



Table of Contents

Acknowledgments	1
Executive Summary	2
Introduction	
Overall Ranking: Leaders and Laggards	7
Key Findings	
Animal Welfare	
Conclusion and Recommendations	15
Appendix A: Survey and Scoring Methodology	17
Appendix B: Scoring Criteria	20
Appendix C: Summary of Policies and Survey Responses for Top 12 Grocery Retailers	22
About Us	34
References	35

Acknowledgments

Several organizations working to eliminate the routine use of antibiotics in animal agriculture co-authored this report. Annette Manusevich and Cameron Harsh of World Animal Protection along with Steve Roach of Food Animal Concerns Trust and Keep Antibiotics Working are the lead authors, with significant contributions from Matt Wellington and Fionna Kennedy of the U.S. Public Interest Research Group Education Fund, Julia Ranney of the Center for Food Safety, and Laura Rogers of the Antibiotic Resistance Action Center at the Milken Institute School of Public Health, George Washington University. The authors would like to thank Michael Hansen, Ph.D., from Consumer Reports and David Wallinga, M.D. and Lena Brook from Natural Resources Defense Council for their valuable review of this report. The opinions expressed in this report do not necessarily reflect those of our organization's supporters or reviewers.

©Copyright October 2022



Executive Summary

This first of its kind report, *Superbugs in Stock*, ranks the top 12 U.S. grocery chains and their subsidiaries on their policies and actions related to eliminating routine antibiotic use in their meat and poultry supply chains.¹

The report demonstrates that the grocery sector has, to date, taken little action to protect the health of their customers, ensure the welfare of animals on supplying farms, or promote more sustainable food systems. Most grocery companies lack any meaningful policies requiring their meat and poultry suppliers to eliminate the overuse of antibiotics despite the urgent need to protect human and animal health.

Antibiotic resistance is a rapidly growing global health crisis fueled by the widespread overuse of antibiotics. It is a useful lens through which to evaluate the three priorities listed above. One of the largest users of antibiotics, and thus a significant driver of resistant bacteria, is the factory farming industry. Factory farms in the United States use millions of pounds of antibiotics every year as a routine practice to prevent disease in the crowded and stressful conditions farmed animals are forced to endure. Infectious disease experts have warned about spreading bacterial resistance to antibiotics for decades. Recently published estimates indicated there were 1.27 million deaths globally in 2019 from antibiotic-resistant infections, the most recent vear with comprehensive data available. Resistant infections lead to more severe illness, more and longer hospital stays, higher medical costs, and increased deaths. These impacts likely fall more heavily on historically marginalized groups in a manner similar to other public health challenges, including COVID-19.

The overuse of antibiotics is the primary driver for the development and spread of resistant bacteria causing the public health crisis we now face. As of 2019, antibiotic-resistant infections were the third leading cause of death in the world.² Yet it remains largely invisible to consumers and to decision-makers. While the overuse of antibiotics in human medicine has contributed to this crisis, almost two-thirds of medically important antibiotics³ in the US are sold for use in farmed animals.⁴ These

Company Ranking			
A			
В			
С	⊙ TARGET		
C-	Ahold Delhaize		
D	COSTCO meijer		
	Kroger Walmart ** TRADER JOE'S		
F	H-E-B & Albertsons		
	Publix. Wakefern		

drugs are used routinely to keep animals from becoming ill in confined conditions that increase their susceptibility to disease.⁵ If animals were raised in ways that did not make them sick on a regular basis, then significant reductions in antibiotic use would be achieved.⁶ Without swift action to improve the regulation of antibiotic use across the animal agriculture industry, experts estimate that these practices (along with overuse in human medicine) will contribute to the loss of 10 million lives globally per year to drug-resistant infections by 2050.⁷

This report, *Superbugs in Stock*, is a novel exposé examining the antibiotic policies and sourcing practices of the U.S. grocery industry. In this report, we focus on private-labeled (store-owned) meat products across the supply chain of leading grocery

i This report is neither endorsed by, nor sponsored by, nor affiliated with the grocery chains ranked herein. The name and logo of each grocery chain are registered trademarks of the respective grocery chain.

ii A meaningful policy requires all suppliers of beef, pork, turkey, and chicken to at a minimum end the use of medically important antibiotics, as defined by the World Health Organization (WHO), for disease prevention purposes and limits their use to the treatment of animals diagnosed with an illness, use during surgery, or administration to a group of animals once a proportion of the animals in the group have been diagnosed with the indicated disease. The elimination of antibiotics for disease prevention should be coupled with policies that require suppliers to implement improvements to the living conditions and management practices that promote the natural health and development of the animals and reduce risk of disease.

stores. We examine company policies regarding allowed or prohibited antibiotic use in chicken, beef, turkey, and pork produced for their private label offerings as well as the level of progress toward full implementation of any such policies. This process is done in order to provide a thorough analysis and ranking of the U.S. grocery industry's efforts to address antibiotic resistance, antibiotic stewardship, and animal welfare.

Grocery companies are a primary source of meat products consumed in American households and the main source for consumers for information about these products. Thus, these companies have a responsibility to the health of their customers and the quality of the products they sell. Most U.S. consumers are demanding meat and poultry raised without the routine use of antibiotics, and 40 percent of consumers "always" or "often" purchase meat and poultry raised without antibiotics at the supermarket.8 However, of the top 12 grocery chains in the US, the majority are failing to meaningfully address the issue of antibiotic overuse by their meat suppliers [see 'Company Ranking' graphic on page 2]. To protect public health and shift to a more responsible food system, grocery companies must set and enforce clear policies requiring that their meat suppliers eliminate the use of antibiotics for disease prevention.

As some of America's largest meat buyers, grocery chains can and should act to preserve lifesaving medicines for the future and ensure farmed animal welfare by requiring meat suppliers to adopt responsible antibiotic use practices. Initial analysis of the publicly available policies of the top grocery chains shows that the industry has taken only limited actions to require that the meat sold in their stores comes from systems that use antibiotics responsibly. We define responsible use as prohibiting the administration of medically important antibiotics, as defined by the World Health Organization (WHO)⁹, to farmed animals for purposes other than treating sick or injured animals or for controlling the spread of disease diagnosed by a veterinarian¹⁰.

Overall, no company received higher than a "C" grade, with the majority receiving F's, even though we were generous in our scoring and grading [See Appendix A for full scoring methodology]. This demonstrates that significant progress on this critical issue is needed. Target and Ahold Delhaize (parent company of Food Lion, Giant, Hannaford, and Stop & Shop) earned a "C" and "C-", respectively, reflecting their meaningful policy language and lack of clear information on how much of their meat and poultry currently complies.

	Available Points
60	Policy & Implementation
40	Reporting & Verification
100	Total

Scoring Breakdown			
90 - 100	A		
80 - 89	В		
60 - 79	B-		
40 - 59	С		
30 - 39	C-		
20 - 29	D		
O - 19	F		

In the past, when resistance made a bacterial infection unresponsive to the standard antibiotic prescribed, there was often another drug that could be relied on to work. But now, resistance is spreading faster than the development of new antibiotics, making treatment difficult and, in some cases, impossible. This is true even for common infections like skin infections caused by staph, urinary tract infections caused by E. coli, and foodborne infections caused by Salmonella.

Given the challenge of developing new drugs, much more effort needs to go into protecting the existing ones. Grocery chains can make a difference in this rapid rise in resistance. Around 50% of meat products sold in the United States are purchased in grocery stores, making this sector of the animal product industry incredibly impactful when it comes to establishing new baseline industry standards that protect animals, the planet, and public health. 11,12,13,14

Chain Reaction

Several authors of this report have previously released 'Chain Reaction' reports as part of the Antibiotics Off the Menu coalition, examining the antibiotic policies of leading restaurant chains across the United States for the meat served in their restaurants. While this scorecard report has pivoted to focus on grocery stores, this coalition will continue to pressure the restaurant sector to fulfill past commitments they have made to reduce or eliminate antibiotics in their beef supplies. For example, McDonald's has yet to meet its December 2018 pledge to establish antibiotic reduction targets for beef suppliers in certain countries by the end of 2020. In February 2022, this coalition sent a petition with over 25,000 signatures urging McDonald's to follow through on its commitment to reduce antibiotic use in beef production. The company is currently backtracking on its commitment by switching target language from 'reducing use' to 'responsible use'. Their current approach compromises public trust and is a major loss for protecting public health.

Introduction

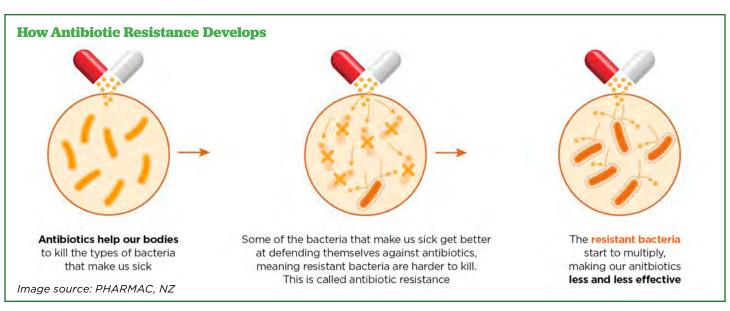
Superbugs in Stock was written to raise awareness and spur action on the serious threat to the health of people and animals from antibiotic-resistant superbugs. The grocery sector, in particular, has taken very little action to meaningfully address misuse of antibiotics by meat and poultry suppliers and we cannot afford to let an important retailer off the hook.

