

FRESH FROM THE FARM: REGULATING CONCENTRATED ANIMAL FEEDING
OPERATIONS FOR ANTIBIOTIC ABUSE IN TENNESSEE

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I. INTRODUCTION

Antibiotics are an essential tool in medical practice. But imagine living in a world where antibiotic medicines stopped working. According to Dr. James Johnson, professor of infectious diseases medicine at the University of Minnesota, “[i]t’s already happening.”¹ Antibiotic-resistant bacteria or “superbugs” are on the rise in the U.S., and a major contributor to this problem is rooted in modern agricultural practices and how food animals are raised.

Today, most of America’s commercial livestock are raised on large factory farms, called animal feeding operations (“AFOs”) or concentrated animal feeding operations (“CAFOs”), in under-ventilated, overcrowded, and sordid conditions.² The CAFO model of livestock production keeps the price of meat, egg, and dairy products relatively cheap³ and price-conscious consumers happy, but the scale of CAFO operations creates numerous societal costs including threats to food safety and human health, in addition to environmental pollution that individual states and the EPA regulate.

The Environmental Protection Agency (“EPA”) defines an AFO as:

[a] lot or facility . . . where . . . [terrestrial] [a]nimals . . . have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and [where] [c]rops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.⁴

1. Susan Brink, *A Superbug That Resisted 26 Antibiotics*, NAT’L PUB. RADIO (Jan. 17, 2017), <http://www.npr.org/sections/goatsandsoda/2017/01/17/510227493/a-superbug-that-resisted-26-antibiotics>. Dr.

Johnson commented in a news report covering the death of a 70-year old Nevada woman who died from an incurable bacterial infection resistant to all twenty-six antibiotics available in the U.S.. *See id.*

2. Am. Soc’y for the Prevention of Cruelty to Animals, *Farm Animals Need Our Help*, FARM ANIMAL WELFARE, <http://www.asPCA.org/animal-cruelty/farm-animal-welfare> (last modified Feb. 13, 2017) (“Over 99% of farm animals in the U.S. are raised in factory farms, which focus on profit and efficiency at the expense of animal welfare.”).

3. Nathalie Prescott, Note, *Antibiotics: It’s What’s for Dinner*, 28 GEO. ENVTL. L. REV. 307, 308 (2016) (citing JAMES M. McDONALD & WILLIAM D. MCBRIDE, *THE TRANSFORMATION OF U.S. AGRICULTURE: SCALE, EFFICIENCY, AND RISKS* 20 (2009)) (“AFOs . . . provide a source of low-cost meat due to subsidies, efficiencies [in production], and economies of scale.”).

4. 40 C.F.R. § 122.23(b)(1) (2012). *See also* Tenn. Dep’t of Agric., *Animal Feeding Operation FAQ*, <https://www.tn.gov/agriculture/article/ag-farms-cafo-faq>. (last visited Nov. 13, 2017).

The EPA and state environmental agencies further classify AFOs into one of three sizes based on the number of livestock housed at each facility: large,⁵ medium,⁶ and small.⁷ A CAFO is an AFO that meets the size requirements of a medium AFO or a large AFO.⁸ The EPA and state environmental agencies regulate CAFOs as point sources of water pollution under the Clean Water Act.⁹

An individual need not live in a rural community to experience the harmful health effects of CAFOs. Studies show that the development of antibiotic-resistant bacteria in humans is linked to egregious nontherapeutic use¹⁰ of antimicrobial medicines in livestock operations.¹¹ To be clear, “antibiotics” are drugs that are designed to attack and kill bacteria whereas “antimicrobials” (which include antibiotics) encompass a larger class of drugs that affect not just bacteria, but also other disease-causing microorganisms such as fungi, protozoa, viruses, and parasites.¹²

5. 40 C.F.R. § 122.23(b)(4) (2012) (“An AFO is defined as a Large CAFO if it stables or confines as many as or more than the numbers of animals specified in any of the following categories: (i) 700 mature dairy cows, whether milked or dry; (ii) 1,000 veal calves; (iii) 1,000 cattle other than mature dairy cows or veal calves . . . ; (iv) 2,500 swine each weighing 55 pounds or more; (v) 10,000 swine each weighing less than 55 pounds; . . . (viii) 55,000 turkeys; (ix) 30,000 laying hens or broilers, if the AFO uses a liquid manure handling system; [or] (x) 125,000 chickens (other than laying hens), if the AFO uses [anything] other than a liquid manure handling system . . .”).

6. 40 C.F.R. § 122.23(b)(6) (2012) (“The term Medium CAFO includes any AFO with the type and number of animals that fall within any of the ranges listed [below] and which has been defined or designated as a CAFO. . . . The type and number of animals that it stables or confines falls within any of the following ranges: (A) 200 to 699 mature dairy cows . . . ; (C) 300 to 999 cattle other than mature dairy cows or veal calves . . . ; (D) 750 to 2,499 swine each weighing 55 pounds or more; (E) 3,000 to 9,999 swine each weighing less than 55 pounds; . . . ; (H) 16,500 to 54,999 turkeys; (I) 9,000 to 29,999 laying hens or broilers, if the AFO uses a liquid manure handling system; [or] (J) 37,500 to 124,999 chickens (other than laying hens), if the AFO uses other than a liquid manure handling system . . .”).

