that imported animals and animal products must present no more than a negligible risk to human and animal health in the United States. In particular, the World Organisation for Animal Health (OIE) and Codex Alimentarius Commission facilitate information sharing on emerging diseases that impact international trade of animals and animal-derived food products. In the United States, the FDA and USDA Food Safety and Inspection Service (FSIS) are the lead agencies in monitoring imported foods, but these efforts have been woefully underfunded given the volume and diversity of imported foods. Coordination with USDA-APHIS and the Department of Homeland Security (DHS) is necessary to facilitate this effort in addition to funding.
- The AVMA also supports the concepts of the recommendations for strengthening the animal health framework of the United States contained in the National Research Council's 2005 report "Animal Health at the Crossroads: Preventing, Detecting, and Diagnosing Animal Diseases":
 - The nation should establish a high-level, centralized, authoritative, and accountable coordinating mechanism or focal point for engaging and enhancing partnerships among local, state, and federal agencies and the private sector.
 - Agencies and institutions—including the USDA and the DHS—responsible for protecting animal industries, wildlife, and associated economies should encourage and

support rapid development, validation, and adoption of new technologies and scientific tools for the detection, diagnosis, and prevention of animal diseases and zoonoses.

- The animal health laboratory network should be expanded and strengthened to ensure sufficient capability and capacity for both routine and emergency diagnostic needs and to ensure a robust linkage of all components (federal, state, university, and commercial laboratories) involved in the diagnosis of animal and zoonotic diseases.
- Federal agencies involved in biomedical research (both human and veterinary) should establish a method to jointly fund new, competitive, comprehensive, and integrated animal health research programs; ensure that veterinary and medical scientists can work as collaborators; and enhance research, both domestically and internationally, on the prevention, detection, and diagnosis of animal and zoonotic disease encompassing both animal and human hosts.
- To strengthen the animal health and zoonotic disease research infrastructure, the committee recommends that competitive grants be made available to scientists to upgrade equipment for animal disease research and that the nation construct and maintain government and university biosafety level 3 (BSL-3 and BSL-3 Ag) facilities for livestock (including large animals), poultry, and wildlife.
- The United States should commit resources and develop new shared leadership roles with other countries and international organizations in creating global systems for preventing, detecting, and diagnosing known and emerging diseases, disease agents, and disease threats as they relate to animal and public health.
- Integrated and standardized regulations should be developed and implemented nationally to address the import, sale, movement, and health of exotic, non-domesticated, and wild-caught animals.
- The USDA, DHS, HHS, and state animal and public health agencies and laboratories should improve, expand, and formalize the use of predictive, risk-based tools and models to develop prevention, detection, diagnostic, and biosecurity systems and strategies for indigenous, exotic, and emerging animal diseases.
- Industry, producers, the AVMA, government agencies, and colleges of veterinary medicine should build veterinary capacity through both recruitment and preparation of additional veterinary graduates into careers in public health, food systems, biomedical research, diagnostic laboratory investigation, pathology, epidemiology, ecosystem health, and food animal practice.
- The USDA, state animal health agencies, the AVMA, and colleges and schools of veterinary medicine and departments of animal science should develop a national animal health education plan focusing on education and training of individuals from all sectors involved in disease prevention and early detection through day-to-day oversight of animals.
- The government, private sector, and professional and industry associations should collectively educate and raise the level of awareness of the general public about the importance of public and private investment to strengthen the animal health framework.

The AVMA
advocates
cooperative
federal and state
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educational
action toward
food safety
assurance ...

- 10) Create a Food Safety Administration that combines the food inspection and safety responsibilities of the federal government, USDA, FDA, EPA, and other federal agencies into one agency to improve the safety of the US food supply.

AVMA Response

- The AVMA advocates cooperative federal and state regulatory and educational action toward food safety assurance, including:
 - A coordinated, integrated, and unified food safety regulatory program that is effectively enforced and that cooperates closely with state and municipal programs.

Pew Recommendations on Public Health (continued)

- If food safety is overseen by an existing federal agency, it should be located in the USDA. Of the existing federal agencies, USDA has the most appropriate expertise, resources, and systems to manage the full scope of the food quality assurance program as a continuous process through production, processing, distribution, sales, and consumption, including consumer education through the cooperative extension service and other forms of outreach.
- Leadership positions in food safety management should be held by veterinarians. Veterinarians are educated in comparative medicine, pathology, physiology, toxicology, microbiology, pharmacology, immunology, epidemiology, parasitology, and public health.
- The safety assurance of animal-derived food products throughout processing and marketing channels should be publicly funded, and it should be managed and performed by government regulatory officials.
- Requirements that imported foods meet the same production and quality standards as domestic products.
- Public education on purchasing, handling, storing, preparing, and serving foods for food service establishments and consumers to ensure their safety (http://www.avma.org/issues/policy/food_safety.asp).

- 11) Develop a flexible risk-based system for food safety from farm to fork to improve the safety of animal protein produced by IFAP facilities.
 - a. Any risk-based, farm-to-fork food safety system must allow for size differences among production systems—a “one-size-fits-all” system will not be appropriate for all operations. The system must be flexible enough for small and local producers to get their products to the marketplace.
 - b. Attack food safety issues at their source, instead of trying to fix a problem after it has occurred, by instituting better sanitary and health practices at the farm level. Ranch operating plans may provide one approach to on-farm food safety; FDA’s 2004 proposed rule for the prevention of *Salmonella enteritidis* in shell eggs is another example (<http://www/cfsan.fda.gov/~lrd/fro4922b.html>).
 - c. Ensure that diagnostic tools are sensitive and specific and are continuously evaluated to detect newly emerging variants of microbial agents of food origin.
 - d. Make resources available through competitive grants to encourage the development of practical but rigorous monitoring systems and rapid diagnostic tools. Provide resources for the application of newly identified or developed technologies and processes and for the training of inspectors and quality control staff of facilities.
 - e. Introduce greater transparency in feed ingredients. Often producers do not even know what additives they are feeding the animals since the feed arrives premixed from the integrator. One option would be to extend certain provisions of the Food, Drug, and Cosmetic Act to the farm.
 - f. Encourage the food animal production industry (contractors, producers, and integrators) to commit to finding ways to minimize the risk of outbreaks of zoonotic disease and other IFAP-related public health threats to vulnerable communities, such as those where IFAP facilities are the most concentrated and where local citizens are least able to protect their rights (e.g., lower-income and/or minority areas).
 - g. Include both imported and domestically produced foods of animal origin in the enhanced monitoring systems.

... food safety standards must apply equivalently to small, local producers and to larger producers ...

... each food safety issue across the entire “farm-to-fork” continuum should be defined ...