Antibiotic resistance is a global health crisis fueled by many factors, but the use of antibiotics as a routine practice to prevent disease within the intensive animal agriculture industry is a significant driver today. Bacteria resistant to three or more classes of antibiotics (also called 'superbugs') and antibiotic resistance genes/elements contaminate our environment and food supply. These superbug bacteria proliferate in large part due to misuse and overuse of antibiotics in farmed animals. The human toll from antibiotic resistance is significant and increasing, with at least 1.27 million deaths in 2019

due to drug-resistant bacterial infections.¹⁵ In fact, in 2019, antibiotic resistance was the third leading cause of death globally.¹⁶ This crisis has been called the next pandemic by leading health organizations, and unless key stakeholders take urgent action, the issue will only continue to worsen. Often consumers are concerned about antibiotic residues in meat, and while that concern is valid, the greater threat from antibiotic use on farms is that it leads to superbugs that can cause potentially deadly infections in people (and in animals).

What are antibiotics, and what is antibiotic resistance?

Antibiotics are drugs used for treating infections caused by bacteria and have been used since the 1940s to save countless lives. Antibiotics attack disease-causing bacteria by either killing them or shutting down their ability to cause infection. However, misuse and overuse of these drugs has contributed to a phenomenon known as antibiotic resistance. Resistance occurs when bacteria evolve



to defend themselves against the drugs, making the infections they cause harder to treat and increasing the risk of disease spread, severe illness, and death. Bacteria reproduce rapidly, quickly creating new generations of resistant bacteria. They can also transfer genetic traits to other bacteria they encounter, sharing their drug resistance as they move through the environment and our food system.



How are antibiotics, farmed animal welfare, and public health connected?

Antibiotics are regularly used in farmed animals today. As animal production became increasingly intensified, shifting toward the factory farming model of confining thousands of animals together in a single barn or feedlot, the use of antibiotics increased to speed growth and to address the high risk of disease in a system that prioritizes maximizing production over animal health. Factory farms in the United States put animals through incredible stress via overcrowding, sudden shifts in their environment, physical procedures such as "docking" or cutting their tails, and an emphasis on rapid growth. Giving animals antibiotics routinely via their feed and/or water is an accepted way to prevent disease from impacting profits and has become standard practice on factory farms.

Factory farms are one of the largest users of antibiotics today, and thus a significant driver of resistant bacteria. Factory farms in the United States use millions of pounds of antibiotics each year as a routine practice to prevent disease. Pigs in factory farms, for example, are taken from their mothers at three weeks old, before they have had sufficient time to build healthy immune systems and guts that are able to digest solid food. They are also subjected to unnecessary physical alterations—cutting of tails, teeth clipping and/or castration—that leaves them vulnerable to infection. They are then raised in barren, overcrowded pens with concrete floors. Factory farming's reliance on continuous antibiotic usage is propping up a cruel system, leading to superbugs that can be transmitted to people.

The World Health Organization warns we are already facing a superbug health crisis. It has been estimated that globally, 73% of all antibiotics are used within the livestock sector and this number will continue to rise as many countries, increase their demand for animal products and expand their farming systems.¹⁷

The use of antibiotics to routinely prevent disease in groups of animals, without addressing the underlying animal welfare and husbandry practices that impede animal health, is contributing to the development and spread of antibiotic resistance. These antibiotic-resistant bacteria are then present in the animals' waste, on harvested meat, in the air emitted from the factory farms, and from trailers when they are shipped to the slaughterhouse, ending up in the environment and in the food supply. Farm workers can become infected or carry resistant bacteria to their families and communities. Antibiotic resistance also increases the risk of untreatable infections in the farmed animals, potentially undermining the livelihoods of farmers and global food security.¹⁸

This is not only a problem in the United States and, without immediate action, it is projected that 10 million people will die globally each year from resistant infections by the year 2050.¹⁹ In early 2022, a new study done in Europe found a highly resistant strain of the superbug MRSA-methicillin-resistant *Staphylococcus aureus*-emerged in livestock, likely due to the extensive use of antibiotics in pig farming, and has been shown to transfer from animals to people.²⁰

Antibiotics undergird the health care system. If we do not ensure the antibiotics we have are used properly, increasing resistance will render them ineffective against bacteria that cause disease and illness. Cesarean births, transplants, chemotherapy, and even routine surgeries could be too risky to undertake and routine infections could once again turn deadly. This is the future we could face unless urgent action is taken by the healthcare, farmed animal, and plant agriculture sectors. This report is meant to spur leadership within the grocery sector to help stop the misuse and overuse of antibiotics on factory farms.

Some progress on antibiotic reduction has been made through public pressure campaigns on the restaurant sector as well as certain steps taken by the U.S. Food and Drug Administration (FDA) but progress has stalled over the last five years. The greatest reductions occurred in the chicken industry with much higher levels of use continuing in the other livestock sectors.

While this progress is certainly notable, much more needs to be accomplished to transform the food system to one that is protective of farmed animals and public health. The grocery sector has failed to take meaningful action.

The role of grocery companies in addressing misuse of antibiotics in meat production:

The presence of resistant bacteria on meat and poultry products demonstrates the importance of the role grocery companies must play in addressing this crisis. While many actors from government agencies to farmers influence how antibiotics are used on farms and feedlots, as major purchasers of meat and poultry, grocery companies have significant leverage to push for responsible antibiotic use by their meat suppliers. Policies set by these companies will spur positive change throughout the entire supply chain.

Grocery stores have a responsibility to their customers, the animals used in their supply chains, the people they employ, and the general public to develop and implement responsible standards of practice for the beef and poultry products they sell. They also have significant oversight and leverage for the meat and poultry sold under their private brand labels, and in recent years the percentage of

meat sold under private labels has been increasing in comparison to overall meat sales. In 2021, across the sector, private label products comprised 25% of total meat products on shelves.²¹ This represents a significant volume of meat over which grocers have direct control. In addition, grocers should also work to expand or implement policies to cover all meat products sold in their stores in order to make the greatest impact.

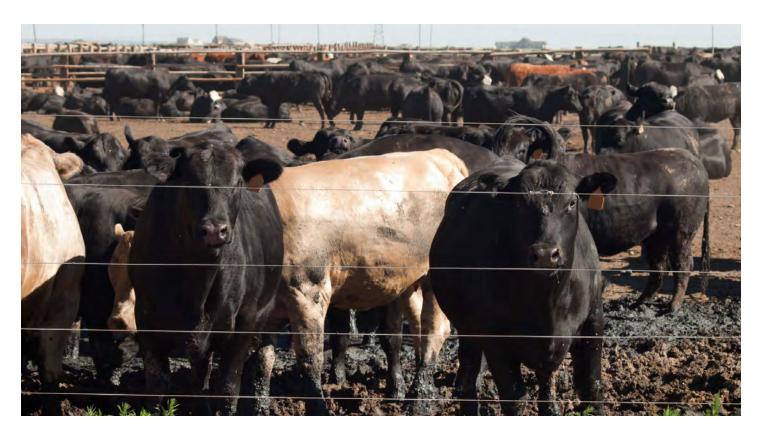
Grocers play a key role in consumer behavior as well. The products that grocery stores stock, the information provided in stores, and even the placement of products often dictates the purchasing decisions of the consumer. It is their responsibility to provide consumer safe food options, and meat and poultry products that contribute to the rise and spread of antibiotic-resistant infections are misaligned with this obligation.

Both the policies regarding antibiotic stewardship and the consumer product labels grocery stores adopt must be transparent and make it clear to the consumer what they are purchasing. A recent study conducted by USDA²² found that the label "raised without antibiotics" directly influences some consumer purchases because it provides transparency about the product that allows them to make more informed purchasing decisions. Often consumers are also willing to spend more on products they deem as more "environmentally friendly" or "sustainable," but with this rise in a more eco-conscious consumer, comes the need for accurate and transparent labeling. The recent study exposing use patterns within the "Raised Without Antibiotics" label chain discussed earlier makes the need for transparency all the more urgent.



Overall Ranking: Leaders and Laggards

Parent Company	Brands	Total Points (out of 100)	Grade
• TARGET		56	С
Ahold Delhaize	Stop & Shop, Food Lion, Giant/Martin, Hannaford, Giant Food, Peapod	34	C-
meijer	Meijer, Bridge Street, Woodward Corner	23	
COSTCO		24	D
Kroger	Kroger, Ralphs, Dillons, Smith's, Roundy's, King Soopers, Fry's, QFC, City Market, Owen's, Jay C, Pay Less, Baker's, Gerbes, Harris Teeter, Pick N' Save, Copps, Metro Market, Mariano's, Fred Meyer, Food 4 Less, Foods Co.	10	
Walmart :	Walmart, Sam's Club	5	
TRADER JOE'S		4	
H-E-B		4	F
Albertsons Albertsons	Albertsons, Safeway, Vons, Jewel-Osco, Shaw's, Acme, Tom Thumb, Randalls, United Supermarkets, Pavilions, Star Market, Carrs, Haggen	4	
Publix.	Publix, Greenwise	3	
Mà ALDI		3	
Wakefern FOOD CORP.	Price Rite, ShopRite, The Fresh Grocer, Gourmet Garage, Dearborn Market	1	



Key Findings

Superbugs in Stock aims to spur needed changes to reduce the public health threat posed by antibiotic resistance and push for the factory-farmed meat and poultry industries to shift to practices that protect animals and life-saving antibiotics. This report analyzes the antibiotic use policies and practices of the top 12 grocery chains in the United States. Companies were graded based on their steps taken for private label meat products, not all the meat they sell, since that is where stores are able to make the most direct and immediate change. Although not factored into the company grades, the urgency of this issue warrants making meaningful progress for all meat and poultry on their shelves.

The report authors sent surveys to companies regarding their antibiotic use policies for private label brands. If a company responded to the survey, the authors compared those responses to publicly available information to ensure consistency. If a company did not respond to the survey, the authors relied on publicly available information to grade them, and if no information was readily available it was assumed the company did not have an antibiotic use policy in place.