7. A small CAFO is defined as “[a]n AFO that is designated as a CAFO and is not a Medium CAFO.” 40 C.F.R. § 122.23(b)(9) (2012).

8. *See* 40 C.F.R. § 122.23(b)(2) (2012).

9. *See also* TETRA TECH, INC., U.S. ENVTL. PROT. AGENCY, STATE COMPENDIUM: PROGRAMS AND REGULATORY ACTIVITIES RELATED TO ANIMAL FEEDING OPERATIONS 3–4 (2002) (providing a national overview of state AFO regulatory programs).

10. A “nontherapeutic use[] mean[s] . . . an entire heard or flock of animals receives a small dose” of medication for an extended period of time. FOOD & WATER WATCH, ANTIBIOTIC RESISTANCE 101: HOW ANTIBIOTIC MISUSE ON FACTORY FARMS CAN MAKE YOU SICK 5 (2015).

11. *See* discussion *infra* Section II.B.3.

12. *See Antimicrobial Use and Antimicrobial Resistance FAQ*, AM. VETERINARY MED. ASS’N (last visited Mar. 15, 2017), <https://www.avma.org/KB/Resources/FAQs/Pages/Antimicrobial-Use-and-Antimicrobial-Resistance-FAQs.aspx>. Additionally, antibiotics are subdivided into two categories, broad and narrow spectrum, based on the

Antibiotic resistance is a serious public health threat. However, states like Tennessee have not adequately addressed the livestock industry's contribution to this epidemic. California, on the other hand, recently passed a new law that precludes wasteful uses of medically important antimicrobials in livestock production.¹³

This paper urges Tennessee lawmakers to address the issue of antibiotic resistance by adopting a modified version of California's recent livestock antimicrobial law. Part II examines the livestock industry's (particularly CAFOs') contribution to antibiotic resistance, showing why legislative reform is needed. Part III looks at California's recent law targeting injudicious use of medically important antimicrobials by livestock producers. Part IV suggests improvements for future agri-antimicrobial legislation and provides a model Tennessee lawmakers a model livestock antimicrobial law. Part V concludes.

II. CAFO'S CONTRIBUTION TO THE SUPERBUG

CAFOs present a significant threat to the environment and human health—external costs that the price of meat or dairy products do not include. To start, CAFOs are major point sources of pollution. In America, CAFOs produce 133 million tons of animal waste each year,¹⁴ and most of this waste is stored in open pit lagoons or being sprayed on crops as fertilizer.¹⁵ When the application of manure exceeds the land's ability to absorb nutrients, the residual nutrients from manure (mostly nitrogen and phosphorous) leech off fields into groundwater and rivers.¹⁶

number and types of bacteria they affect. Broad spectrum antibiotics are effective against many types of bacteria, while narrow spectrum antibiotics are effective against a more limited range of bacteria. *Id.*

13. S.B. 27, 2015–2016 Reg. Sess. (Ca. 2015).

14. JoAnn Burkholder et al., *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality*, 115 ENV. 308, 308 (2007).

15. PEW COMM'N ON INDUS. FARM ANIMAL PROD., *supra* note 16, at 1, *available at* http://www.pewtrusts.org/~media/assets/2008/pcfifap_exec-summary.pdf.

16. FOOD & WATER WATCH, *FACTORY FARM NATION 2015 EDITION* 21 (2015).

CAFOs are also cause for concern with respect to food safety and human health. Concentrated CAFO waste, applied to fields, harbors pathogens such as drug-resistant *E. coli* and *Salmonella*.¹⁷ In some instances these pathogens contaminate crops and meat destined for human consumption, causing human illness outbreaks.¹⁸ The CDC estimates that contaminated meat and poultry-related infections make up to 3 million people sick each year, killing at least 1,000—figures that are probably underreported.¹⁹ Transmission of drug-resistant microbes from animals to humans can also occur through direct human-animal contact. Farmers, veterinarians, and slaughterhouse workers are at the highest risk of exposure to drug-resistant bacteria via direct contact with colonized or infected CAFO animals.²⁰ Professor Sturt Levy of Tufts University School of Medicine was the first to report on the direct spread of bacteria from animals to people; he found the same tetracycline-resistant *E. coli* strains in the gut flora of chicken-farm workers and in the gut of chickens receiving tetracycline-laced feed.²¹ Later, two independent studies carried out in Iowa and Pennsylvania examined the relationship between animal farms and methicillin-resistant *Staphylococcus aureus*²² (“MRSA”) and found an increased risk of MRSA