AVMA Response

- The AVMA supports flexibility to reduce risk of regulatory economic burden to small businesses; however, food safety standards must apply equivalently to small, local producers and to larger producers.
- In addition to post-harvest interventions, a pre-harvest approach to food safety is a logical part of the continuum of steps to make food safe. This is why it is so critical that veterinarians have the tools they need, including antimicrobials, to address animal diseases before they spread and potentially jeopardize the food supply.
- However, the AVMA also asserts that not all food safety problems originate at the farm level. The Pew Commission’s recommendation implies poor sanitary and health practices are the sole cause of food safety hazards, yet the majority of human foodborne illnesses are caused by human viruses and the bacterial pathogens are naturally occurring organisms. They are often ubiquitous, occurring in virtually every type of environment and are not the result of unsanitary conditions. Their “source” may in fact be during processing, at the retail level, or even at the consumer level of the “farm-to-fork” continuum. Moreover, the ecology of each food safety issue across the entire “farm-to-fork” continuum should be defined, as should the best location(s) to apply corrective or protective strategies. The most effective and efficient critical control point may not be at the farm level but may be at the processing level. This is the basis of the Hazard Analysis and Critical Control Point System approach to food safety, wherein the critical control point(s) that will be most effective and efficient in providing safe food are identified and rectified.
- It is important to recognize that other components are critical in a safe food supply:
 - An expanded animal health laboratory network to ensure sufficient capability and capacity for both routine and emergency diagnostic needs and to ensure a robust linkage of all components (federal, state, university, and commercial laboratories) involved in the diagnosis of animal and zoonotic diseases.
 - Improved, more robust monitoring and timely reporting of foodborne disease and antimicrobial resistance by systems such as FoodNet and NARMS.
 - Effective collaboration between government, industry, AVMA, and others to minimize threats of zoonoses and foodborne disease to not only vulnerable communities but the entire public.

- 12) Improve the safety of our food supply and reduce use of antimicrobials by more aggressively mitigating production diseases (disorders associated with IFAP management and breeding).
 - a. More attention should be given to antimicrobial-resistant and other diseases on the farm. Too often attempts are made to address the effects of production diseases after they arise (at processing), rather than preventing them from occurring in the first place.
 - b. Research into systems that minimize production diseases should be expanded, implemented, and advocated by the state and the federal governments.

AVMA Response

- It is important to recognize that diseases can cause animal health concerns at both large and small production units. The Pew Commission’s assertion that specific animal health disorders are associated specifically with “IFAP” management is unfounded. Animal health problems could be found at either large or small farms. In fact, larger farms might have greater resources available to develop and use new technologies that could improve animal health.
- The Pew Commission’s recommendation seems to contradict earlier recommendations—strategic use of antimicrobials at the farm level by a veterinarian does prevent disease from occurring in the first place. If veterinarians lose

antimicrobials as a tool to protect animal health and prevent suffering, then indeed, disease prevention may not be attained as easily.

- Advances in animal health have greatly improved food safety (through the reduction of pathogens) while also contributing significantly to a reduced need for antimicrobials over time. Production is already efficient, as evidenced by an abundance of safe and healthy meat, yet it could be enhanced even further by genetic, nutritional, and new management tools that can continue to decrease the need for antimicrobial use.
- Optimal breeding and management are important tools for optimal health and welfare as well as efficient production. The risk that diseases present to the food supply can be mitigated through both optimal breeding and management and antimicrobial therapies as deemed appropriate by an attending veterinarian.

Pew Recommendations on the Environment

- 1) Improve enforcement of existing federal, state, and local IFAP facility regulations to improve the siting of IFAP facilities and protect the health of those who live near and downstream from them.
 - a. Enforce all provisions of the Clean Water Act and the Clean Air Act that pertain to IFAP.
 - b. Provide adequate mandatory federal funding to states to enable them to hire more trained inspectors, collect data, monitor farms more closely, educate producers on proper manure handling techniques, write Comprehensive Nutrient Management Plans (CNMPs), and enforce IFAP regulations (e.g., NRCS, EPA Section 106 grants, SBA loans).
 - c. States should enforce federal and state permits quickly, equitably, and robustly. A lack of funding and political will often inhibits the ability of states to adequately enforce existing federal and state IFAP (currently Concentrated Animal Feeding Operation, or CAFO) regulations. Often states must rely on general fund appropriations to fund IFAP (CAFO) monitoring and rule enforcement. Dedicated mandatory funding would improve this situation, and additional funding for monitoring and enforcement could be realized if permitting fee funds were dedicated to monitoring and enforcement.
 - d. States should implement robust inspection regimes that are designed to deter IFAP facility operators from ignoring pollution rules. Often, no state-sanctioned official visits an IFAP facility unless there is a complaint, and then it may be too late to document or fix the problem. Each state should set a minimum inspection schedule (at least once a year), with special attention to repeat violators (Kelly, March 20, 2007).
 - e. State environmental protection agencies, rather than state agricultural agencies, should be charged with regulating IFAP waste. This would prevent the conflict of interest that arises when a state agency charged with promoting agriculture is also regulating it (Washington State Department of Ecology, 2006). While environmental protection agencies may not have expertise with food animals, they are generally better equipped than state agriculture agencies to deal with waste disposal since they regulate many other types of waste disposal. Unfortunately, several states are transferring the regulation of IFAP facilities from the department of environment to their department of agriculture.
 - f. The EPA should develop a standardized approach for regulating air pollution from IFAP facilities. IFAP air emissions—including pollutants such as particulate matter, hydrogen sulfide, ammonia, methane, and volatile gases—are unregulated at the federal level.
 - g. Clarify the definition of the types of waste handling systems and number of animals that constitute a regulated IFAP facility (CAFO) in order to bring a greater proportion

of the waste from IFAP facilities under regulation. Under currently proposed EPA rules, only 49 to 60% of IFAP waste qualifies for federal regulation (EPA, 2003).

h. The federal government should develop criteria for allowable levels of animal density and appropriate waste management methods that are compatible with protecting watershed, airshed, soil, and aquifers by adjusting for relevant hydrologic and geologic factors. States should use these criteria to permit and site IFAP operations.

i. Once criteria are established and implemented, EPA should monitor IFAP's effects on entire watersheds, not just on a per farm basis, since IFAP can have a cumulative effect on the health of a watershed.

j. Grant permits only to new IFAP facilities that comply with local, state, and federal regulations.

k. Require existing IFAP facilities to comply and shut down those that cannot or do not.

l. The federal and state governments should increase the number of IFAP operations (currently restricted to EPA-defined CAFOs) to be regulated under federal and state law (NMPs, effluent restrictions, National Pollutant Discharge Elimination System (NPDES) permits) and provide robust financial and technical support to smaller producers included in the expanded IFAP (CAFO) definition to help them comply with these regulations. Under the current definition of a concentrated animal feeding operation (CAFO), only 5% of animal feeding operations (AFOs) are CAFOs, yet they raise 40% of US livestock. And only about 30% (4,000) of the 5% have federal permits (Copeland 2006). If the current final rule (1,000 animal units, or AU) were lowered to the original rule proposed in 2000, which would regulate CAFOs between 300 and 999 AU or a 500-animal threshold (EPA, 2003), 64% to 72% more waste would be covered under the federal permitting process.

m. Require operations that do not obtain a permit to prove they are not discharging waste into the environment. Test wells for groundwater monitoring, and require surface water monitoring for those who wish to opt out of obtaining a permit. This would expand the number of AFOs subject to regulation. Currently, many operations that meet IFAP facility (CAFO) size thresholds do not obtain permits or fall outside state and federal regulation because they claim they do not discharge. Claiming no discharge exempts IFAP facilities from federal regulation, although they are often still subject to state laws, which vary greatly from state to state (as noted in the National Conference of State Legislatures study [NCSL, 2008]).