Policy and implementation scores

Our research reveals that the companies evaluated in this report have not taken significant strides to create strong, comprehensive policies on antibiotics. We consider policies that prohibit the use of medically important antibiotics for disease prevention (use when no illness has been diagnosed in the animals receiving the antibiotics) to be strong policies. With the exception of Target, Ahold Delhaize, and Costco, all companies received a failing grade for their antibiotic policies even though our scoring and grading criteria were generous. The grocery sector overall has not acted on antibiotics, relying on weak policies if any and offering a small percentage of products raised with responsible use of antibiotics.

Target, receiving a C, the highest grade out of the companies surveyed, has adopted a time-bound policy that applies to each species of animal products sold by their private label brands. Target has also connected the link to animal welfare associated with their antibiotic policies and made note that improvements to welfare would contribute to lower antibiotic use. While Target has a policy, it did not provide information to us on what portion of the meat it sells actually meets the commitment.

iii The twelve companies included in this report were identified via Supermarket News 2021 list of the top 50 food and grocery retailers by sales, omitting Canadian chains, pharmacy chains, and corner store/gas station chains. See https://www.supermarketnews.com/retail-financial/top-50-food-and-grocery-retailers-sales.



Ahold Delhaize has received a score of a C- for having a publicly available antibiotic policy that applies to each species of animal products sold by their private label. They failed to earn more points because the company does not have a clear timeframe for fully implementing this policy across its supply chain.

Costco has received a score of a D for having a policy on their private label branded chicken and earned points for linking their policy back to animal welfare, and implementing an internal audit of their policies.

Meijer has received a score of a D for prohibiting routine antibiotic use in their private label branded chicken and earned additional points for the availability of private-label products raised without antibiotics for disease prevention across various species, as well as linking their policy back to animal welfare.

The remaining eight out of the 12 surveyed companies received a failing grade, having either no publicly available policy to the critical public health threat of antibiotic resistance or policies that require nothing more from their suppliers beyond legal compliance with the FDA's currently inadequate regulations. Among those eight are Kroger, Walmart, and Albertsons, all among the top five grocers in the United States based on annual revenue. Many of these companies do market some meat under "raised

without antibiotics labels" but do not have strong policies covering all of their private-label fresh meats.

Monitoring and reporting scores

Public health agencies, advocacy groups, and other stakeholders assert that a key goal in addressing the current use of antibiotics in farmed animals must be to reduce antibiotic overuse. This requires food companies to track and report on use levels to establish a baseline from which to measure change and hold producers they supply from accountable on these metrics. This is critical for determining whether reductions are being achieved and companies are making progress to meet their commitments. Monitoring and reporting antibiotic use is also important to the increasing numbers of consumers who want to know how their food is produced.

Based on publicly available information or communications with the authors, almost all companies surveyed in this report fail to require their suppliers to track and report antibiotics used in the products that they purchase and sell in their stores. This is disappointing, as tracking antibiotic use is an important first step in stopping overuse. Three companies, Target, Walmart, and Costco, received points for requiring their suppliers to track and report use data to the companies. However, only Target stipulates that these data should be made public.

The companies were also assessed on whether they require their suppliers to be audited annually to verify they are in compliance with company policies. Independent, third-party audits are needed to best ensure suppliers are implementing the practices to which they have committed. None of the companies require independent third-party auditing of their suppliers to verify compliance with their antibiotics policies. Only Costco received partial points in this category for having internal auditing procedures, but the standards for these audits are not made public.

Animal welfare

The link between antibiotic use and animal welfare should be incorporated into the policy developments of grocery stores. Reducing crowding, providing materials that enrich barns or pens, keeping young animals with their mothers for longer, and shifting away from the rapid growth expected from the animals are a few examples of practices that can improve the lives of animals and lower the risk of disease. In the current system, regular use of antibiotics results in drug-resistant 'superbugs' contaminating our environment and food supply.

Labels and Label Claims that Indicate Reduced Antibiotics Use

This chart provides a list of the existing labels or claims that indicate producers are taking steps to not overuse antibiotics. It is important that measures to reduce antibiotics be implemented in tandem with measures to improve living conditions, reduce stress for the animals, allow for expression of natural behaviors, and prioritize natural growth rates.

Animal Welfare	Animal Welfare Approved: This label indicates that animals raised for meat, dairy, or egg products were raised according to rigorous standards for animal welfare, treatment, and living conditions. Antibiotics are not allowed for disease prevention.
American Grass-fed: Use of this claim (labels vary) indicates animals (pigs and cow raised on a lifetime diet of 99 percent grass and forage, such as legumes, and had a to pasture during most of the growing season. Antibiotics are not permitted for rou use. The label does not include rigorous standards for animal welfare, treatment, an conditions.	
global animal	Global Animal Partnership Certified: Antibiotics are not allowed at any Step in the GAP program. GAP Steps 2-5+ include rigorous standards for animal welfare, treatment, and living conditions.
CERTIFIED HUMANE	Certified Humane: "Certified Humane Raised and Handled" was developed by a team that included animal scientists and veterinarians. Antibiotics may not be administered for disease prevention. The label includes rigorous standards for animal welfare, treatment, and living conditions.
USDA ORGANIC	Organic : Products that are certified organic come from animals raised without antibiotics. The USDA organic standards do not include rigorous minimum provisions for animal welfare, treatment, and living conditions for all species. The current rules require outdoor access be provided and the animals can express their natural behaviors, but detailed standards are only available for cows and other ruminants. Standards for chickens and turkeys will be added with the passage of the upcoming regulations, and standards are needed for pigs.
No logo, words on package instead	No antibiotics ever: No antibiotics were administered at any time in the animal's life. There is no approved mark, only words on packaging instead. "No Antibiotics Ever" (NAE) alone do not indicate animals were raised to rigorous minimum standards for animal welfare, treatment, and living conditions.
No logo, words on package instead	No antibiotics administered: No antibiotics were administered at any time in the animal's life. There is no approved mark, only words on packaging instead. "No Antibiotics Administered" (NAA) alone does not indicate animals were raised to rigorous minimum standards for animal welfare, treatment, and living conditions.
No logo, words on package instead	Raised without antibiotics: No antibiotics were administered at any time in the animal's life. There is no approved mark, only words on packaging instead. "Raised Without Antibiotics" (RWA) alone does not indicate animals were raised to rigorous minimum standards for animal welfare, treatment, and living conditions.

Note: A recent study found that some cattle raised within the "Raised Without Antibiotics" supply chain were in fact administered antibiotics at one point.²³ This study underscores the importance of regular, third-party audits to verify suppliers are fully complying with the standards they claim to follow.



There are other grocery chains not among the top 12 evaluated in *Superbugs in Stock* that should be recognized for their meaningful sourcing policies and practices addressing routine use of antibiotics.

Whole Foods, for example, commits to a "No antibiotics ever" standard for their fresh and frozen meat store brand products [while Whole Foods' parent company, Amazon, is one of the largest companies in the United States, Whole Foods as the company's predominant grocery channel does not make the top 12]. Mom's Organic Market, which has locations in Maryland, Virginia, D.C, Pennsylvania, New Jersey, and New York, requires meat and poultry suppliers to provide documentation that no antibiotics are used for disease prevention. Natural Grocers, which has 164 locations across the United States, does not allow meat suppliers to use antibiotics for disease prevention. As noted in the labels chart on page 10, it is imperative that these companies implement robust monitoring and verification programs that include testing in order to effectively ensure adherence to these policies by the suppliers. The recent study identifying evidence of use of antibiotics in cattle raised for the "Raised Without Antibiotics" supply chain attests to the need for much more meaningful policies backed with verification across the entire grocery sector.

World Animal Protection global testing links antibiotic resistance to intensive pork and chicken production:

World Animal Protection, a lead author of this report, has conducted novel testing projects identifying the presence of resistant bacteria and resistant genes on meat products and in the environment near factory farms.

In 2019, pork product samples purchased at grocery stores were tested for the presence of resistant bacteria. The samples were tested for the presence of E. coli, Enterococcus, Listeria, and Salmonella bacteria, which, where identified, were then isolated and tested for susceptibility to important antibiotics. Resistance to tetracycline, one of the most commonly used antibiotic classes in pig production, was identified in bacteria found in nearly all samples, and 41% of bacteria isolated were multi-drug resistant—resistant to three or more classes of antibiotics, also called 'superbugs'.24 The presence of resistant bacteria on retail pork products demonstrates the risk posed to consumers from the current system and the responsibility that grocery chains must take to protect consumers from dangerous bacteria.

In 2020, water and soil samples were collected near factory pig farms in eastern North Carolina, a region with a high concentration of intensive farming of pigs and chickens, and tested for the presence of antibiotic resistance genes (ARG) of concern.

As with the pork meat testing, the water and soil samples contained ARGs indicating resistance to antibiotics considered critically important human medicines by WHO. Specifically, this testing found that²⁵:

- » All samples tested returned a positive result for at least 1 resistance gene.
- » 92% of samples had positive results for 3 or more resistance genes, indicating multi-drug resistance, with the largest number of genes in a single sample being 10.
- » Genes conferring resistance to tetracyclines were identified in 99% of samples.
- » There were notable differences in samples taken downstream from the target farms, which are more likely to be directly impacted by the farms' operations, emissions, and discharges, including genes for streptomycinand macrolide-resistance (both categorized as critically important) being found predominantly in downstream samples only.