17. *What is the difference between Salmonella and E. coli?*, U.S. DEP’T OF HEALTH AND HUMAN SERV., <https://www.hhs.gov/answers/public-health-and-safety/what-is-the-difference-between-salmonella-and-e-coli/index.html> (last visited Mar. 16, 2017). *E. coli* and *Salmonella* become part of manure when they are shed or excreted from the animal’s digestive system in the feces along with undigested food. *Salmonella* is the most common cause of foodborne illness in humans; “symptoms usually last 4–7 days” and “include fever, diarrhea, abdominal cramps[,] and headache.” *E. coli* causes bloody diarrhea, and can sometimes cause kidney failure and even death. *Id.*

18. Tenn. Dep’t of Agric., *supra* note 6 (describing land impacts of CAFO farming). See generally PAUL EBNER, PURDUE EXTENSION, CAFOs AND PUBLIC HEALTH: PATHOGENS AND MANURE 2 (2007), <https://www.extension.purdue.edu/extmedia/id/cafo/id-356.pdf>. “[An instance of disease] outbreak occurred in Walkerton, Ontario,” Canada after “heavy rains washed manure into well water thereby causing high concentrations of *E. coli* and *Campylobacter* to enter public drinking water. Over 2000 people were affected by the outbreak which included seven fatalities.” *Id.*

19. Paul D. Frenzen et al., CONSUMER ACCEPTANCE OF IRRADIATED MEAT AND POULTRY PRODUCTS, 757 Agriculture Information Bulletin 8 (2000), https://www.ers.usda.gov/webdocs/publications/aib757/32077_aib757_002.pdf.

20. Bonnie M. Marshall & Stuart B. Levy, *Food Animals and Antimicrobials: Impacts on Human Health*, 24 CLINICAL MICROBIOLOGY REV. 718, 723 (2011), <http://cmr.asm.org/content/24/4/718.full#aff-1>.

21. *Id.* at 723, 725.

22. *Staphylococcus aureus* is a gram-positive bacterium that colonizes a variety of animal species including dairy-producing animals (cattle and goats), chickens, and farmed rabbits. Tara C. Smith, *Livestock-Associated*

colonization or infection in humans living close to farms or in areas where manure was spread on fields.²³

Astonishingly, researchers estimate “[a]bout one-third of the antibiotics used in the U.S. each year [are] routinely added to animal feed to increase growth.”²⁴ The livestock industry uses many classes of antimicrobials that are relevant for human health, including tetracyclines, macrolides, penicillins, and sulfonamides, among others.²⁵ These medicines are used to prevent the spread of communicable diseases and bacterial infections in densely packed, sordid AFOs and to encourage animal growth.²⁶ However, using antibiotics for non-therapeutic purposes such as animal growth enhancement promotes the development of deadly multidrug-resistant bacteria. Furthermore, mixing medicine into animal feed makes dosing imprecise and ineffective for disease treatment.²⁷

Underdosing antibiotics is bad practice because it creates an opportunity for bacteria to survive and become resistant.²⁸ Biologically speaking, bacteria become drug-resistant in three ways: (1) by spontaneous genetic mutation; (2) by acquiring DNA from a neighboring drug-

Staphylococcus aureus: The United States Experience, 11(2) PLOS PATHOGENS 1, 3 (2015), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4412291/>.

23. *See id.* at 3.

24. JoAnn Burkholder et al., *supra* note 31, at 309.

25. Smith, *supra* note 50, at 1.

26. *See* CTR. FOR DISEASE DYNAMICS, ECON. & POL’Y, THE STATE OF THE WORLD’S ANTIBIOTICS 2015 11 (2015). “In the United States, about three-quarters of feedlots administered at least one antibiotic for growth promotion or disease prevention in 2011.” *Id.* at 39.

27. *See* D.C. Love et al., *Feather Meal: A Previously Unrecognized Route for Reentry into the Food Supply of Multiple Pharmaceuticals and Personal Care Products*, 46 ENVTL. SCI. & TECH. 3795, 3796 (2012).

28. PEW CHARITABLE TRUSTS, HOW ANTIBIOTIC RESISTANCE HAPPENS 1 (2011), http://www.pewtrusts.org/~media/legacy/uploadedfiles/phg/content_level_pages/issue_briefs/antibioticresistancepdf.pdf (explaining how bacteria become resistant to drugs).

resistant bacterium in a process called “horizontal gene transfer;”²⁹ or by absorbing “free” DNA from the environment near cells that have burst open.³⁰

The U.S. Food and Drug Administration considers the most “significant risk to the public health associated with antimicrobial resistance to be human exposure to food containing antimicrobial-resistant bacteria resulting from the exposure of food-producing animals to antimicrobials”³¹ The CDC estimates that around 2 million Americans experience antibiotic resistant infections each year, leading to 23,000 deaths.³² “Approximately 22% of those infections originate from foodborne pathogens.”³³ Antibiotic resistance makes treatment of bacterial infections more difficult, increases how long people are sick, limits therapeutic options (in both humans and animals), and increases mortality rate.³⁴

III. CALIFORNIA’S NEW LAW

California became the first state to address the livestock industry’s contribution to antibiotic resistance via legislative reform when it passed Senate Bill 27 entitled “Livestock: Use of Antimicrobial Drugs (“S.B. 27”) in 2015.³⁵ California enacted S.B. 27 in response to public concern over prolonged use of antimicrobial drugs in livestock.³⁶ S.B. 27 took effect on January

29. See FOOD & WATER WATCH, *supra* note 13, at 6. See generally *General Background: About Antibiotic Resistance*, ALLIANCE FOR THE PRUDENT USE OF ANTIBIOTICS (2014), http://emerald.tufts.edu/med/apua/about_issue/about_antibioticres.shtml#.