AVMA Response

- While the AVMA finds value in continued refining and improvement of existing regulations, the Pew has not provided any evidence that the current regulations are insufficient or inadequately enforced. Existing federal, state, and local regulations serve to protect the public regardless of the size of the farm. Without a comprehensive risk assessment, it is inappropriate to assume or imply that those who live near or downstream from a large farm are at a greater public health risk than those who live in other areas.
- The EPA has the authority to regulate air emissions from confined animal feeding operations (CAFOs). Particulate matter emitted from a CAFO is regulated under the Clean Air Act; other pollutants, such as ammonia and hydrogen sulfide, may be regulated under the act in certain circumstances. The Comprehensive Environmental Response, Compensation, and Liability act of 1980 (CERCLA) and The Emergency Planning and Community Right-to-Know act of 1986 (EPCRA) require operators of these facilities to report to federal, state, or local authorities when a reportable quantity of a hazardous substance, such as ammonia or hydrogen sulfide, is released.
- Most states have previously identified CAFO locations. In response to the Clean Water Act (303d requirements), all states have tested or are testing the surface

Pew Recommendations on the Environment (continued)

waters of their respective states. In so doing, if any are found to contain substances or microorganisms that do not meet EPA or state guidelines, then a water quality assessment is required to determine the source of such contaminants. If remediation is necessary, then a total maximum daily load (TMDL) plan for violative contaminants must be prepared with control of the sources put in place.

- The current guidelines are particularly cautious relative to bacteria, in that fecal coliforms and enterococci are measured as indicators of animal or human fecal contamination. The detection limits are set sufficiently low to require close scrutiny. There are many sources of these indicator organisms other than concentrated animal feeding facilities (e.g., wildlife, septic tanks, urban runoff, public water treatment facilities, pastured livestock). However, if a CAFO or Animal Feeding Operation should be the source, it will be readily identified.
 - Also, EPA currently is conducting a national Air Emissions Monitoring Study in collaboration with researchers from eight universities. This study will measure levels of hydrogen sulfide, particulate matter, ammonia, nitrous oxide, volatile organic compounds, and other gases from livestock facilities. Results are expected in 2011 and will provide the EPA with national baseline information on air emissions from CAFOs.
- 2) Develop and implement a new system to deal with farm waste (that will replace the inflexible and broken system that exists today) to protect Americans from the adverse environmental and human health hazards of improperly handled IFAP waste.
- a. Congress and the federal government should work together to formulate laws and regulations outlining baseline waste handling standards for IFAP facilities. These standards would address the minimum level of mandatory IFAP facility regulation as well as which regulations states must enforce to prevent IFAP facilities from polluting the land, air, and water; states could choose to implement more stringent regulations if they considered them necessary. Our diminishing land capacity for producing food animals, combined with dwindling freshwater supplies, escalating energy costs, nutrient overloading of soil, and increased antibiotic resistance, will result in a crisis unless new laws and regulations go into effect in a timely fashion. This process must begin immediately and be fully implemented within 10 years.
 - b. Address size-specific permits for the operation of all IFAP facilities and include the monitoring of air, water, and soil, total maximum daily loads (TMDLs), site-specific NMPs, comprehensive nutrient management plans (CNMPs), inspections, data collection, and self-reporting to the clearinghouse (see Recommendation #3e in this section).
 - c. Require the use of environmentally sound treatment technologies for waste management (without specifying a particular technology that might not be appropriate for all conditions).
 - d. Mandate shared responsibility and liability for the disposal of IFAP waste between integrators and producers proportional to their control over the operation (instead of this burden being solely the responsibility of the producer; [Arteaga, 2001]).
 - e. Include baseline federal zoning guidelines that set out a framework for states. Require a pre-permit/construction environmental impact study. Such a requirement would not prevent states and counties from enacting their own, more comprehensive, zoning laws if necessary (see Recommendation #1 under Competition and Community Impacts).
 - f. Establish mechanisms for community involvement to provide neighbors of IFAP facilities opportunities to review and comment on proposed facilities, and allow them to take action in cases where federal or state regulations have been violated in

the absence of enforcement of those laws by the appropriate authority. Individuals who have had their private property contaminated through no fault of their own must have access to the courts to obtain redress.

g. Ensure that all types of IFAP waste (e.g., dry litter, wet waste) are covered by regulations (EPA, 2003).

h. Establish standards that protect people, animals, and the environment from the effects of IFAP waste on and off the operation's property (Arteaga, 2001; EPA, 2003; Schiffman, Studwell et al., 2005; Sigurdarson and Kline 2006; Stolz, Perera et al., 2007).

i. Phase out the use of lagoon and spray systems in areas that cannot sustain their use (e.g., fragile watersheds, floodplains, certain geologic formations, areas prone to disruptive weather patterns).

j. Require new and expanding IFAP facilities in vulnerable areas to use primary, secondary, and tertiary treatment of animal waste (similar to the treatment associated with human waste) until lagoon and spray systems can be replaced by safe and effective alternate technologies.

k. Require minimal water use in alternative systems to protect the nation's dwindling freshwater resources, balanced with the system's effect on air and soil quality. Liquid manure handling systems should be used only if another system is not feasible or would have greater environmental impact than a liquid system. The sustainability of alternative systems in relation to water resources and carbon use should be a major focus during their development.

l. Prohibit the installation of new liquid manure handling systems and phase out their use on existing operations as technology allows.

m. Require states to implement a robust inspection regime that combines adequate funding for annual inspections with additional risk-based inspections where necessary. It is important that all IFAP facilities be inspected on a regular basis to ensure compliance with state and federal waste management regulations. Additionally, some IFAP facilities may need special attention because of the type of manure handling system in use, the facility's age, its size, or its location. These high-risk operations should be inspected more often than lower-risk operations.

AVMA Response

- The Commission misplaces its emphasis on the quantity of manure produced by our animals. The AVMA asserts that the more critical metric is how well the manure is being used to support crop production because of its nutrient and organic matter content. The application of manure fertilizer is a responsible means of utilizing wastes that result from animal production by "recycling" those wastes for crop production.
- Manure is being successfully substituted for large quantities of commercial fertilizer in crop production throughout the United States, resulting in substantial energy savings. For example, in the case of corn production, energy savings from the substitution of swine manure for commercial nitrogen fertilizer result in net energy savings on the order of 31 percent to 34 percent (<http://engrwww.usask.ca/oldsite/societies/csae/c9915.pdf>. McLaughlin NB, Hiba A, Wall GJ, King DJ. Comparison of energy inputs for inorganic fertilizer and manure based corn production. *Can Agric Eng* 2000;42:9-17).
- The nutrient and energy savings that manure use creates is often overlooked or taken for granted. Many people do not know that our livestock and poultry production systems across the country are engaged in an efficient, expansive nutrient and organic matter recycling program that makes a major contribution to helping feed the United States and much of the world while cutting down on the use of commercial fertilizers and in the process supporting energy conservation and the reduction of greenhouse gas emissions. The use of this valuable resource helps to make agricultural production economically viable in many cases. The current value of animal waste on a dry-matter basis when compared to equivalent amounts of commercial N, P205, and K2O

Pew Recommendations on the Environment (continued)

When it is later applied as fertilizer, manure also adds to carbon sequestration, resulting in a reduction of CO₂ in the atmosphere

...

exceeds \$100 per ton (NASS 2008). Such substantial energy savings, of course, also translate into substantial reductions in greenhouse gas emissions.