This research is supported by data from other organizations and academic institutions that has identified resistant bacteria and superbugs associated with animal products and with waste from farmed animal production.²⁶



A misleading label grocers and consumers should avoid

One distinct example of inappropriate labeling is the development of the One Health Certified label for animal products. It was developed by meat companies and claims to demonstrate a company's commitment to animal welfare, environmental issues, and responsible antibiotic use. It is currently approved for use on chicken and turkey. While on the surface this label seems to promote consumer transparency, it does not require practices beyond existing factory farming standards and has no meaningful animal welfare requirements or standards to address air and water pollution caused by crowded and confined animal feeding operations. Under this label, antibiotics and other types of drugs can still be used routinely. The creators of the OHC label initially deceived customers by implying that the label was a program of USDA, and only ceased this messaging when a group of advocacy organizations, including several of the author organizations of this report, intervened.²⁷





Since 2016, the U.S. chicken industry has significantly reduced its use of medically important antibiotics, spurred primarily by public pressure campaigns, not the FDA action. Several of the groups authoring this report also co-authored an annual ranking of fast and fast-casual restaurant chains and ran joint pressure campaigns. This effort successfully moved most large companies to set meaningful commitments to reduce the use of antibiotics by their suppliers, primarily in chicken. According to industry data, more than half of all chickens today are raised without the use of antibiotics. In 2020, data collected by the FDA shows that already low antibiotic sales to the chicken sector continued to trend downward.²⁸ Yet despite these proof points of industry transformation, the FDA continues to allow the use of antibiotics for disease prevention even when there are no signs of disease, does not track how antibiotics are used on farms and feedlots, and has ignored calls to set targets for reductions in antibiotic overuse

The FDA regulates veterinary medicines, including antibiotics used in farmed animals. Historically, the agency has done very little to restrict the use of antibiotics in animal agriculture, despite evidence as early as the 1960s that routine overuse in farmed animals was contributing to the spread of resistant bacteria and helped spur the decline in the drugs' efficacy in people and animals. The most significant action taken by the FDA was to disallow the use of medically important antibiotics solely to promote growth and improve feed efficiency in 2017. The FDA continues to sanction their routine use to prevent disease in healthy animals and allow antibiotics not considered medically important to be used to promote growth.

Congress directed the FDA to require companies that make antimicrobial drugs to disclose their annual sales data beginning in 2009. Aside from this significant step, much of the agency's action to address misuse and overuse of antibiotics has been issued through voluntary guidance for companies rather than enforceable regulations. Certain aspects of this guidance, such as requiring drug makers to remove claims for growth promotion and feed efficiency uses from their medically important antibiotic products, have been changed into enforceable regulatory language. However, research by The Pew Charitable Trusts identified several loopholes allowing products to continue to be used for growth promotion benefits, such as the continued use for maintenance of growth in the presence of disease. The FDA also has yet to take meaningful action to set limits on how long drugs may be used, allowing producers to use certain antibiotics continuously for the lifespan of the animals.

Even further, the FDA's classifications of medically important antibiotics (MIA) differ from the international health agency, the World Health Organization (WHO), leaving drugs such as bacitracin and tiamulin off the United States' list.³⁰ Bacitracin is a topical antibiotic used to prevent bacterial infections that may result from skin injuries (such as cuts or burns). It is related to polymyxins, which are a last line of treatment for serious resistant infections.³¹ Tiamulin is a pleuromutilin antibiotic, sharing a class with Lefamulin, which was recently approved by the FDA for use in treating community-acquired pneumonia in humans.³² However, since the FDA has not updated their list of MIAs in 20 years it couldn't take note of this new information.

iv In 2012, the agency issued voluntary guidance for the industry (Guidance 209) that acknowledged the role misuse and overuse of antibiotics play in enabling resistant bacteria to increase, but asserted that routine use in healthy animals to prevent future disease was acceptable, but that use for growth promotion and feed efficiency was not acceptable. US Food and Drug Administration. (2012). FDA Guidance 209, https://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/UCM216936.pdf.

v In 2013 Guidance 213 led to drug makers no longer marketing drugs considered medically important for growth promotion and feed efficiency. The guidance which was implemented by the beginning of 2017 also led to changes that required all medically important antibiotics in feed or water needing a veterinarian's order. US Food and Drug Administration. (2013). FDA Guidance 213. https://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/UCM299624.pdf.



Meat companies are not meaningfully engaging on this issue:

Many large companies that produce, process, or sell animal products have recently (after years of scientific evidence and agreement from global health leaders) acknowledged that use of antibiotics in farmed animals contributes to the risk of resistant infections in people. Many of these companies have issued policies stipulating how antibiotics can or should be used in their supply chains or signed on to antibiotic stewardship agreements, such as Hormel Foods' and Tyson Foods' endorsement of the Pew Charitable Trust's Framework for Antibiotic Stewardship in Food Animal Production³³.

However, the language in these policies or agreements is often vague and can give the public the false impression that companies have implemented meaningful change when that often is not the case. This type of language is indicative of "greenwashing": making unsubstantiated or misleading claims that lead consumers to believe

their products or behaviors are more sustainable or values-based than they actually are. Many companies are capitalizing on this approach and using it as a method of marketing to step away from making impactful policy changes.^{vi}

Many of the current claims and commitments do not go beyond what is regulated by the FDA. They are framed as being "industry leading" while not contributing to genuine impact on antibiotic resistance or animal welfare.

Restricting antibiotics to the treatment of sick animals when diagnosed through testing by a licensed veterinarian is imperative to curb the global health crisis resulting from current use patterns. This requires adopting on-farm practices that align with the Five Domains of Animal Welfare³⁴ created by animal welfare pioneer, Dr. David Mellor, using sufficient space, enriched living environments, natural behaviors, and reduced stress to prevent disease rather than antibiotics.

vi Hormel, for example, relies on words such as "strive" in its commitment to hedge against meaningful accountability for making progress and downplays the fact that its commitment does not apply to the significant numbers of animals, particularly pigs, raised for the company on contract farms. See, https://www.worldanimalprotection.us/blogs/are-antibiotics-commitments-and-labels-new-greenwashing.



Conclusion and Recommendations

Conclusion:

The largest U.S. grocery chains are failing to meaningfully address one of the largest threats to public health from our food system: antibiotic resistance. Even the few companies that receive passing grades on this scorecard for having strong policies in place are not monitoring whether their suppliers are complying or even making progress toward complying. If these companies continue to rely on weak approaches or ignore the issue entirely, they are putting farmed animals, public health, and our food system in jeopardy.

Antibiotic resistance is growing globally at an alarming rate and without urgent action, the number of global deaths from resistant infections is likely to increase over the next 30 years to 10 million annually.³⁵ Action is needed at all levels — by food companies and their shareholders, by consumers, by the health care sector and by local, state, and federal policymakers.

Grocery stores in the United States have significant purchasing power across the meat production supply chain. They must take meaningful actions and implement policies that reduce the amount of antibiotics used by their meat suppliers to help slow the spread of antibiotic resistance that is damaging and destroying lives.

For Grocery Chains:

- » Make firm, timebound commitments to phase out the routine use of antibiotics for disease prevention across all meat supply chains, with a priority on medically important classes.³⁶
- » Work closely with producers across the supply chain to require the phase out of all routine antibiotic use in a timely manner that matches the urgency of this public health threat, with a priority on medically important classes.
- » Improve data collection and transparency regarding how antibiotics are being used by supplying farms, in what quantities, and for what species and purposes.
- » Share these data with the public on an annual basis to ensure transparency and continuous improvement.
- » Provide regular reports and updates on progress with antibiotic policy implementation to customers and investors.
- » Use third-party certifiers and/or auditors with specific expertise in antibiotic use practices to verify progress.

For Meat Producers:

- » Make commitments to require supplying feedlots and farms to phase out routine antibiotic use as recommended by WHO.
- » Identify and implement changes in company standard operating procedures to eliminate the

- need for routine antibiotics such as providing appropriate diets and providing time after weaning for vaccination and to adapt to solid food before transporting cattle to feedlots.
- » Track and report all antibiotic use in production systems.

For Consumers:

- » Reduce meat consumption in diets to reduce intake of animal products that could be contaminated with antibiotic-resistant bacteria.
- » If purchasing meat, seek options raised without the routine use of antibiotics and which include rigorous, verified standards for animal welfare.
- » Ask grocery store managers about their meat sourcing policies and practices and request they carry options that are better for public health, animals and the environment—including meat produced without the routine use of antibiotics.
- » Visit the websites and social media pages of grocery chains and leave comments asking them to sell only meat raised without the routine use of antibiotics, i.e., no use of antibiotics except for treatment of sick animals or a verified disease outbreak.
- » Join our campaigns calling on top companies to commit to better meat sourcing policies. Visit the websites of the report authors for more information.

For Federal Regulators and Policymakers:

- » Set a national antibiotic use reduction target for the livestock sector; this goal should aim to reduce the sales of medically important drugs for food animals by at least 50 percent below 2009 levels (the first year for which sales data are available).
- » Set policies that prohibit routine antibiotic use in food animals for disease prevention, with a priority on phasing out medically important antibiotics for all purposes.
- » Update FDA's list of medically important antimicrobials to align with that of the WHO.
- » Establish a use duration limit of 21 days for any medically important antibiotic used in food animal production.
- » Put in place a comprehensive system to require farm-level data reporting on how antibiotics are used, including information on amounts used, reason for use, and livestock species receiving antibiotics; and improve monitoring of resistant bacteria in food and food production

- environments.
- » Strengthen workplace protections for food chain workers, especially from infectious disease.
- » Investigate and include interventions related to racial disparities in health outcomes when addressing antibiotic resistance.

For State and Local Regulators and Policymakers:

- » Adopt and implement strong laws that build on the examples set by Maryland and California, incorporating clear language that prohibits the use of antibiotics for disease prevention, and establishes data collection and monitoring provisions.
- » Implement and enforce state policies that have been passed. The California Department of Food and Agriculture and the Maryland Department of Agriculture should clearly and effectively implement and enforce S.B. 27 and the Keep Antibiotics Effective Act of 2019, respectively.
- » Replicate in other cities the 2017 San Francisco ordinance requiring large grocery chains to report on antibiotic use practices of the meat they sell.