30. See *General Background: About Antibiotic Resistance*, *supra* note 57.

31. New Animal Drugs; Cephalosporin Drugs; Extralabel Animal Drug Use; Order of Prohibition, 77 Fed. Reg. 735, 738 (proposed Jan. 6, 2012) (to be codified at 7 C.F.R. pt. 530), available at <http://www.gpo.gov/fdsys/pkg/FR-2012-01-06/pdf/2012-35.pdf>.

32. *Antibiotic/Antimicrobial Resistance*, CTR. FOR DISEASE CONTROL AND PREVENTION, <https://www.cdc.gov/drugresistance/> (last visited Mar. 16, 2017).

33. FOOD & WATER WATCH, *supra* note 13, at 2.

34. See U.S. FOOD & DRUG ADMIN., GUIDANCE FOR INDUSTRY #152 EVALUATING THE SAFETY OF ANTIMICROBIAL NEW ANIMAL DRUGS WITH REGARD TO THEIR MICROBIOLOGICAL EFFECTS ON BACTERIA OF HUMAN HEALTH CONCERN 7 (Oct. 23, 2003), <http://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/UCM052519.pdf>.

35. See CAL. FOOD & AGRIC. CODE §14402 (2015).

36. In 2016, the author of S.B. 27, California Senator Jerry Hill, commented: “We have a crisis on our hands The growth of antibiotic resistance threatens our very way of life. Anything we can do to slow down its development, we should do. We [the citizens of California] have an imperative to act.” *Senator Hill to Introduce*

1, 2018, and is administered by the California Department of Food and Agriculture (“CDFA”).³⁷ S.B. 27 eliminates over-the-counter availability of “medically important antimicrobial drugs”³⁸ by requiring livestock³⁹ owners to obtain a veterinarian’s prescription or feed directive before use.⁴⁰ Second, S.B. 27 outlaws administration of medically important antimicrobials to livestock for the sole purpose of increasing weight-gain or improving feed efficiency.⁴¹ The heart of S.B. 27 is section 14402, which provides:

[A] medically important antimicrobial drug may be used when, in the professional judgment of a licensed veterinarian, the medically important antimicrobial drug is

...

- (1) Necessary to *treat a disease or infection*.
- (2) Necessary to *control the spread of a disease or infection*.
- (3) Necessary in relation to *surgery or a medical procedure*.
- (4) . . . [or] needed for *prophylaxis* to address an elevated risk of contraction of a particular disease or infection.⁴²

S.B. 27 then provides a plan for implementing and monitoring livestock owners’ compliance with these standards. Under section 14404, the CDFA must work with the Veterinary Medical Board, the State Department of Public Health, universities, and cooperative extensions to develop antimicrobial stewardship guidelines and best management practices for veterinarians and livestock owners on the “proper use” of medically important antimicrobial drugs for disease treatment, control, and prevention.⁴³ Notably, these guidelines must include scientifically validated

Bill Requiring Reporting of Superbug Infections, SEN. JERRY HILL (Oct. 10, 2016), <http://sd13.senate.ca.gov/news/2016-10-10-senator-hill-introduce-bill-requiring-reporting-superbug-infections>. See generally CAL. FOOD & AGRIC. CODE §14402 (2015).

37. CAL. FOOD & AGRIC. CODE §§ 14400–14408 (2015).

40. “Medically important antimicrobial drug” means any drug listed in Appendix A of the FDA’s Guidance For Industry #152. CAL. FOOD & AGRIC. CODE § 14400(a) (2015). Appendix A is an extensive list of antimicrobial drugs that ranks antimicrobial drugs into three tiers, “critically important,” “highly important,” or “important,” in regard to their human medical importance. CITE

39. “Livestock” means all animals and poultry, including aquatic and amphibian species, that are raised, kept, or used for profit. CAL. FOOD & AGRIC. CODE § 14400(b) (2015).