- Currently, waste from confinement animal facilities is contained within lagoons (including silos), in compost stacks, or within production facilities until it is harvested and applied as fertilizer. When it is later applied as fertilizer, manure also adds to carbon sequestration, resulting in a reduction of CO₂ in the atmosphere. It further improves soil microbial biomass and activity, resulting in a healthier environment for plant growth as opposed to inorganic fertilizers. The resulting improved water-holding capacity provided by manure organic matter further aids in the reduction of runoff from the surface as well as improves survivability of growing plants (Sainju UM, et al. Tillage, Cropping Systems and Nitrogen Fertilizer Source: Effects on Soil Carbon Sequestration and Fractions. J Environ Qual 2007;37:880-888).
- The EPA and state requirements mandate that confinement facility farm waste be contained so as to avoid contamination of surface and ground waters. The respective state departments of environmental quality and health further provide inspection oversight. Many states also have laws in place that dictate the surface application requirements of waste from confinement animal facilities so as to prevent any contamination of waters and air.

- 3) Increase and improve monitoring and research of farm waste to hasten the development of new and innovative systems to deal with IFAP waste and to better our understanding of what is happening with IFAP today.
 - a. All IFAP facilities should have, at a minimum, a Nutrient Management Plan (NMP) for the disposal of manure. An NMP describes appropriate methods for the handling and disposal of manure and for its application to fields. The plan should also include records of the method and timing of manure disposal.
 - i. State and federal governments should provide funds through state regulatory agencies and the National Resources Conservation Service (NRCS) to help producers write and implement NMPs.
 - ii. The EPA should set federal minimum standards for the extent of NMPs and specify what monitoring data should be kept.
 - iii. Allow the Environmental Quality Incentives Program (EQIP) to (1) fund the writing of NMPs to expedite their implementation and (2) provide business plans for alternative systems to equalize access to government funds for non-IFAP and IFAP (CAFO)-style production.
 - b. The federal, state, and local governments should begin collecting data on air emissions, ground and surface water emissions, soil emissions, and health outcomes (e.g., cardiovascular disease, heart disease, injuries, allergies) for people who live near IFAP facilities and for IFAP workers. These data should be tabulated and combined with existing data in a *national IFAP data clearinghouse* that will enable the EPA and other agencies to keep track of air, water, and land emissions from IFAP facilities and evaluate the public health implications of these emissions. The EPA and other state and federal agencies should use these comprehensive data both to support independent research and to better regulate IFAP facilities. Currently, FDA, EPA, and other federal agencies each keep extensive records for different industries as a way to track changes and regulate each industry. The clearinghouse would consolidate data from around the country, thereby giving producers the chance to improve their operation by providing access to information about better technologies and improved waste systems. It would also allow researchers, regulators, and policymakers to evaluate changing environmental and public health impacts of agriculture and adjust regulations accordingly. The EPA, FDA, and USDA should take the following actions:

- i. Add data collected on farm waste handling systems to the clearinghouse for use assessing and evaluating the sustainability of animal production models and farm waste handling systems by region.
 - ii. Link data to their collection location to facilitate regional comparisons, given different environmental and geological conditions.
 - iii. Implement data protection procedures to ensure that personal information (e.g., information that could be used by identity thieves) can be accessed only by authorized agencies and personnel for official purposes.
 - iv. Include comprehensive USDA Agriculture Census data in the national clearinghouse to provide a context for the data and thus improve their utility.
 - v. Include data on individual violations of state and federal IFAP facility (CAFO) regulations in the public portion of the national clearinghouse. Currently, it is difficult to determine compliance with IFAP (CAFO) laws because states may or may not keep good records of violations and may make them extremely difficult to access (NASDA, 2001).
- c. Expand our understanding of how to deal with concentrated IFAP waste, as well as the health and environmental effects of this waste through more diversely funded and well-coordinated research to address methods for dealing with IFAP waste and its environmental and health effects, as well as to move the United States towards more sustainable systems for dealing with farm waste. National standards for alternative waste systems are needed to guide development of improvements to existing waste handling systems as well as the development of alternative/new waste handling systems.
- i. Require states to report basic data (general location, number of animals, NMP, etc) on all IFAP facilities in the public portion of the national clearinghouse.
 - ii. Federal and state governments should fund research into alternative systems to replace existing, insufficient waste handling systems, similar to the recent research done at North Carolina State University. They should also increase funding for research on the effects of IFAP waste on public health, the environment, and animal welfare.
 - iii. Establish a national clearinghouse for data on alternative systems. The clearinghouse would be the repository of regionally and topographically significant data on economic performance, environmental performance (air, water, and soil), and overall sustainability for potentially useful alternative waste handling systems.
 - iv. Improve and standardize research methods for data collection and analysis for the clearinghouse. Standardized methods would allow states and the federal government to compare regionally relevant data in the clearinghouse and facilitate evaluation of new waste handling systems.
 - v. Increase funding for research to effectively assess and improve the economic performance, energy balance, risk assessment, and environmental sustainability of alternative waste handling systems.
 - vi. Increase funding for research focused on comprehensive systems to deal with waste, rather than those focused on one process to deal with one aspect of waste (such as using a digester to reduce volume, which does little to reduce the levels of certain toxic components). Dealing with only one component of waste may have the unintended consequence of causing greater harm to the environment.
 - vii. Expand the type and number of entities researching farm waste handling by expanding the public funding to research at both land-grant and non-land-grant institutions, and other research entities. In addition, transparency of funding source in agricultural research should be standard.

Pew Recommendations on the Environment (continued)

AVMA Response

- Based on published epidemiologic studies of community health outcomes near CAFOs, the AVMA asserts that, while additional research can be valuable, establishment of a national data collection effort is not justified at this time because no causal relationship has been identified and relative risks have not been assessed.
- The Public Health Chapters of the Pew report states “Four large epidemiological studies have demonstrated strong and consistent associations between IFAP air pollution and asthma.” However, examination of the published reports of these studies does not support this statement. All of the studies lacked direct measurements of exposure in study participants; most relied on self reports of illness, rather than providing objective measurement of adverse health effect. In general, authors of these studies were much more cautious in interpreting their findings than was the Pew Commission. Authors emphasized the limitations of their studies, and suggested further epidemiologic study was needed before a causal relationship between air emissions and adverse community health outcomes could be established. One paper concludes, “The hypothesis that CAFOs contribute to environmental pollution adversely affecting respiratory health in young children needs to be further explored. A prospective study in which concentrations of environmental pollutants are correlated with airway symptoms and physiologic measurements in exposed children will be important to follow up these findings” (Radon K, Schulze A, Ehrenstein V, et al. Environmental exposures to confined animal feeding operations and respiratory health of neighboring residents. *Epidemiology* 2007;18:300-308).
- Monitoring is already in place at both the federal and state levels. With the implementation of new CAFO regulations, monitoring is expected to increase. States are obligated under the Clean Water Act to monitor “pollution” of the surface and ground waters within their respective jurisdictions.
- Numerous research projects at land-grant universities have resulted in peer-reviewed publications on animal waste handling and usage as fertilizer (such as the *Journal of Environmental Quality*, *Soil Science Society of America Journal*, *Journal of Animal Science*, *Journal of Soil and Water Conservation*, *USDA Natural Resources and Conservation Services* and *Agricultural Research Service* publications, etc). Such research continues at most land grant universities. In addition, the EPA has recently awarded numerous grants for research to examine various potential pollutants that might be present in animal manures. However, more funding for similar projects would be welcomed.