For Investors:

- » Consider company policies on antibiotic use especially for beef and pork — when making personal and institutional investment decisions in restaurant chains, grocery stores or any other company that sources meat and poultry products.
- » Submit and support shareholder resolutions requiring major buyers and producers to adopt the responsible antibiotic use policies and practices defined throughout this report.

For Public and Private Institutional Meat Buyers, including Schools, Universities, and Hospitals:

- » Purchase meat from animals raised by suppliers that do not use medically important antibiotics for routine purposes, and who use antibiotics only to treat sick animals and in temporary circumstances, to control a verified disease outbreak.
- » Incorporate greater proportion of plant-based proteins in meals and menu items to reduce and/or replace animal proteins.

Appendix A - Survey and Scoring Methodology

The 12 companies assessed in the report were provided the below survey and given two months to return responses. The authors followed up with the companies several times to remind them of completion deadlines and offer to answer any questions about the survey content. Companies were also notified that a completed survey would contribute to their overall total score. Three of the 12 companies (25%) returned a survey.

Where surveys were not submitted by the companies, the authors reviewed publicly available information on the company's website and in their published materials (such as corporate social responsibility [CSR] reports, sustainability reports, and press releases). Notes and links related to the information used to assess each company are outlined in Appendix C.

Survey on Grocery Meat/Poultry Procurement Policies and Antibiotics April 2022

NAME OF COMPANY'II						
1. Doe	IOTICS POLIC s your company hav try suppliers?			y regarding the u	se of antibiotics k	by your meat/
	s, please complete meat/poultry is cur ted.					
	s policy is publishe published, please p		URL:			
	No antibiotics ever	No medically important* antibiotics ever	No routine use of antibiotics**	No routine use** of medically important* antibiotics	% of product currently compliant with company policy	Deadline for full compliance with company policy
Chicke	n					
Turkey	,					
Pork						
Beef						
* Medically important includes all those antibiotics that the World Health Organization (WHO) <u>classifies</u> as important, highly important or critically important in its "Critically important antimicrobials for human medicine: 6th edition" from 2019.						
** "No routine use" means use is limited to: treatment of animals diagnosed with an illness, use during surgery, or administration to a group of animals once a proportion of the animals in the group have been diagnosed with the indicated disease.						
2. Check all that apply. The company's antibiotics policy applies to: Private-label meat and poultry Third-party branded meat and poultry Fresh meat and poultry Frozen meat and poultry						

- Have you established interim benchmarks toward the full implementation of your policy targets? If yes, please indicate what the benchmarks are for each meat category. For example, 20% implementation of chicken by 2018, 50% of pork by 2020, etc.
- 4. Is your company's policy on antibiotic use directly connected to any animal welfare policies your company currently requires meat and poultry suppliers to meet or make time bound progress toward? If yes, please explain briefly below and share links to additional information.

RE	PORTING A	AND VERIF	ICATION			
5.	Does your company require independent third-party auditing of your suppliers to verify compliance with y antibiotics policy?				to verify compliance with your	
antibiotics policy:				Yes No		
If yes, who is your third party auditor (i.e. USDA PVP, GAP, organic certifier)?						
	If no, does yo	ur company do	its own auditing c	of suppliers? If	so, please descri	be
6.	Are your audit	ting standards p	oublicly available?	Yes N	0	
	If yes, please p	provide a copy o	or URL of the stan	ıdards.		
7.	As part of you	ır auditing requi	Fre	the frequency of quency: t required:	of on-site visits to	supplying farms?
8.	What is your p	oolicy regarding	suppliers who are	e found to be r	on-compliant?	
9.	Do you currently require your suppliers to track and report the type and amount of antibiotics used to produce the meat you sell?				nt of antibiotics used to	
		Track use	Report to company	Data is publicly shared	Tracking and reporting applies to all meats	Tracking and reporting applies to all own-brand meats
	Chicken					
	Turkey					
	Pork					
	Beef					
10.		ntly reporting o tation of your p	olicy?	on your website		least on an annual basis, on
	If yes, provide	URL for progre	ss report:			
			nan one year old, l antibiotics policy?		nitted to issuing a	a public progress report on the
			Yes	No		

BEYOND ANTIBIOTICS

11.	Do you have a published policy prohibiting the use of beta-agonists (i.e. ractopamine and/or zilpaterol) in your meat and poultry supply?
	Yes No
	If yes, please provide the policy or a URL:
12.	Do you have a published policy prohibiting the use of the medicated feed additive carbadox in your meat supply?
	Yes No
	If yes, please provide the policy or the URL:

Appendix B: Scoring Criteria

Report authors have adopted a novel method for scoring grocery chains for this report. They developed a scoring rubric to capture the inherent complexities and variation in antibiotic use policies adopted by grocery companies for their meat product supply.

Category #1: Policy and Implementation - 60 points available

In this category, companies were scored based on the strength of their policy language, whether the policy applies to all of the major meat types, as well as whether the policy is tied to a time bound deadline and directly linked to the company's broader animal welfare commitments.

Category	Scoring Criteria	Points Breakdown
Meaningful public policy (16 points available)	A public company policy was easily found in public sources that prohibits the use of all antibiotics, or antibiotics in classes used in human medicine, for growth promotion and disease prevention. Treatment of sick animals and use to control a disease outbreak is acceptable.	+4 pts for each species (chicken, turkey, pork, beef) to which the policy applies
	The policy is expected to be met by supplies currently	+4 pts for each species
Commitment	The policy will be met by 2025	+2 pts
Time Frame (16 points available)	The policy will be met by 2030 or has no clear timeframe	+0 pts
	The policy will be met at a date beyond 2030	-4 pts
Implementation	15-40%	+1 pt for each species
of policy across supply chain	41-60%	+2 pts for each species
(16 points available)	61-80%	+3 pts for each species
	81-100%	+4 pts for each species
Current availability of aligned private-label products (4 points available)	Company has a private-label product available that is raised without antibiotics for disease prevention or growth promotion*	+1 pt for each species
Connection to animal welfare (8 points available)	Company links its antibiotics policy back to or within its animal welfare policies	+8 pts

^{*} To the best ability of the report's authors, company websites and local stores were reviewed to determine the current availability of chicken, pork, beef, and turkey sold under private brand labels that requires animals be raised without routine use of antibiotics for disease prevention. One point was awarded for each meat type found in this search. If private label product lines that are available were not discovered in this search it is unlikely this omission would have significant impact on the company's final score.

Category #2: Monitoring & Reporting - 40 points

In this category, companies were scored on several transparency criteria: whether a company responded to the survey; if its antibiotic use policy claims are being audited annually either internally or by a third-party auditor; and if it is publicly reporting on several components, including audit standards, use data by suppliers, or its progress towards full implementation of the company's policy.

Category Scoring Criteria		Points Breakdown	
Company responded to survey request	Partial response to survey	+3 pts	
(6 points available)	Complete response to survey	+6 pts	
	Company audits using internal auditors, only	+3 pts	
Auditing	Company works with independent third-party auditors or suppliers that have third party audits, for entire supply chain covered by antibiotics policy	+6 pts	
(12 points available)	Audit standards are public (a Process Verified Program through USDA qualified)*	+3 pts	
	On-site farm inspection is completed annually*	+3 pts	
Data collection	Data on antibiotics use is reported to grocer by suppliers	+1 pt for each species	
(12 points available)	Grocer makes data public	+1 pt for each species	
	Grocer requires supplier to track and publicly report use itself	+1 pt for each species	
Progress Reporting (10 points available)	Company publishes progress online	+10 pts (5 points partial credit if policy is less than one year old and company has commitment to publish progress within the next year)	

^{*} Companies that do not have a strong policy prohibiting the routine use of antibiotics for disease prevention in at least one species (chicken, turkey, pork, or beef) but have some availability of "No Antibiotics Ever" or "Raised Without Antibiotics" products that may be part of a Process Verified Program do not receive any points for public audit standards or annual on-site inspections.

Appendix C: Summary of Policies and Survey Responses for Top 12 Grocery Retailers

Information in this Appendix concerning company ownership, number of locations, and annual revenue is sourced from Supermarket News "Top 50 Food and Grocery Retailers by Sales". Companies are listed in order of total 2020 sales, in dollars.

The information concerning each company's policies was gathered through the company's survey response (if submitted), follow-up engagement between the authors and the company via email or virtual meetings, public statements made by the company that are available online, and/or other company materials such as annual reports, website content, position statements, or policy documents. Representatives of the companies wishing to provide any additional information concerning antibiotics and/or meat sourcing policies or inquire about the findings of this report should reach out to Annette Manusevich at World Animal Protection US, annettemanusevich@worldanimalprotecion.us.

1. Walmart

Owned by: Walton Family (50.85%)

Corporate Headquarters: 702 Sw 8th St., Bentonville, AR, 72716 USA

CEO: Doug McMillon

Number of U.S. Locations: 5,342

U.S. Sales: \$433.9 billion Returned the Survey: No

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies:

Overall Policies: https://corporate.walmart.com/policies

We're asking Walmart U.S. and Sam's Club U.S. fresh and frozen meat, seafood, deli, dairy and egg suppliers to:

- 1. Comply with all federal, state and local regulatory requirements as well as Walmart food safety standards.
- 2. Adopt and implement American Veterinary Medical Association Judicious Use Principles of Antimicrobials 3 in their own operations and in their industry producer programs, including but not limited to:
 - a. Disease prevention strategies;
 - b. Appropriate veterinary oversight;
 - c. Accurate records of treatment and outcomes;
 - d. Careful review before antibiotics are used; and
 - e. Limit medical antibiotic use to ill or at-risk animals.
- 3. Adopt and implement U.S. Food and Drug Administration's Voluntary Guidance for Industry #2094 (Judicious Use of Medically Important Antimicrobial Drugs) in their own operations and in their industry producer programs, including elimination of growth promotion uses of medically-important antibiotics.
- 4. Eliminate growth promotion uses of all antibiotics.
- 5. Promote transparency by providing an antibiotics management report to Walmart and publicly reporting antibiotic use on an annual basis.