40. See CAL. FOOD & AGRIC. CODE § 14401 (2015).

41. CAL. FOOD & AGRIC. CODE § 14402(c) (2015).

42. CAL. FOOD & AGRIC. CODE § 14402(a) (2015) (emphasis added).

43. See CAL. FOOD & AGRIC. CODE § 14404(a) (2015).

practical “alternatives” to antimicrobial use such as introducing effective vaccines and developing good hygiene practices.⁴⁴ Any person, other than a licensed veterinarian,⁴⁵ caught violating any provision of S.B. 27 faces a civil penalty of \$250 for each day a violation occurs and must complete an educational program on the judicious use of medically important antimicrobial drugs within 90 days of the violation; the penalty for subsequent violations increases to \$500 for each day a violation occurs.⁴⁶

S.B. 27 is a step in the right direction toward phasing out the use of antibiotics in livestock production; however, there remain a few key weaknesses in the law. The biggest concern relates to livestock owners’ use of antimicrobial drugs when disease symptoms *are not* clinically present in animal herds. Under Section 14402(b), “[a] medically important antimicrobial drug may . . . be used when . . . it is needed for *prophylaxis* to address an *elevated risk* of contraction of a particular disease or infection.”⁴⁷ Legislative reports show that the legislature intended others to interpret “prophylaxis” according to its plain ordinary meaning as “steps taken to *prevent* a particular disease or condition”⁴⁸ Additionally, legal prophylactic use of medically important antimicrobials hinges on a veterinarian’s definition of an “elevated risk.”⁴⁹ It is unclear whether veterinarians must find the presence or absence of an elevated risk based on a subjective or

44. CAL. FOOD & AGRIC. CODE § 14404(a) (2015).

45. Instead of facing civil penalties, veterinarians who fail to comply with the provisions of S.B. 27 may face disciplinary sanctions pursuant to the Veterinary Medicine Practice Act. *See* CAL. FOOD & AGRIC. CODE § 14408(c) (2015).

46. CAL. FOOD & AGRIC. CODE § 14408(a)–(b) (2015). The penalties section is significantly watered-down from what drafters of the bill initially proposed. An earlier draft of S.B. 27 called for violations to be a misdemeanor “punishable by up to six-months [imprisonment] in county jail and/or a fine not exceeding \$1,000.” *Livestock: use of antibiotics: Hearing on S.B. 27 Before the S. Comm. on Agric.*, 2015–16 Reg. Sess. 5 (Cal. 2015).

47. *See* CAL. FOOD & AGRIC. CODE § 14402(b) (2015) (emphasis added).

48. Senate Third Reading 5 Sept. 10, 2015, http://www.leginfo.ca.gov/pub/15-16/bill/sen/sb_0001-0050/sb_27_cfa_20150911_200348_asm_floor.html (providing “this bill explicitly authorizes the routine use of antibiotics on animals that are not sick through the exception for prophylactic use to *prevent disease transmission or infection.*”) (emphasis added). *See also* Harvard University, *Medical Dictionary of Health Terms: J-P*, HARV. HEALTH PUBL’NS (Dec. 2011), <http://www.health.harvard.edu/medical-dictionary-of-health-terms/j-through-p#P-terms> (emphasis added).

49. The term “elevated risk” lacks its own definition. *See* CAL. FOOD & AGRIC. CODE § 14400 (2015).

objective standard. Factory farm animals are constantly exposed to sordid, cramped conditions that create an elevated risk for contracting communicable diseases.⁵⁰ Thus, prophylaxis in the context of CAFOs reasonably suggests that livestock owners will always routinely administer antimicrobial medicines to their animals. Stated differently, section 14402(b) does not completely close the prophylactic loophole, potentially allowing livestock owners to secretly feed their animals antibiotics for the purpose of promoting growth and increasing feed efficiency under the veil of “medical necessity”.⁵¹

Another issue with S.B. 27 is its feeble data reporting requirements on the amount of antibiotics given to livestock at each CAFO facility. Specifically, S.B. 27 requires that the CDFA to work only with “willing participants” to gather samples, rather than mandating surveillance or on-farm reporting of antibiotic use for all CAFOs.⁵² Requiring this information is necessary to ensure effective enforcement of civil penalties against violators. Additionally, the data reporting requirements do not obligate livestock owners to report the total quantity of antibiotics used on each farm, which also contributes to the dearth of available data in monitoring and enforcement efforts.⁵³

IV. PROPOSED TENNESSEE LEGISLATION

Antibiotic resistance rates in Tennessee are among the highest in the U.S..⁵⁴ The Tennessee Department of Food and Agriculture (“TDFA”) needs to work with Tennessee legislators to

50. Roberto A. Saenz et al., *Confined Animal Feeding Operations as Amplifiers of Influenza*, 6 VECTOR BORNE ZOONOTIC DISEASES 338 (2006) (“The crowding of swine and poultry in CAFOs increases the transmission of influenza viruses.”).

51. Prescott, *supra* note 12, at 327.

52. See CAL. FOOD & AGRIC. CODE § 14405(c) (2015).

53. See CAL. FOOD & AGRIC. CODE § 14405 (2015); *Livestock: use of antimicrobials drugs: Third Reading of S.B. 27 Before the S. Agric. Comm. & the S. Appropriations Comm.*, 2015–16 Reg. Sess. 10 (Cal. 2015) (“The Consumers Union [is] . . . concern[ed] that ‘the data reporting part of the bill does not require reporting of total quantity of antibiotics used.’”).

