Estimates of On-Farm Antimicrobial Usage in Broiler Chicken and Turkey Production in the United States, 2013 – 2017

Executive Summary

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Full report available at:
http://mindwalkconsultinggroup.com/poultry_on-farm_antimicrobial_use_2013-2017

Antimicrobial use in any setting is a key selective force behind the emergence of resistant bacteria. Therefore, optimizing strategies for more efficacious and targeted antimicrobial use ('stewardship') is an essential component of efforts to combat antimicrobial resistance.

To bolster stewardship programs in animal agriculture, industrywide processes are needed for the systematic collection of on-farm antimicrobial use data, which should include principal indications for use and methods of administration (dose, route, duration) of specific antimicrobial compounds. This report demonstrates the development of a systematic data collection approach and presents a longitudinal analysis of data on antimicrobial use in the U.S. broiler chicken and turkey industries.

The scope of the data collection was antimicrobial use in broiler chickens and turkeys from the hatchery until the day of slaughter, spanning the period of 2013-2017. This range intentionally straddles the changes to the Veterinary Feed Directive (VFD) Rule that went into effect on October 1, 2015 and full implementation of FDA Guidance for Industry (GFI) #213 on January 1, 2017. Industry participation in this data collection effort was completely voluntary, and all companies were guaranteed anonymity and data confidentiality.

For 2017, the broiler data in this report represent up to 93% of annual U.S. broiler production and up to 82% of annual U.S. turkey production based on the list published by WATT Poultry USA. The data submitted by participating companies for 2017 include more than 7,500,000,000 broiler chickens and 164,000,000 turkeys slaughtered. The representativeness of the collected data to U.S. broiler and turkey production increased from 2013 to 2017. No attempts were made to extrapolate the data collected in this project to the entire U.S. poultry industry; the results reported herein are specifically from the data submitted by the companies that participated.

Data presented in this report were audited by collaborators at the Center for Epidemiology and Animal Health at USDA:APHIS. Data are expressed as total kilograms of each antimicrobial used for each specific route of administration and as total grams of antimicrobial per 100,000 birds placed (for hatchery antimicrobial administration) and per 1,000,000 pounds liveweight produced (for feed and water-soluble administration). No comparison of these data is made to the sales data presented in the FDA Sales and Distribution Report from 2017.

For both the broiler chicken and turkey industries, large reductions were observed in antimicrobial use over the 5-year period. Key findings are listed below for each species. While a reduction in antimicrobial use may be an important indicator of improved stewardship, reducing the need for antimicrobials through improved disease prevention should be considered a more holistic indicator of overall flock health and optimal antimicrobial use. Towards that aim, the full implementation of FDA GFI #213 and the changes to the VFD rule resulted in a couple of key improvements in antimicrobial stewardship. First, antimicrobials used in broiler chicken and turkey production shifted to veterinary supervision, thereby making medical decision-making the responsibility of the veterinarian. Second, noticeable improvements in data management with respect to antimicrobial administration occurred over the five-year time span of this report.

Data from these two industries will continue to be collected, and we expect that the data in future reports will have greater granularity at the flock level, thereby enabling the application of more precise antimicrobial use metrics.