Beef Specific Policy: N/A
Pork Specific Policy: N/A
Chicken Specific Policy: N/A
Turkey Specific Policy: N/A

Implementation Strategy and Timeline

Walmart does not have any information regarding antibiotic reduction strategies or implementation timelines.

Monitoring for Antibiotic Use and Third-Party Antibiotics Audit

No firm or enforced monitoring protocol reported.

"We ask Walmart and Sam's Club U.S. fresh and frozen meat, seafood, deli, dairy, and egg suppliers to...promote transparency by providing an antibiotics management report to Walmart and publicly reporting antibiotic use on an annual basis."

2. Kroger

Owned by: The Kroger Co.

Corporate Headquarters: 1014 Vine St. Cincinnati, OH 45202 USA

CEO: Rodney McMullen

Number of U.S. Locations: 2,742

U.S. Sales: \$132.5 billion Returned the Survey: Yes

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies:

Overall Policies: https://www.thekrogerco.com/wp-content/uploads/2018/07/The-Kroger-Co_AnimalWelfarePolicy_2018-July.pdf

Kroger is a recognized industry leader with our offerings of antibiotic-free meats. In addition to several national brands, our Simple Truth® line of meat products are available in stores and is entirely free from antibiotics and growth hormones. We recognize that the responsible use of antibiotics in the supply chain may be necessary to protect the health and welfare of animals if they become ill. Antibiotics should only be used in alignment with the guidance of the veterinary guidelines in animal welfare standards and government regulations. Kroger does not believe in the use of antibiotics to promote growth. Kroger also believes that our suppliers should be transparent in the use of antibiotics. This includes record keeping of antibiotic use and on-pack product claims to ensure customers have access to full information on the products they chose to purchase.

Authors note: Kroger received one point each for availability of Simple Truth brand chicken, turkey, pork, and beef.

Beef Specific Policy: N/A
Pork Specific Policy: N/A
Chicken Specific Policy: N/A
Turkey Specific Policy: N/A

Implementation Strategy and Timeline

None reported in survey response.

Monitoring for Antibiotic Use and Third-Party Antibiotics Audit

No audits for compliance were reported in the survey response.

Regarding tracking and reporting: "We ask suppliers to track and report antibiotic use in products sold in geographies where local legislation requires reporting of this information by the retailer."

Authors note: While Kroger also states, "Kroger also believes that our suppliers should be transparent in the use of antibiotics. This includes record keeping of antibiotic use" this is not indicative of a clear policy requiring suppliers track use of antibiotics.

3. Costco

Owned by: Costco Wholesale Corporation

Corporate Headquarters: 999 Lake Drive Issaquah, WA 98027 USA

CEO: W. Craig Jelinek

Number of U.S. Locations: 559

U.S. Sales: \$122.1 billion Returned the Survey: No

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies:

Overall Policies: https://www.costco.com/sustainability-animal-welfare.html

"Costco's goal is to control the use of antibiotics that are medically important to humans, in its meat and poultry supply chains. This is consistent with our goal of protecting the health and welfare of our members – and of the poultry, hogs, and cattle in our supply chains. Our policy is to limit application of these antibiotics to therapeutic use only for the prevention, control and treatment of disease only under the supervision of a licensed veterinarian in a valid veterinary client/patient relationship."

Beef Specific Policy: N/A Pork Specific Policy: N/A

Chicken Specific Policy: https://www.costco.com/sustainability-animal-welfare.html

"Regarding our poultry supply chains, we continue to work with our suppliers and have made progress, positioning us to make the following target commitments:

By the end of 2022, 95% of Kirkland Signature[™] chicken products (defined as frozen, sold in the meat case, rotisserie and raised with No Antibiotics Ever) sold in the U.S. will be raised without routine use of antibiotics important to human medicine."

Turkey Specific Policy: N/A

Implementation Strategy and Timeline

"By the end of 2022, we will (1) outline a timeline for achieving 100% of chicken (defined as frozen, sold in the meat case and rotisserie) sold in the U.S to be raised without routine use of antibiotics important to human medicine; and (2) begin to report annually the percentage by product category (fresh chicken sold in the meat case, rotisserie, frozen and canned) raised without routine use of antibiotics important to human medicine, until such time as our target of 100% is reached." https://www.costco.com/sustainability-animal-welfare.html

Authors note: Costco received 2 points assuming that the timeline for achieving 100% implementation for its chicken policy will occur before 2025 given the company's statement that it will be 95% compliant by the end of 2022. Costco also received 2 points for having some availability of private label chicken raised without antibiotics for disease prevention, in accordance with this policy, and for its Kirkland Signature brand of organic beef.

Monitoring for Antibiotic Use and Third-Party Antibiotics Audits

Audits can be conducted by Costco auditors, suppliers, and/or third parties. Audit type, frequency and intensity can vary across suppliers and species. Costco requires U.S. animal welfare auditors to be certified.

This has resulted in placing emphasis on auditing suppliers of Kirkland Signature™ items, particularly in the United States. Even as to those items, however, the large number of producers in the supply chain limits the scope and frequency of audits that may feasibly be conducted and evaluated.

4. Albertsons

Owned by: Albertsons Companies LLC (Cerberus Capital Management)

Corporate Headquarters: 250 E Parkcenter Boulevard Boise, ID 83706 USA

CEO: Vivek Sankaran

Number of U.S. Locations: 2,227

U.S. Sales: \$69.7 billion Returned the Survey: No

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies:

Overall Policies: Animal Well-Being https://www.albertsonscompanies.com/our-impact/products/animal-well-being/default.aspx

Meat Guidelines - https://s29.q4cdn.com/239956855/files/our_impact/Supplier-Sustainability-Expectations-1-7-2022.pdf

"We expect our suppliers to manage the use of antibiotics in accordance with FDA guidance documents 209, 213 and 152, and the American Veterinary Medical Association Judicious Use Guidelines. Suppliers that do not adhere to local, state, and federal laws or the guidance listed above when using antibiotics, feed additives and/or supplements are excluded from our program. Albertsons Companies participated in an industry-wide working group led by Pew Research Center to create an antibiotic stewardship framework to guide the judicious use of antibiotics in animals, and we recommend our suppliers adopt and implement an antibiotic stewardship program."

Beef Specific Policy: N/A
Pork Specific Policy: N/A
Chicken Specific Policy: N/A
Turkey Specific Policy: N/A

Implementation Strategy and Timeline

"As part of this commitment, we aim to have at least 50% of our O Organics fresh chicken supply chain certified to GAP-3 standards by 2024. As of 2021, we are more than 85% of the way to achieving this goal. Please visit the GAP website for more information on the criteria for their standards."

Monitoring for Antibiotic Use and Third-Party Antibiotics Audits

In addition to GAP – "We conduct annual humane handling audits through our own internal Professional Animal Auditor Certification Organization (PAACO) Certified auditor on our Own Brand vendors in addition to requiring our fresh beef and pork suppliers to have 3rd party validation on-file of meeting North American Meat Institute (NAMI) Standards for Humane Handling guidelines. We are a member of the North American Meat Institute as well as a member of the Pork Retail Advisory Committee, which meets at least once a year to review relevant industry issues, including animal well-being."

5. Ahold Delhaize USA

Owned by: Ahold Delhaize

Corporate Headquarters: 1149 Harrisburg Pike, Carlisle, PA 17013

CEO: Kevin Holt

Number of U.S. Locations: 1,970

U.S. Sales: \$51.8 billion Returned the Survey: Yes

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies:

Overall Policies: https://www.aholddelhaize.com/sustainability/our-position-on-societal-and-environmental-topics/ animal-welfare/

"Ahold Delhaize does not support the prophylactic use of antimicrobials in animal farming, or their use as growth promoters. Our local brands will continue working with their suppliers to responsibly reduce antimicrobial use in animal farming, especially those considered by the World Health Organization to be critically important for human health. Some of our brands offer products from animals that were raised without the use of antibiotics."

Beef Specific Policy: N/A
Pork Specific Policy: N/A
Chicken Specific Policy: N/A
Turkey Specific Policy: N/A

Implementation Strategy and Timeline

None reported in survey response.

Monitoring for Antibiotic Use and Third-Party Antibiotics Audits

No audits for compliance were reported in the survey response.

6. Publix

Owned by: The Jenkins Family

Corporate Headquarters: 3300 Publix Corporate Pkwy., Lakeland, FL, 33811 USA

CEO: Todd Jones

Number of U.S. Locations: 1,269

U.S. Sales: \$44.9 billion Returned the Survey: No

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies:

Overall Policies: https://corporate.publix.com//home/about-publix/publix-faq/position-statements

"For the past several years, Publix has met with our chicken suppliers and discussed the importance of proper antibiotic stewardship. When provided, antibiotics are administered to chickens to prevent animal suffering. The majority of chickens in the Publix supply chain never receive any human antibiotics. For the limited number that may receive antibiotics, it is through a prescribed use under the direction of licensed and USDA-accredited veterinarians. We have also held conversations with the US Centers for Disease Control and Prevention (CDC), US Food and Drug Administration (FDA), as well as non-government organizations (NGOs) to discuss our collaborative efforts with suppliers to reduce the use of antibiotics in the food supply."