54. *Appropriate Antibiotic Use*, TENN. DEP’T OF HEALTH, <https://www.tn.gov/health/topic/appropriate-antibiotic-use> (last updated Mar. 10, 2017). “In 2000, Tennessee’s utilization rates for” the antibiotics “penicillin,

develop new and effective laws that reduce the nontherapeutic use of antibiotics in the livestock industry. Government leaders in Tennessee’s legislative and administrative branches already recognize the threat of antibiotic resistance.⁵⁵ In 2008, the state legislature enacted TENN. CODE ANN. § 68-11-267 where the Tennessee Department of Health (“TDH”) established a committee, known as the Infections Taskforce, that met twice a year to “[create] strategies and recommendations for the prevention and control of antibiotic resistant infections.”⁵⁶ However, this task force mainly reported on the presence of invasive MRSA in hospitals—not on farms—and the statute’s mandate for biannual reports expired in 2011.⁵⁷

Additionally in 2008, the TDH received funding from the CDC to develop a campaign called “Keep Antimicrobials Working”⁵⁸ to address antimicrobial resistance in agricultural and veterinary settings in Tennessee.⁵⁹ In the spirit of this campaign, the TDH established the Tennessee Team on Antimicrobial Resistance (“TTAR”), a coalition comprised of members from the TDH, TFDA, the University of Tennessee College of Veterinary Medicine, Tennessee Veterinary Medical Association, UT Extension Service, Tennessee Agricultural Experiment

cephalosporins, and trimethoyprim-sulfamethoxazole were over 20% higher than the national average.” *Tenn. Appropriate Antibiotic Use Campaign*, TENNESSEE EPI-NEWS (Tenn. Dep’t of Health), Oct. 2002, at 1 (available at https://tn.gov/assets/entities/health/attachments/Newsletter_Oct_2002.pdf).

55. In 2016, Governor Bill Haslam declared November 14–20, 2016, as “Get Smart for Antibiotics Week in Tennessee” as a part of the CDC’s Campaign to Promote Appropriate Antibiotic Use. *Appropriate Antibiotic Use*, TENN. DEP’T OF HEALTH, <https://tn.gov/health/topic/appropriate-antibiotic-use> (last visited Sept. 30, 2017).

56. TENN. CODE ANN. § 68-11-267(a) (2016).

57. See TENN. CODE ANN. § 68-11-267(b) (2016). “Tennessee is a leader in collecting and reporting on antibiotic resistant infections by having made invasive . . . [MRSA] cases reportable to the Department of Health’s Communicable and Environmental Disease Services section in June 2004.” TENN. DEP’T OF HEALTH, METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) INFECTIONS: PROGRESS REPORT AND RECOMMENDATIONS OF THE TENNESSEE DEPARTMENT OF HEALTH AND THE INFECTIONS TASKFORCE 1 (2011).

58. TENN. DEP’T OF HEALTH, KEEP ANTIMICROBIALS WORKING!, <https://www.tn.gov/health/article/keep-antimicrobials-working> (last visited Mar. 14, 2017).

59. Tennessee Team on Antimicrobial Resistance was funded by the CDC’s “Get Smart on the Farm initiative.” ASS’N OF STATE AND TERRITORIAL HEALTH OFFICIALS, MEETING SUMMARY: MULTISECTOR COLLABORATION—“ONE HEALTH” APPROACH TO ADDRESSING ANTIBIOTIC RESISTANCE (2015), <http://www.astho.org/Programs/Infectious-Disease/Antimicrobial-Resistance/Multisector-Collaboration---One-Health-Approach-to-Addressing-Antibiotic-Resistance/>.

Station, and Tennessee Cattlemen’s Association.⁶⁰ TTAR’s initial objective was to conduct a survey among beef cattle producers—purveyors of the leading agricultural commodity in Tennessee—“[to] address knowledge, attitudes, practices, and needs related to biosecurity and the use of antimicrobials.”⁶¹ Based on the survey results and other current resources, TTAR developed and distributed educational brochures “to provide the most current information possible for beef cattle producers and veterinarians about antimicrobial resistance and guidelines for appropriate [antimicrobial] use.”⁶² The establishment of TTAR and the Infections Taskforce shows that Tennessee policy makers are aware of the link between antibiotic resistance and nontherapeutic use of antimicrobials in livestock animals, but the General Assembly should take further legislative action to establish uniform animal husbandry practices that do not rely on antibiotics.

Furthermore, the materialization of TTAR and growing consumer demand for animal-products raised without antibiotics means now is the perfect time for Tennessee to adopt new legislation to limit antimicrobial use in the livestock industry. Tennessee has the authority to regulate livestock antibiotics under the Tennessee Food, Drug and Cosmetic Act.⁶³ This author recommends that Tennessee use S.B. 27 as a template to create its own livestock antibiotics law and retain the overall organization of S.B. 27 with its nine sections: section one defines key terms;⁶⁴ section two restricts access to medically important antimicrobial drugs via a veterinary prescription or VFD;⁶⁵ section three explains acceptable uses of medically important antimicrobial

60. TENN. DEP’T OF HEALTH, ANTIBIOTIC USE IN ANIMALS, <https://www.tn.gov/health/article/antibiotic-use-in-animals> (last visited Mar. 25, 2017).