- 4) Increase funding for research into improving waste handling systems and standardize measurements to allow better comparisons between systems.
 - a. Develop a central repository for information on how to best facilitate rapid adoption of new air and water pollution reduction technologies that currently exist or are under development across the country. Research to develop effective means of assistance to pay for them, (EQIP should be part of this) should be a component of this repository. (Examples of technologies include: biofilters, buffer strips, dehydration, injection, digesters, reduced feed wastage, etc.)
 - b. Increase funding for the creation and expansion of programs for implementing improved husbandry and technology practices on currently existing facilities including funding conversions to alternative farming practices. (Examples of such programs include, but are not limited to: EQIP, cooperative extension, NRCS, cost share, loans, grants, and accelerated capital depreciation.) Sign-up and application information for these types of programs should be included in the clearinghouse so that producers only have to go to one place to get information and sign up for a program. A dollar amount cap should be placed on the cost-share program to

prevent large-scale operators from using the program to externalize their costs.

These funds should not be used for physical construction of new facilities.

c. Target increased assistance and information to small producers who are least able to afford implementation of new practices and deal with increased regulation, but still have the potential to pollute. Air emission technologies, such as biofilters, that are used in other parts of the world should be considered for use in IFAPs in the United States.

AVMA Response

- The AVMA agrees with the Pew Commission's recommendation that additional funds be targeted toward such research. The AVMA advises that perhaps the Pew Charitable Trust would consider funding such research, with the goal of submission of publications to peer-reviewed journals.

Pew Recommendations on Animal Welfare

- 1) The animal agriculture industry should implement federal performance-based standards to improve animal health and well-being.
 - a. The federal government should develop performance-based (not resource-based) animal welfare standards. Animal welfare has improved in recent years based on industry research and consumer demand; the latter has led, for example, to the creation of the United Egg Producers' certification program and the McDonald's animal welfare council. However, in order to fulfill our ethical responsibility to treat farm animals humanely, federally monitored standards that ensure at least the following minimum standards for animal treatment:
 - Good feeding: Animals should not suffer prolonged hunger or thirst;
 - Good housing: Animals should be comfortable especially in their lying areas, should not suffer thermal extremes, and should have enough space to move around freely;
 - Good health: Animals should not be physically injured and should be free of preventable disease related to production; in the event that surgical procedures are performed on animals for the purposes of health or management, modalities should be used to minimize pain; and
 - Appropriate behavior: Animals should be allowed to perform normal nonharmful social behaviors and to express species-specific natural behaviors as much as reasonably possible; animals should be handled well in all situations (handlers should promote good human-animal relationships); negative emotions such as fear, distress, extreme frustration, or boredom should be avoided.
 - b. Implement a government oversight system similar in structure to that used for laboratory animal welfare: Each IFAP facility would be certified by an industry-funded, government-chartered, not-for-profit entity accredited by the federal government to monitor IFAP. Federal entities would audit IFAP facilities for compliance. Consumers could look for the third-party certification as proof that the production process meets federal farm animal welfare standards.
 - c. Change the system for monitoring and regulating animal welfare, recommend improvements in animal welfare as science, and encourage consumers to continue to push animal welfare policy. Improved animal husbandry practices and an ethically based view of animal welfare will solve or ameliorate many IFAP animal welfare problems.
 - d. Federal standards for farm animal welfare should be developed immediately based on a fair, ethical, and evidence-based understanding of normal animal behavior.
- 2) Implement better animal husbandry practices to improve public health and animal well-being.

Pew Recommendations on Animal Welfare (continued)

- a. Change breeding practices to include attributes and genetics besides productivity, growth, and carcass condition (Appleby and Lawrence, 1987); for example, hogs might be bred for docile behavior, fowl for bone strength and organ capacity, and sows, dairy and beef cattle for “good” mothering. In recent decades, farm animals have been selectively bred for specific physical traits (e.g., fast growth, increased lean muscle mass, increased milk production) that have led to greater incidence of and susceptibility to transmissible disease, new genetic diseases, a larger number and scope of mental or behavioral abnormalities, and lameness.
 - b. Improve and expand the teaching of animal husbandry practices at land-grant universities.
 - c. Federal and state governments should fund (through tax incentives and directed education funding, including for technical colleges) the training of farm workers and food industry personnel in sustainable, ethical animal husbandry.
 - d. Diversify the type of farm animal production systems taught at land-grant schools beyond the status quo IFAP system.
 - i. Increase funding for the teaching of good husbandry and alternative production techniques through local extension offices.
 - ii. Work to reduce and eliminate “production diseases,” defined as diseases caused by production management or nutritional practices; liver abscesses in feedlot cattle are an example of a production disease.
- 3) Phase out the most intensive and inhumane production practices within a decade to reduce IFAP risks to public health and improve animal well-being; these practices include the following:
- a. Gestation crates where sows are kept for their entire 124-day gestation period. The crates do not allow the animals to turn around or express natural behaviors, and they restrict the sow’s ability to lie down comfortably. Alternatives such as open feeding stalls and pens can be used to manage sows.
 - b. Restrictive farrowing crates, in which sows are not able to turn around or exhibit natural behavior. As an alternative, farrowing systems (e.g., the Freedom Farrowing System, Natural Farrowing Systems) provide protection to the piglets while allowing more freedom of movement for the sow.
 - c. Any cages that house multiple egg-laying chickens (commonly referred to as “battery cages”) without allowing the hens to exhibit normal behavior (e.g., pecking, scratching, roosting).
 - d. The tethering and/or individual housing of calves for the purpose of white veal. This practice is already rare in the United States, so its phaseout can be done quickly.
 - e. Forced feeding of fowl to produce foie gras.
 - f. Tail docking of dairy cattle.
 - g. Forced molting by feed removal for laying hens to extend the laying period (for the most part, this has been phased out by UEP standards implemented in 2002).
- 4) Improve animal welfare practices and conditions that pose a threat to public health and animal well-being; such practices and conditions include the following:
- a. Flooring and housing conditions in feedlots and dairies: cattle kept on concrete, left in excessive amounts of feces, and/or not provided shade and/or misting in hot climates.
 - b. Flooring and other housing conditions at swine facilities: hogs that spend their entire lifetime on concrete are prone to higher rates of leg injury (Andersen and Boe, 1999; Brennan and Aherne, 1987).
 - c. The method of disposal of unwanted male chicks and of adult fowl in catastrophic situations that require the destruction of large numbers of birds.

- d. Hand-catching methods for fowl that result in the animals' broken limbs, bruising, and stress.
- e. Body-altering procedures that cause pain to the animals, either during or afterward.
- f. Air quality in IFAP buildings: gas buildup can cause respiratory harm to animal health and to IFAP workers through exposure to gas buildup, toxic dust, and other irritants.
- g. Ammonia burns on the feet and hocks of fowl due to contact with litter.
- h. Some weaning practices for piglets, beef cattle, and veal calves: the shortening of the weaning period or abrupt weaning to move the animal to market faster can stress the animals and make them more vulnerable to disease.