Sustainability Report: https://sustainability.publix.com/wp-content/uploads/sustainability-report.pdf

As mentioned in the Sustainability Report, Greenwise (a Publix brand) has beef, chicken, turkey, and pork products that are 100% antibiotic free.

"You can trust that an item with a Greenwise label will meet one or more of these strict requirements:

...

» Raised without antibiotics or added hormones"

"Greenwise beef...comes from cattle raised on a 100% vegetarian diet that never receives any antibiotics..."

"Our Greenwise chickens are never given antibiotics..."

"When you pick up our Greenwise pork, pork is all you're getting. It contains no antibiotics..."

Animal Welfare Policy: https://corporate.publix.com/newsroom/q-and-a

Beef Specific Policy: N/A
Pork Specific Policy: N/A
Chicken Specific Policy: N/A
Turkey Specific Policy: N/A

Authors note: The authors are assuming that the language stating Greenwise products are 100% antibiotic free means that antibiotics were not used in the raising and processing of the animals. It is possible this language refers to the meat being 100% free of antibiotic residues, which would not be possible to guarantee and would not align with the intent of this report. The species-specific language for chickens and cattle makes clear that the animals never receive antibiotics. Due to the ambiguous language for Greenwise pork, Publix did not receive the one possible point for having availability of private label pork product raised without antibiotics for disease prevention. The company should work to incorporate clearer language if it means to communicate that pigs raised for Greenwise products are raised without any antibiotics.

Implementation Strategy and Timeline

None reported in survey response.

Monitoring for Antibiotic Use and Third-Party Antibiotics Audits

No audits for compliance were reported in the survey response.

7. H-E-B

Owned by: H-E-B grocery Company LP (The Butt Family)

Corporate Headquarters: 646 S Flores St, San Antonio, TX 78204 USA

CEO: Charles Butt

Number of U.S. Locations: 351

U.S. Sales: \$31.75 billion Returned the Survey: No

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies:

Overall Policies: https://www.heb.com/static-page/animal-welfare

No language concerning use of antibiotics or antimicrobials by meat and poultry suppliers could be found.

Beef Specific Policy: N/A
Pork Specific Policy: N/A
Chicken Specific Policy: N/A
Turkey Specific Policy: N/A

Implementation Strategy and Timeline

None available

Monitoring for Antibiotic Use and Third-Party Antibiotics Audits

None available

8. Meijer

Owned by: Meijer Companies, Ltd.

Corporate Headquarters: 929 Walker Ave NW, Grand Rapids, MI 49544

CEO: Rick Keyes

Number of U.S. Locations: 253

U.S. Sales: \$20.95 billion Returned the Survey: No

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies

Overall Policies: http://meijercommunity.com/animal-welfare

Meijer lacks a specific antibiotics policy. However, "All Meijer-brand fresh chicken is antibiotic free." Brands include True Goodness and Never Ever Chicken.

Beef Specific Policy: N/A
Pork Specific Policy: N/A
Chicken Specific Policy: N/A
Turkey Specific Policy: N/A

Authors note: The authors are assuming that the language stating Meijer-brand fresh chicken is antibiotic free means that antibiotics were not used in the raising and processing of the animals. It is possible this language refers to the meat being 100% free of antibiotic residues, which would not be possible to guarantee and would not align with the intent of this report. The company should work to incorporate clearer language if it means to communicate that chickens for Meijer-brand fresh products are raised without any antibiotics.

Implementation Strategy and Timeline

None available.

Monitoring for Antibiotic Use and Third-Party Antibiotics Audits

None available

9. Aldi US

Owned by: Albrecht Discounts

Corporate Headquarters: 1200 N. Kirk Rd. Batavia, IL 60510 USA

CEO: Jason Hart

Number of U.S. Locations: 2,070

U.S. Sales: \$18.4 billion Returned the Survey: No

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies

Overall Policies: https://corporate.aldi.us/fileadmin/fm-dam/Corporate Responsibility/Animal Welfare/ALDI

Animal Welfare Policy 10.07.2019-FINAL.pdf

"Animal health needs (including euthanasia) should be attended to in a prudent and responsible manner by knowledgeable personnel. We support the judicious use of antibiotics to treat sick or injured animals as stipulated by the Food and Drug Administration's Veterinary Feed Directive."

Beef Specific Policy: N/A
Pork Specific Policy: N/A
Chicken Specific Policy: N/A
Turkey Specific Policy: N/A

Implementation Strategy and Timeline

None available

Monitoring for Antibiotic Use and Third-Party Antibiotics Audits

None available.

10. Wakefern

Owned by: Wakefern Food Corporation

Corporate Headquarters: 5000 Riverside Dr Keasbey, NJ, 08832

CEO: Joseph Colalillo

Number of U.S. Locations: 363

U.S. Sales: \$18.4 billion Returned the Survey: No

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies:

Overall Policies: https://www2.wakefern.com/commitment-to-animal-welfare/

No language concerning use of antibiotics or antimicrobials by meat and poultry suppliers could be found.

Beef Specific Policy: N/A
Pork Specific Policy: N/A
Chicken Specific Policy: N/A
Turkey Specific Policy: N/A

Implementation Strategy and Timeline

None available

Monitoring for Antibiotic Use and Third-Party Antibiotics Audits

None available

11. Target

Owned by: The Target Corporation

Corporate Headquarters: 1000 Nicollet Mall, Minneapolis, MN 55403

CEO: Brian Cornell

Number of U.S. Locations: 1,934

U.S. Sales: \$18.4 billion Returned the Survey: Yes

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies

Overall Policies: https://corporate.target.com/sustainability-ESG/environment/animal-welfare/food-animal-welfare

"Antibiotics and antimicrobial

We believe sick animals must be treated appropriately to end or reduce suffering. When antibiotics or antimicrobials are administered by a registered veterinarian, using them judiciously for therapeutic purposes, they play a critical role in the overall well-being of an animal.

However, we do not support the use of routine, non-therapeutic antimicrobials to promote growth or prevent disease. We expect our suppliers and the producers they work with to phase out these practices and only use antimicrobials when medically necessary.

There is greater risk to human health when antimicrobial-resistant bacteria develop due to overuse and misuse of certain medically-important antimicrobials. In response to this risk, we ask our suppliers to minimize and remove the use of those deemed critical for human health listed in the "2017 WHO guidelines on use of medically important antimicrobials in food-producing animals" and listed in FDA Guidance #152.

We also request that our suppliers promote transparency by annually providing an antibiotics management report to Target and publicly report antibiotic use on an annual basis."

Authors note: As Target considers its suppliers to already be complying with its policy to phase out routine, non-therapeutic antimicrobials to prevent disease, we have given the company full points for its policy being current in its timeline but stress the importance of implementing its data collection and reporting requirement in a robust way to verify the level of compliance, monitor progress, and address non-compliance.

Beef Specific Policy: N/A
Pork Specific Policy: N/A
Chicken Specific Policy: N/A
Turkey Specific Policy: N/A

Implementation Strategy and Timeline

None reported in survey response.

"We are currently vetting compliance with this via surveying our vendors. In surveys, our vendors indicate that they comply, but we have not drilled down to get the specific data for each species from our vendors at this point."

Monitoring for Antibiotic Use and Third-Party Antibiotics Audits

No audits for compliance were reported in the survey response.

12. Trader Joe's

Owned by: Aldi Nord (Family of Theo Albrecht) Corporate Headquarters: 800 S Shamrock Ave,

Monrovia, CA 91016, USA

CEO: Dan Bane

Number of U.S. Locations: 530

U.S. Sales: \$16.5 billion Returned the Survey: No

Information concerning antibiotic policies and product sourcing as reported in disclosed policies, public statements, publicly available information, or correspondence with the authors:

Antibiotics Policies

Overall Policies: https://www.traderjoes.com/home/FAQ/product-fags

While not a policy, the FAQ has information about antibiotics - "When it comes to meat and poultry, Trader Joe's offers items from sources of a conventional nature (where antibiotics are likely used) and sources that do not use antibiotics (organic, all natural or explicitly labeled as antibiotic-free [ABF])."

Beef Specific Policy: N/A
Pork Specific Policy: N/A
Chicken Specific Policy: N/A
Turkey Specific Policy: N/A

Implementation Strategy and Timeline

None reported in survey response.

Monitoring for Antibiotic Use and Third-Party Antibiotics Audits

No audits for compliance were reported in the survey response.

About Us



Center for Food Safety's mission is to empower people, support farmers, and protect the earth from the harmful impacts of industrial agriculture. Through groundbreaking legal, scientific, and grassroots action, we protect and promote your right to safe food and the environment. Please join our more than 900,000 advocates across the country at www. centerforfoodsafety.org. Twitter: @CFSTrueFood, @CFS_Press



Food Animal Concerns Trust expands safe and humanely raised food options by supporting humane farmers and advocating against antibiotic overuse and harmful drugs in farm animals. Our Humane Farming Program invests in family farmers seeking to raise their animals humanely by providing them with grants, scholarships, and webinars. Our Food Safety Program advocates for stronger corporate and federal policies that eliminate the overuse of antibiotics and veterinary drugs known to be harmful to consumers. Together they expand safe and humane practices on farms across the country.