Broiler Chicken Summary

- Broiler companies participated voluntarily and represented a large percentage of the overall U.S. broiler chicken production
  - The antimicrobial use datasets represent 72% to 93% of broiler chicken produced annually based on the companies included in the published WATT Poultry USA list
  - The antimicrobial use data that were submitted for 2017 include information on approximately 7,900,000,000 chicks placed, 7,500,000,000 chickens slaughtered, and 48,000,000,000 pounds liveweight produced
- Several key diseases were targeted by antimicrobial administration
  - Necrotic enteritis, a clostridial disease of chickens, remains one of the most important diseases of chickens that requires antimicrobial therapy
  - Colibacillosis, a broad category of *E. coli* diseases that affect chickens, results in much of the antimicrobial use in feed and water
  - Gangrenous dermatitis, another clostridial disease, necessitates a considerable fraction of the overall antimicrobial use in chicken production
- Hatchery antimicrobial use decreased substantially between 2013 and 2017
  - The approximate percentage of broiler chicks placed that received hatchery antimicrobials decreased from 93% in 2013 to 17% in 2017
  - Hatchery gentamicin use in broiler chicks decreased approximately 74% between 2013 and 2017
- Medically important in-feed antimicrobial drug use decreased substantially
  - In-feed virginiamycin use decreased approximately 60% between 2013 and 2017
  - In-feed tetracycline use decreased approximately 95% between 2013 and 2017
  - Some approved uses of in-feed antimicrobial drugs were discontinued with implementation of GFI #213
    - There are no remaining approved uses of in-feed tylosin in broiler chickens, and thus in-feed tylosin use went to zero in 2017
- There was a shift to antimicrobial drugs that are not considered medically important
  - In-feed bacitracin remained a commonly-used antimicrobial drug for the prevention of necrotic enteritis
  - In-feed avilamycin use increased in 2017; it is a not medically important antimicrobial drug for the prevention of necrotic enteritis
- Medically important water-soluble antimicrobial use decreased substantially
  - Water-soluble penicillin use decreased approximately 21% between 2013 and 2017 and approximately 42% since the peak in 2015
  - Water-soluble tetracycline use decreased approximately 47% between 2013 and 2017
  - Water-soluble lincomycin use decreased approximately 28% between 2013 and 2017 and approximately 58% since the peak in 2015
  - Water-soluble sulfonamide use decreased approximately 72% between 2013 and 2017
  - Water-soluble tylosin use decreased approximately 46% between 2013 and 2017
- This report documents substantial reductions in the use of most medically important antimicrobials in broiler production, regardless of route of administration

Turkey Summary

- Turkey companies participated voluntarily and represented a large percentage of the overall U.S. turkey production
  - The antimicrobial use datasets represent 77% to 82% of turkey produced annually based on the companies included in the published WATT Poultry USA list.
  - The antimicrobial use data that were submitted for 2017 include information on approximately 187,000,000 poults placed, 164,000,000 turkeys slaughtered, and 5,000,000,000 pounds liveweight produced
- Several key diseases were targeted by antimicrobial administration
  - Gangrenous dermatitis, a clostridial disease of turkeys, remains one of the most important diseases of turkeys that requires antimicrobial therapy
  - Bacterial enteritis also comprised a considerable fraction of the overall antimicrobial use in turkey production
  - Colibacillosis, a broad category of *E. coli* diseases that affect turkeys, results in much of the antimicrobial use in feed and water
- Hatchery antimicrobial use decreased substantially between 2013 and 2017
  - The approximate percentage of turkey poults placed that received hatchery antimicrobials decreased from 96% in 2013 to 41% in 2017
  - Hatchery gentamicin use in turkey poults decreased approximately 42% between 2013 and 2017
  - Hatchery ceftiofur use in turkey poults went to zero between 2013 and 2017 for the birds represented in this dataset
- Medically important in-feed antimicrobial drug use decreased substantially
  - In-feed tetracycline use decreased approximately 67% between 2013 and 2017
  - Some approved uses of in-feed antimicrobial drugs were discontinued with implementation of GFI #213
    - There are no remaining approved uses of virginiamycin or in-feed tylosin in turkeys, and thus use of both of these antimicrobial drugs in-feed went to zero in 2017
- Medically important water-soluble antimicrobial use decreased substantially for most antimicrobials
  - Water-soluble penicillin use decreased approximately 42% between 2013 and 2017 and approximately 26% between 2016 and 2017
  - Water-soluble tetracycline use decreased approximately 28% between 2013 and 2017 and approximately 15% between 2016 and 2017
  - Water-soluble lincomycin use decreased approximately 46% between 2013 and 2017
  - Water-soluble neomycin use decreased approximately 49% between 2013 and 2017
  - Water-soluble erythromycin use decreased approximately 65% between 2013 and 2017
  - Water-soluble tylosin use increased approximately 275% between 2013 and 2017
  - Florfenicol use increased more than fivefold between 2013 and 2017
- There are very few not medically important antimicrobial options approved for use in turkey production
- This report documents substantial reductions in the use of most medically important antimicrobials in turkey production, regardless of route of administration