The federal government should act on the following recommendations to improve animal welfare:

- a. Strengthen and enforce laws dealing with the transport of livestock by truck. Transport laws should also address the overpacking of livestock during transportation, long-distance transport of farm animals without adequate care, and transport of very young animals.
 - b. The federal government must include fowl under the Humane Methods of Slaughter Act.
- 5) Improve animal welfare research in support of cost-effective and reliable ways to raise food animals while providing humane animal care.
- a. There is a significant amount of animal welfare research being done, but the funding often comes from special interest groups. Some of this research is published and distributed to the agriculture industry, but without acknowledgement of the funding sources. Such lack of disclosure taints mainstream animal welfare research. To improve the transparency of animal research, there needs to be disclosure of funding sources for peer-reviewed published research. Much of today's agriculture and livestock research, for example, comes from land-grant colleges with animal science and agriculture departments that are heavily endowed by special interests or industry. However, a lot of very good research on humane methods of stunning and slaughter has been funded by the industry.
 - b. More diversity in the funding sources for animal welfare research is also needed. Most animal welfare research takes place at land-grant institutions, but other institutions should not be barred from engaging in animal welfare research due to lack of research funds. The federal government is in the best position to provide unbiased animal welfare research; therefore federal funding for animal welfare research should be revived and increased.
 - c. Focus research on animal-based outcomes relating to natural behavior and stress, and away from physical factors (e.g., growth, weight gain) that do not accurately characterize an animal's welfare status except in the grossest sense.
 - d. Include ethics as a key component of research into the humaneness of a particular practice. Scientific outcomes are critical, but whether a practice is ethical must be taken into account.

... simply increasing the space allotted to animals will always have both positive and negative effects ...

AVMA Response

- The report of the Pew Commission on Industrial Farm Animal Production, and its recommendations, inappropriately assume that intensive methods of farmed animal production are patently inhumane. The basis of this assumption appears to be the following **misconceptions** regarding ensuring animal well-being:
 - That increasing space guarantees improved welfare—In fact, simply increasing the space allotted to animals will always have both positive and negative effects. While increasing space may facilitate some beneficial behaviors (e.g., spontaneous activity, unimpeded conspecific socialization) it may also increase harmful behaviors

Pew Recommendations on Animal Welfare (continued)

... it is possible to have both good and bad welfare on both large and small farms ...

Maintaining good welfare within production systems involves trade-offs ...

(e.g., pecking, excessive mounting, competition for resources, general fearfulness). Furthermore, increasing space while maintaining a barren environment is unlikely to substantively satisfy an animal's behavioral needs, so space allocations must be considered in the context of genetics, enclosure design, conspecific interactions, and human monitoring and intervention (e.g., animals destined for transportation and off-site slaughter may experience fear during this period if not habituated to close handling by unfamiliar people and periods of confinement).

- That stable, small-to-moderate group sizes are always associated with good welfare—In fact, what constitutes a welfare-friendly group size is highly dependent on species and can even be dependent on breed/type within a species. For example, swine producers moving to group housing or open-pen farrowing should proceed cautiously if they are working with lean commercial breeds of swine that tend to react fearfully to social challenges.
- Associations of small, family-run farms with good welfare, and large, corporate-owned farms with bad welfare—In fact, depending on how animals, personnel, and resources are chosen and allocated, it is possible to have both good and bad welfare on both large and small farms. Farm size is not an independent variable in the welfare “equation.”
- A complete assessment of welfare requires consideration of animals’ physiological and behavioral needs. In general, intensive animal production systems better satisfy the physiological and health needs of animals, whereas extensive animal production systems better satisfy their behavioral needs. Because the advantages and disadvantages of farmed animal production systems for animal welfare are qualitatively different, there is no simple or objective way to rank systems for “overall” welfare. Similarly, it is inappropriate to focus exclusively on either animals’ physical or mental needs, whether in research or practical application. For overall good welfare, sufficient and appropriate attention must be paid to both.
- Maintaining good welfare within production systems involves trade-offs. For example, production systems that allow animals to perform natural behaviors (e.g., providing substrates that permit swine to root) may present more challenges for disease and injury control (e.g., substrates are prone to contamination with substances ranging from dead or poisoned vermin to disease vectors or chemical residues, either at the source or during transportation or storage). Conversely, using intensive confinement to improve disease and injury control often limits animals’ ability to engage in normal behaviors.

- The chart below provides a representative sample of contributors to the welfare of laying hens and illustrates how they may or may not be satisfied within particular housing systems. The most welfare-friendly animal production systems will be those that maximize the positive aspects of system types while modifying those aspects that are less welfare-friendly. For example, preliminary research on cages for housing laying hens indicates that cages modified to include nest boxes and perches may better accommodate hens' behavioral needs, while maintaining the health and disease control benefits of confinement housing.

Indicators	Conventional Cage	Furnished Cages			Non-cage (Barn)		Outdoor (Free-range)
		Small	Medium	Large	Single Level	Multiple Levels	
Mortality (%)	■	■	■	§	■	■	■
Mortality from feather pecking and cannibalism	■	■	■	■	■	■	■
Bone strength and fractures	†	*	*	*	‡	‡	‡
Exposure to disease vectors (e.g., wild birds)	■	■	■	■	■	■	■
Internal parasites (e.g., coccidia, roundworms)	■	■	■	■	■	■	■
External parasites	■	■	■	■	■	■	■
Bumblefoot	■	■	■	■	■	■	■
Feather loss	■	■	■	■	■	■	■
Hen hysteria and piling/smothering	■	■	■	■	■	■	■
Risk of predation	■	■	■	■	■	■	■
Level of egg production and cleanliness	■	■	■	■	■	■	■
Use of nest boxes	■	■	■	■	■	■	■
Use of perches	■	■	■	■	■	■	■
Foraging behavior	■	■	■	■	■	■	■
Dustbathing behavior	■	■	■	■	■	■	■
Air quality (e.g., dust, ammonia)	■	■	■	■	■	■	■

§ = Recent data indicate lower mortality may be achievable in large furnished cages

† = Reduced bone strength, fractures when birds are caught

* = bones stronger from perch use but increased incidence of deformation of the keel

‡ = More fractures during lay despite stronger bones

How well welfare measures are met: Good Medium Poor Insuff Data

- Although the Pew report and its recommendations appear to focus largely on housing type, housing type cannot be considered in isolation from other important factors that influence animal welfare, including management, feeding systems, environmental features, and animal type.
- People, including veterinarians and other scientists, approach animal welfare from different viewpoints and attribute various degrees of importance to different measures of animal welfare on the basis of their education, training, experience, and personal values and the perspectives, morals, and ethical constructs of the society in which they live and work. The Pew report, like all assessments of farmed animal production systems, reflects its authors' views and prejudices.

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Synopsis of the American Veterinary Medical Association Response to the Report of the Pew Commission on Industrial Farm Animal Production

Pew Recommendations on Public Health

- 1) Restrict the use of antimicrobials in food animal production to reduce the risk of antimicrobial resistance to medically important antibiotics.

AVMA Response

Bans on animal antimicrobials in other countries adversely affected animal health without improving human health. How antimicrobial resistance develops and spreads is largely unknown. The AVMA recommends targeted complete scientific risk analyses to determine how antimicrobial resistance develops and spreads and how it impacts human health first, before any drugs are “banned.” It is not reasonable to ban antimicrobials based on *theoretical* human health concerns without also weighing the scientifically based benefits of antimicrobial use in animals—benefits to both animals and people.

- 2) Clarify antimicrobial definitions to provide clear estimates of use and facilitate clear policies on antimicrobial use.

AVMA Response

The AVMA opposes use of the non-recognized terminology “non-therapeutic,” and asserts that the widely accepted definitions for “therapeutic” and “prophylactic” include control and prevention uses. Disease treatment, control, prevention, and growth promotion/feed efficiency as indicated on the FDA-approved labels of all antimicrobials should be used as the terminology.