61. TENN. DEP’T OF HEALTH, *supra* note 176.

62. TENN. DEP’T OF HEALTH, *supra* note 176.

63. *See* TENN. CODE ANN. § 53-1-207 (1976) (providing, “[t]he commissioner is authorized to make regulations promulgated under this chapter conform, insofar as practicable, with those promulgated under the federal [Food, Drug, and Cosmetic] act.”).

64. *See generally* CAL. FOOD & AGRIC. CODE § 14400 (2015).

65. *See generally* CAL. FOOD & AGRIC. CODE § 14401 (2015).

drugs;⁶⁶ section four indicates retailers' ability to sell medically important antimicrobial drugs in feed or water;⁶⁷ section five lays the foundation for the departments' establishing antimicrobial stewardship guidelines and best management practices on proper use of medically important antimicrobial drugs;⁶⁸ section six establishes data reporting standards on use of medically important antimicrobial drugs in livestock;⁶⁹ section seven relays the department's authority to collect VFDs;⁷⁰ section eight asserts confidentiality of data reported under section six;⁷¹ and section nine establishes civil penalties for violators.⁷²

S.B. 27 needs a few major changes however. First, Tennessee should improve S.B. 27 by defining "nontherapeutic use" as "the use of a medically important antimicrobial drug for the purposes of: (1) promoting weight gain or growth, (2) improving feed efficiency, or (3) routine disease prevention."⁷³ Expressly defining nontherapeutic use to include "routine disease prevention" serves an important purpose: eliminating the possibility of prophylactic use. Second, Tennessee should completely eliminate subsection 14402(b) to eliminate the possibility of

66. *See generally* CAL. FOOD & AGRIC. CODE § 14402 (2015).

67. *See generally* CAL. FOOD & AGRIC. CODE § 14403 (2015).

68. *See generally* CAL. FOOD & AGRIC. CODE § 14404 (2015).

69. *See generally* CAL. FOOD & AGRIC. CODE § 14405 (2015).

70. *See generally* CAL. FOOD & AGRIC. CODE § 14406 (2015).

71. *See generally* CAL. FOOD & AGRIC. CODE § 14407 (2015).

72. *See generally* CAL. FOOD & AGRIC. CODE § 14408 (2015).

73. The new statute would read as follows:

TENN. CODE ANN. § 43-41-101. Definitions.

For purposes of this chapter, the following definitions apply:

(a) 'Medically important antimicrobial drug' means an antimicrobial drug listed in Appendix A of the federal FDA's Guidance for Industry #152, including critically important, highly important, and important antimicrobial drugs, as that appendix may be amended.

(b) 'Livestock' means all animals and poultry, including aquatic and amphibian species, that are raised, kept, or used for profit. Livestock does not include bees or those species that are usually kept as pets, such as dogs, cats, and pet birds.

(c) 'Veterinary feed directive' has the same definition as in Section 558.3 of Title 21 of the CFR

(d) 'Nontherapeutic Use' means the use of a medically important antimicrobial drug, as defined in this section, for the following purposes: (1) promoting weight gain or growth, (2) improving feed efficiency, or (3) routine disease prevention.

(emphasis added).

prophylactic use as a pretext for promoting growth.⁷⁴ Third, the General Assembly should replace the phrase “for purposes of promoting weight gain or improving feed efficiency” from subsection 14402(c) with the phrase “for any nontherapeutic purpose.”⁷⁵ This change will eliminate all prophylactic use which will consequently force CAFO owners to cleanup environmental conditions of factory farms by providing animals with more space and cleaner paddocks or cages, among other remedial measures.

Fourth, Tennessee lawmakers should rewrite section 14405’s data reporting requirements to force veterinarians and livestock producers to provide statistically relevant data. TENN. CODE ANN. § 68-5-104(a) authorizes the TDH to mandate the reporting of certain communicable diseases/conditions.⁷⁶ This author recommends replacing the phrase “on medically important antimicrobial drug sales and usage, as well as antimicrobial resistant bacteria and livestock management practice data” in subsection 14405(b)(1) with the phrase “on the administration of each medically important antimicrobial drug, including the number and species of livestock, the type of drug and disease, and the duration of use.”⁷⁷ Finally, subsection 14405(c)’s mandate to

74. See TENN. DEP’T OF HEALTH, *supra* note 176 and accompanying text.

75. The new statute would read as follows:

TENN. CODE ANN. § 43-41-103. Use of medically important antimicrobial drug; conditions

(a) A medically important antimicrobial drug may be used when, in the professional judgment of a licensed veterinarian, the medically important antimicrobial drug is any of the following:

(1) Necessary to treat a disease or infection.

(2) Necessary to control the spread of a disease or infection.

(3) Necessary in relation to surgery or a medical procedure.