Nontherapeutic: any use of antimicrobials in food animals in the absence of microbial disease or known (documented) microbial disease exposure.

AVMA Response

The term “nontherapeutic” is being used differently by different groups with no consistent definition and has no meaning in federal regulation. Strategic use for disease prevention (where predictable disease exposures occur but where the exposure may not yet have been documented) is an important use in population medicine and is essential for protection of animal health and welfare and of the food supply. Antibiotics labeled for feed efficiency or growth promotion often prevent or treat sub-clinical disease, and such use should not be confused with performance-enhancing drugs. This type of treatment has been shown to protect animals from disease.

Therapeutic: the use of antimicrobials in food animals with diagnosed microbial disease.

AVMA Response

Therapeutic uses include treatment, control, and prevention as defined by the Codex Alimentarius, FDA, and the AVMA.

Sometimes therapeutic antimicrobial therapy must be initiated based on clinical judgment and in the absence of a laboratory-confirmed (documented) microbial diagnosis.

Prophylactic: the use of antimicrobials in healthy animals in advance of an expected exposure to an infectious agent or after such an exposure but before onset of laboratory-confirmed clinical disease as determined by a licensed professional.

AVMA Response

Although defined in its report, the Pew does not specify its recommendation for prophylactic use. The Pew definition of “nontherapeutic” use includes prophylactic use as “nontherapeutic” use because antimicrobials are used in the absence of “known (documented) microbial disease exposure.” This is an example of several inconsistencies in the Pew report. Prophylactic use is not limited to veterinary medicine and is an important therapeutic option in both human and veterinary medicine.

Prevention and control of disease are key elements in the practice of veterinary medicine. Strategic use anticipates recurring events with each production group based upon prior knowledge and current health status.

Some of the growth promoting, disease preventive, and disease control antimicrobials have no human health equivalent or are not a critically important human antimicrobial (as defined by the WHO) and thus have no human health impact.

- 3) Improve monitoring and reporting of antimicrobial use in food animal production in order to accurately assess the quantity and methods of antimicrobial use in animal agriculture.

AVMA Response

A system for reporting and monitoring antimicrobial use in humans or animals does not exist in the United States. The AVMA asserts that as the profession continues to suffer from a critical workforce shortage, additional requirements for veterinary reporting—without a clear, defined purpose—have the potential to be overly burdensome to the practice of medicine and detract from the preservation of animal health and food safety.

- 4) Improve monitoring and surveillance of antimicrobial resistance in the food supply, the environment, and animal and human populations in order to refine knowledge of antimicrobial resistance and its impacts on human health.

AVMA Response

The Pew Commission appears to have pre-determined an endpoint—that antimicrobial use in animals is a significant cause for the development of resistance in human health. Moreover, we assert that when such monitoring data are collected, the science of epidemiology dictates that such data can only serve as an indicator for further investigation, rather than serving as a conclusion. We recommend a comprehensive research plan, which would require substantial funding. That funding is better utilized to fund not only monitoring and surveillance, but also the subsequent hypothesis-based studies identifying any impacts of antimicrobial use and potential mitigation strategies commensurate with level of risk.

It is important to note that this recommendation does not posit a rationale for collection of such environmental profiles, consider the environmental fate of human-use antimicrobials, or demonstrate a linkage between environmental profile results and human health concerns.

Pew Recommendations on Public Health (continued)

- 5) Increase veterinary oversight of all antimicrobial use in food animal production to prevent overuse and misuse of antimicrobials.

AVMA Response

The AVMA believes that a veterinary consultation should occur and that a veterinarian should be involved in the decision-making process prior to the implementation of any treatment therapy or regimen, including but not limited to the use of antimicrobials.

As a cornerstone of their antimicrobial administration, veterinarians utilize the AVMA *Guidelines for the Judicious Therapeutic Use of Antimicrobials*, which were developed to safeguard public health by providing specific recommendations for responsible and prudent therapeutic use of antimicrobials (<http://www.avma.org/issues/jtua/default.asp>).

- 6) Implement a disease-monitoring program and a fully integrated and robust national database for food animals to allow 48-hour trace-back through phases of their production.

AVMA Response

While the AVMA strongly supports an effective National Animal Identification System (NAIS) administered by the United States Department of Agriculture (USDA), we assert that expanding the NAIS to include “illnesses, breeding, feeding practices and slaughter condition” would add complexity to what is already a financially overwhelmed system, causing it to fail. Any additional tracking systems put into place for such animal production factors should be voluntary and market driven unless a clear need for federal oversight has been identified through a science-based process.

- 7) Fully enforce current federal and state environmental exposure regulations and legislation, and increase monitoring of the possible public health effects of IFAP on people who live and work in or near these operations.

AVMA Response

This recommendation has made conclusions that precede scientific studies. Evidence does not suggest the need to preferentially target larger farms. Once the initial scientific surveillance is conducted, however, hypothesis-driven research can discern relative risk of workers in various settings.

While the AVMA agrees that veterinarians and other workers may be at greater risk than the general public for emerging zoonotic diseases, science-based criteria are needed first to determine the relative risks of personnel in various farm-associated occupations, including at both large and small farms.

- 8) Increase research on the public health effects of IFAP on people living and working on or near these operations, and incorporate the findings into a new system for siting and regulating IFAP.

AVMA Response

The AVMA is supportive of research to assess risks to public health and to establish best management practices. However, it cannot be assumed that individuals living or working near large farms are at any greater risk for a specific condition than those near small farms or no farms. The AVMA again stresses the need for hypothesis-driven research before conclusions can be drawn. Following a thorough risk analysis, interventions for people living or working near farms should be commensurate with risk.

- 9) Strengthen the relationships between physicians, veterinarians, and public health professionals to deal with possible IFAP risks to public health.

AVMA Response

The AVMA has been a leader on One Health, bringing together key stakeholders to promote our nation's public health through collaboration (<http://www.avma.org/onehealth>). Collaboration is important, and we agree with Pew that Doctor of Veterinary Medicine and Master of Public Health (DVM/MPH) training confers extensive public health knowledge and that federal and state training should be expanded to increase the number of food animal veterinarians, which is one of AVMA's Strategic Goals.

We disagree with Pew's contention that NARMS is lacking in its outbreak detection; this indicates a misunderstanding by the Commission about what NARMS does. The NARMS programs monitor trends of bacterial *resistance*, yet any identification of potential hypotheses that could result from such monitoring would not provide actual bacterial *outbreak* detection. Outbreaks are detected by local and state health authorities in cooperation with FoodNET, PulseNet, and other Centers for Disease Control and Prevention (CDC) programs.

- 10) Create a Food Safety Administration that combines the food inspection and safety responsibilities of the federal government, USDA, FDA, EPA, and other federal agencies into one agency to improve the safety of the US food supply.

AVMA Response

The AVMA advocates for a coordinated, integrated, and unified food safety regulatory program that is effectively enforced and that cooperates closely with state and municipal programs (http://www.avma.org/issues/policy/food_safety.asp).

- 11) Develop a flexible risk-based system for food safety from farm to fork to improve the safety of animal protein produced by IFAP facilities.

AVMA Response

The Pew seems to imply that food safety standards should not apply equivalently to small, local producers and IFAPs. However, food safety standards must apply equivalently to all producers.