(b) A person shall not administer a medically important antimicrobial drug to livestock *for any nontherapeutic purpose*.

(c) Unless the administration is consistent with subdivision (a), a person shall not administer a medically important antimicrobial drug in a regular pattern.

(emphasis added).

76. “The commissioner [of TDH] is authorized and directed to promulgate and publish such rules and regulations as may be necessary to prevent the spread of contagious or communicable diseases in order to protect the public health and welfare.” TENN. CODE ANN. § 68-5-104(a)(2) (2013).

77. Incorporating the proposed changes would result in a provision that states:

(“TENN. CODE ANN. § 43-41-106. Data and sample gathering; report to Legislature

(a) It is the intent of the Legislature that the department coordinate with the United States Department of Agriculture, the federal Food and Drug Administration, and the federal Centers for Disease Control and

work with “willing participants” to collect data on farms’ usage of medically important antimicrobials needs to be replaced with mandates on livestock producers to report lists of the antimicrobial agents used and the approximate volume administered to livestock.⁷⁸ By making these changes, Tennessee can best limit the use of antimicrobial drugs in the state’s livestock industry and consequently mitigate the threat of livestock-based antibiotic resistance in all Tennessee communities.

V. CONCLUSION

The correlation between the livestock industry’s prodigious consumption of medically important antimicrobial drugs and the spread of antibiotic-resistant infections is cause for alarm. Part of the problem lies in America’s love affair with cheap animal products and the

Prevention to implement the expanded antimicrobial resistance surveillance efforts included in the National Action Plan for Combating Antibiotic-Resistant Bacteria, and that the information gathered through this effort will help lead to a better understanding of the links between antimicrobial use patterns in livestock and the development of antimicrobial resistant bacterial infections.

(b)(1) *Tennessee Department of Agriculture shall gather information on the administration of each medically important antimicrobial drug, including the number and species of livestock, the type of drug and disease, and the duration of use.* Monitoring efforts shall not be duplicative of the National Animal Health Monitoring System and the National Antimicrobial Resistance Monitoring System, and, to the extent feasible, the department shall coordinate with the United States Department of Agriculture, the federal Centers for Disease Control and Prevention, and the federal Food and Drug Administration in the development of these efforts.

(2) In coordinating with the National Animal Health Monitoring System and the National Antimicrobial Resistant Monitoring System, the department shall gather representative samples from all of the following:

(A) *Tennessee’s* major livestock segments.

(B) Regions with considerable livestock production.

(C) Representative segments of the food production chain.

(c) The department *shall promulgate regulations requiring animal reporting by food-animal operations on the use of antimicrobial agents in livestock, including a list of the antimicrobial agents used and the approximate volume administered.* The department shall also consult with, and conduct outreach to, livestock producers, licensed veterinarians, and any other relevant stakeholders on the implementation of the monitoring efforts. Participation in this effort shall be done in a manner that does not breach veterinary-client-patient confidentiality laws.

(d) The *Tennessee Department of Agriculture* shall report to the Legislature the results of its outreach activities and monitoring efforts. The department shall advise the Legislature as to whether or not participation is sufficient to provide statistically relevant data. The report shall be submitted in compliance with *Tenn. Code Ann. 3-1-114*.

(e) The department shall seek funds from federal, state, and other sources to implement this section.

(f) The department may promulgate regulations to implement this section.”)

(emphasis added).

78. See TENN. CODE. ANN. § 68-11-267(b), *supra* note 179 and accompanying text.

industrialization of livestock-raising practices, particularly the rise of CAFOs. Factory farms' reliance on cheap animal feed and deleterious waste disposal mechanisms cause enormous harm to humans, animals, and the environment. Antibiotic-resistance will continue to threaten public health in America so long as state and federal governments allow CAFOs to continue relying on antimicrobials as a production tool to avoid inevitable illness and disease associated with raising livestock in sordid, crowded conditions.

California's S.B. 27 is a step in the right direction because it restricts livestock producers' ability to obtain and use medically important antimicrobials for growth and feed efficiency purposes. The public, however, needs more stringent legislation reforms. Specifically, states like Tennessee, which boasts 323 CAFOs⁷⁹ and high rates of antibiotic resistance, need to adopt legislation that eliminates livestock producers' prophylactic use of antibiotics in livestock and compels participation in antimicrobial reporting programs that track the amount of medically important antimicrobials being sold to each livestock farm. By incorporating these two missing pieces into legislation, states will indirectly force CAFO owners to improve the cleanliness of their facilities, address animal welfare issues that have long been ignored, and most importantly, stem the tide of antibiotic resistance to promote the safety and health of both humans and animals.

79. As of September 30, 2017, there are 323 CAFOs in Tennessee with active NPDES permits. To obtain this number using the database, I filtered the permit type to "CAFO" then I set the status to "active." Tenn. Dep't of Env't and Conservation, *Heritage WPC Permits in Tennessee*, TENN. DIV. OF WATER RES. (last visited Nov. 13, 2016), http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34001.