The AVMA supports measures to mitigate risks to human health. It is important to recognize, however, that not all food safety problems originate at the farm level. Their "source" may be anywhere along the "farm-to-fork" continuum (i.e., farm, processing, retail, consumer). This is consistent with the FDA's Hazard Analysis and Critical Control Point System approach to food safety, wherein the critical control points that will be most effective and efficient in providing safe food are identified and rectified.

Other important components that are critical in ensuring a safe food supply include an expanded, integrated animal health laboratory network, more robust monitoring and timely reporting by systems such as FoodNet and NARMS, and effective public-private collaboration to minimize the threat of zoonoses and foodborne disease.

- 12) Improve the safety of our food supply and reduce use of antimicrobials by more aggressively mitigating production diseases (disorders associated with IFAP management and breeding).

AVMA Response

The Pew's recommendation seems to contradict earlier recommendations—strategic use of antimicrobials by a veterinarian at the farm level would indeed prevent disease from occurring in the first place. If veterinarians lose antimicrobials as a tool to protect animal health and prevent suffering, then indeed, disease prevention may not be attained as easily.

In addition, disease can be found at both large and small farms and we assert that Pew's explicit focus on animal health disorders associated specifically with "IFAP" management is unfounded.

The risk that animal diseases present to food supply can be mitigated through *both* optimal breeding and management *and* antimicrobial therapies as deemed appropriate by an attending veterinarian.

Pew Recommendations on the Environment

- 1) Improve enforcement of existing federal, state, and local IFAP facility regulations to improve the siting of IFAP facilities and protect the health of those who live near and downstream from them.

AVMA Response

While we find value in continued improvement of existing regulations, the Pew has not provided any evidence that current regulations are insufficient or inadequately enforced. We again assert that a risk assessment must be conducted first before making a conclusion that those who live near or downstream from a large farm are at a greater public health risk than those who live in other areas.

Both the EPA and individual states have the authority to regulate air emissions. Particulate matter from confined animal feeding operations (CAFOs) is regulated under the Clean Air Act, and states have tested or are testing surface waters of their respective states. It is also important to note that current guidelines are particularly cautious, require close scrutiny, and allow for identification of CAFOs if they are indeed the source of fecal contamination.

- 2) Develop and implement a new system to deal with farm waste (that will replace the inflexible and broken system that exists today) to protect Americans from the adverse environmental and human health hazards of improperly handled IFAP waste.

AVMA Response

As stated above, the EPA has the authority to and does enforce environmental regulations. The Commission misplaces its emphasis on the quantity of manure produced by livestock. The AVMA asserts the more crucial metric is how well the manure is used to support crop production while avoiding negative environmental impacts.

- Manure is being successfully substituted for large quantities of commercial fertilizer, resulting in substantial energy savings throughout the United States.
- The use of manure is an efficient, expansive nutrient and organic matter recycling program that supports energy conservation and the reduction of greenhouse emissions.
- Manure produces a healthier environment for plant growth and improved water-holding capacity for soil, as opposed to inorganic fertilizers.
- Many states have laws that control the surface application of manure to protect surface waters and air.

- 3) Increase and improve monitoring and research of farm waste to hasten the development of new and innovative systems to deal with IFAP waste and to better our understanding of what is happening with IFAP today.

AVMA Response

Based on published epidemiologic studies of community health outcomes near CAFOs, the AVMA asserts that, while additional research can be valuable, establishment of a national data collection effort is not justified at this time because no causal relationship has been identified and relative risks have not been assessed.

Examination of the published reports cited by the Pew reveals that the authors of these studies emphasized the limitations of their studies and suggested further epidemiologic study was needed before a causal relationship between air emissions from CAFOs and adverse community health outcomes could be established.

It is important to note that monitoring is already in place at both the federal and state levels, and with implementation of new CAFO regulations, monitoring is expected to increase.

- 4) Increased funding for research into improving waste handling systems and standardize measurements to allow better comparisons between systems.

AVMA Response

The AVMA agrees with Pew's recommendation that additional funds be targeted toward such research. The AVMA advises that perhaps the Pew Charitable Trust would consider funding such research.

Pew Recommendations on Animal Welfare

- 1) The animal agriculture industry should implement federal performance-based standards to improve animal health and well-being.
- 2) Implement better animal husbandry practices to improve public health and animal well-being.
- 3) Phase out the most intensive and inhumane production practices within a decade to reduce IFAP risks to public health and improve animal well-being.
- 4) Improve animal welfare practices and conditions that pose a threat to public health and animal well-being.
- 5) Improve animal welfare research in support of cost-effective and reliable ways to raise food animals while providing humane animal care.

AVMA Response

The report of the Pew Commission on Industrial Farm Animal Production and its recommendations inappropriately assume that intensive methods of farmed animal production are patently inhumane. The basis of this assumption appears to be the following **misconceptions** regarding ensuring animal well-being:

- Increasing space guarantees improved welfare—In fact, simply increasing the space allotted to animals will always have both positive and negative effects.
- Stable, small-to-moderate group sizes are always associated with good welfare—In fact, what constitutes a welfare-friendly group size is highly dependent on species and can even be dependent on breed/type within a species.
- Associations of small, family-run farms with good welfare, and large, corporate-owned farms with bad welfare—In fact, depending on how animals, personnel, and resources are chosen and allocated, it is possible to have both good and bad welfare on both large and small farms. Farm size is not an independent variable in the welfare “equation.”

A complete assessment of welfare requires consideration of animals' physiological and psychological needs. In general, intensive animal production systems better satisfy the physiological and health needs of animals, whereas extensive animal production systems better satisfy the behavioral needs. Because the advantages and disadvantages of farmed animal production systems for animal welfare are qualitatively different, there is no simple or objective way to rank systems for “overall” welfare.

Pew Recommendations on Animal Welfare (continued)

Maintaining good welfare within production systems involves trade-offs. For example, production systems that allow animals to perform natural behaviors (e.g., providing substrates that permit swine to root) may present more challenges for disease and injury control. Conversely, using intensive confinement to improve disease and injury control often limits animals' ability to engage in normal behaviors.

The chart below provides a representative sample of contributors to the welfare of laying hens and illustrates how they may or may not be satisfied within particular housing systems.

Indicators	Conventional Cage	Furnished Cages			Non-cage (Barn)		Outdoor (Free-range)
		Small	Medium	Large	Single Level	Multiple Levels	
Mortality (%)				§			
Mortality from feather pecking and cannibalism							
Bone strength and fractures	†	*	*	*	‡	‡	‡
Exposure to disease vectors (e.g., wild birds)							
Internal parasites (e.g., coccidia, roundworms)							
External parasites							
Bumblefoot							
Feather loss							
Hen hysteria and piling/smothering							
Risk of predation							
Level of egg production and cleanliness							
Use of nest boxes							
Use of perches							
Foraging behavior							
Dustbathing behavior							
Air quality (e.g., dust, ammonia)							

§ = Recent data indicate lower mortality may be achievable in large furnished cages

† = Reduced bone strength, fractures when birds are caught

* = bones stronger from perch use but increased incidence of deformation of the keel

‡ = More fractures during lay despite stronger bones

How well welfare measures are met: **Good** **Medium** **Poor** **Insuff Data**

Although the Pew report and its recommendations appear to focus largely on housing type, housing type cannot be considered in isolation from other important factors that influence animal welfare.

People, including veterinarians and scientists, approach animal welfare from different viewpoints and attribute various degrees of importance to different measures of animal welfare.



American Veterinary Medical Association