World Animal Protection is the global voice for animal welfare, with more than 70 years' experience campaigning for a world where animals live free from cruelty and suffering. We have offices in 12 countries and work across 47 countries. We collaborate with local communities, the private sector, civil society, and governments to change animals' lives for the better. Our goal is to change the way the world works to end animal cruelty and suffering for both wild and farmed animals. Through our global food system strategy, we will end factory farming and create a humane and sustainable food system that puts animals first. By transforming the broken systems that fuel exploitation and commodification, we will give wild animals the right to a wildlife. Our work to protect animals will play a vital role in solving the climate emergency, the public health crisis, and the devastation of natural habitats. For more information on World Animal Protection, visit: http://www.worldanimalprotection.us/

Milken Institute School of Public Health

THE GEORGE WASHINGTON UNIVERSITY

ANTIBIOTIC RESISTANCE ACTION CENTER The Antibiotic Resistance Action Center (ARAC) at the Milken Institute School of Public Health at George Washington University was created to preserve the effectiveness of antibiotics by engaging in research, advocacy, and science-based policy. ARAC is focused on finding out-of-the box solutions to antibiotic resistance, one of the greatest public health threats of our time. Visit us at battlesuperbugs.com and follow us on Twitter, Instagram and Facebook @battlesuperbugs



U.S. PIRG Education Fund is an independent, non-partisan group that works for consumers and the public interest. Through research, public education and outreach, we serve as counterweights to the influence of powerful special interests that threaten our health, safety or well-being.

References

- 1 Christopher JL Murray, et al. "Global Burden of Bacterial Antimicrobial Resistance in 2019: A Systematic Analysis," The Lancet, 399, No. 10325 (2022): 629-655. DOI: https://doi.org/10.1016/s0140-6736(21)02724-0.
- 2 Murray, "Global Burden of Bacterial Antimicrobial Resistance", 629-655.
- World Health Organization. "WHO Guidelines on Use of Medically Important Antimicrobials in Food-Producing Animals: Policy Brief." (November 2017): https://www.ncbi.nlm.nih.gov/books/NBK493702/pdf/Bookshelf_NBK493702.pdf
- 4 Patel, Sameer J., Matthew Wellington, Rohan M. Shah, & Matthew J. Ferreira "Antibiotic Stewardship in Food-Producing Animals: Challenges, Progress, and Opportunities," *Clinical Therapeutics*, 42, No. 9 (September 2020): 1649-1658, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7434449/.
- 5 Landers, Timothy F., Bevin Cohen, Thomas E. Wittum, & Elaine L. Larson. "A Review of Antibiotic Use in Food Animals: Perspective, Policy, and Potential," *Public Health Reports*, 127, No. 1 (Jan-Feb 2012): 4-22, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3234384/
- Diana, Alessia, et al. "Effect of Welfare Standards and Biosecurity Practices on Antimicrobial Use in Beef Cattle", Scientific Reports, 10 (December 2020): https://www.nature.com/articles/s41598-020-77838-w; David Murphy, et al. "EMA and EFSA Joint Scientific Opinion on Measures to Reduce the Need to Use Antimicrobial Agents in Animal Husbandry in the European Union, and the Resulting Impacts of Food Safety" (RONAFA). EFSA Journal, 15 No. 1 (2017): 4666; C.D. Reinhardt & M.E. Hubbert. Control of Liver Abscesses in Feedlot Cattle: A Review. The Professional Animal Scientist, 31 No. 2 (2015): 101-108.
- 7 The Review on Antimicrobial Resistance. "Tackling Drug-Resistant Infections Globally: Final Report and Recommendations." (2016): https://amr-review.org/.
- 8 Loria, Keith. "Consumers are Looking for What's Left Out of Meat and Poultry," *Supermarket Perimeter*, (March 2020): https://www.supermarketperimeter.com/articles/4911-consumers-are-looking-for-whats-left-out-of-meat-and-poultry#:~:text=The%20report%20 revealed%20that%2063,and%20taste%2C%E2%80%9D%20Coleman%20says.
- 9 World Health Organization (WHO). "Critically Important Antimicrobials for Human Medicine, 6th Revision". (March 2019): https://www.who.int/publications/i/item/9789241515528
- 10 Aidara-Kane A, et al. (WHO Guideline Development Group). "World Health Organization (WHO) Guidelines on Use of Medically Important Antimicrobials in Food-Producing Animals." *Antimicrobial Resistance and Infection Control*. (January 2018): https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5772708/
- 11 The report authors estimate, based on available information, that around 50% of meat products sold in the United States are purchased in grocery store.
- 12 Getting accurate numbers for meat purchased in grocery stores is difficult because of how the USDA reports the data. In 2008, 61% of all meats and fish were obtained from at home sources. https://www.ers.usda.gov/amber-waves/2017/april/shares-of-food-commodities-purchased-away-from-home-vary-by-commodity/
- 13 In 2018, 65% of all protein including nuts, fish, meat and poultry was obtained from at home sources. See first table, columns I, J at bottom. https://www.ers.usda.gov/data-products/food-consumption-and-nutrient-intakes/
- 14 According to a 2014 survey by the American Meat Institute, 62% of American shoppers buy their meat at supermarkets. https://www.foodnavigator-usa.com/Article/2014/12/18/A-focus-on-the-retail-meat-market-in-the-USA.
- 15 Christopher JL Murray, et al. "Global Burden of Bacterial Antimicrobial Resistance in 2019: A Systematic Analysis," *The Lancet*, 399, No. 10325 (2022): 629-655. DOI: https://doi.org/10.1016/s0140-6736(21)02724-0.
- 16 Cunningham, Aimee. (2022). "Antimicrobial resistance is a leading cause of death globally," *Science News*, January 24, 2022. https://www.sciencenews.org/article/antimicrobial-resistance-cause-death-antibiotic-bacteria#:~:text=Bacterial%20infections%20 that%20don't.than%20from%20HIV%20or%20malaria.
- 17 Van Boeckel, Thomas P., Katie Tiseo, Marius Gilbert, & Timothy P Robinson. (2020). "Global Trends in Antimicrobial Use in Food Animals from 2017 to 2030," *Antibiotics (Basel)*, 9, No. 12. (2020): DOI: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7766021/#:~:text=Antimicrobials%20are%20an%20essential%20component,raised%20for%20food%20%5B9%5D.
- 18 Jonas, Olga B., Alec Irwin, Frank Cesar Jean Berthe, Francois G. Gall, and Patricio v. Marquez. "Drug-resistant Infections: A Threat to Our Economic Future", World Bank Group, No. 2, (2017): http://documents.worldbank.org/curated/en/323311493396993758/final-report
- 19 The Review on Antimicrobial Resistance. "Tackling Drug-Resistant Infections Globally: Final Report and Recommendations." (2016): https://amr-review.org/.
- 20 Matuszewska, Marta GR Murray, et al. ""Stable Antibiotic Resistance and Rapid Human Adaptation in Livestock-Associated MRSA." *eLife*, (June 2022): DOI: 10.7554/eLife.74819 https://elifesciences.org/articles/74819
- 21 DataWeave. "Inflation Accelerates Private Label Share and Penetration", CPG Whitepaper: Grocery. (2022)
- 22 USDA ERS Consumers' Interpretation of Food Labels with Production Claims Can Influence Purchases." Usda.gov, 2017, www.ers. usda.gov/amber-waves/2022/march/consumers-interpretation-of-food-labels-with-production-claims-can-influence-purchases/.
- 23 George Washington University. (April 2022). https://publichealth.gwu.edu/content/research-shows-%E2%80%98raised-without-antibiotics%E2%80%99-label-claim-beef-cattle-lacks-integrity.
- 24 "U.S. Pork and the Superbugs Crisis", (World Animal Protection US, 2019). https://www.worldanimalprotection.us/sites/default/files/media/us files/us pork superbugs report.pdf.

- 25 "Antibiotic Resistance in the Environment: Factory Farming and Superbug Genes in Rural Streams and Soils". (World Animal Protection US, 2021). https://www.worldanimalprotection.us/blogs/evidence-superbugs-waterways-near-factory-farms.
- Yang, Yichao et al. "Review of Antibiotic Resistance, Ecology, Dissemination, and Mitigation in U.S. Broiler Poultry Systems," Front. Microbiol., 15 (November 2019): https://www.frontiersin.org/articles/10.3389/fmicb.2019.02639/full; He, Ya et al. "Antibiotic resistance genes from livestock waste: occurrence, dissemination, and treatment," npj Clean Water, 3 (2020): https://www.nature.com/articles/s41545-020-0051-0; Wu, Yifan. "Comparative Assessment of Human Exposure to Antibiotic-Resistant Salmonella due to the Consumption of Various Food Products in the United States," Dissertations, Theses, & Student Research in Food Science and Technology, 134 (2022). University of Nebraska: https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1138&context=foodscidiss.
- 27 Rogers, Laura. "Groups Denounce Misleading 'One Health Certified™' Label Scheme." Press Release (January 26, 2021): http://battlesuperbugs.com/article-archive/groups-denounce-misleading-one-health-certifiedtm-label-scheme.)
- 28 Food and Drug Administration Center for Veterinary Medicine. "Summary Report on Antimicrobials Sold or Distributed for Use in Food-Producing Animals", (2021). https://www.fda.gov/media/154820/download.
- 29 Pew Charitable Trusts. "Gaps in FDA's Antibiotics Policies: Many Drugs May Still Be Available for Food Animals at Growth-Promotion Levels," PEW Issue Brief (November 2014): https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2014/11/gaps-in-fdas-antibiotics-policy.
- 30 US Food and Drug Administration. FDA Guidance 152, (2003). https://www.fda.gov/media/69949/download; World Health Organization. Critically Important Antimicrobials for Human Medicine 6th Revision, (2018).
- 31 Shatri, Gentri & Prassana Tadi. "Polymyxin" *National Library of Medicine, StatPearls*, (July, 2022). https://www.ncbi.nlm.nih. gov/books/NBK557540/#:~:text=They%20have%20become%20the%20last,%2C%20Enterobacteriaceae%2C%20and%20 Acinetobacter%20baumannii.
- 32 US Food and Drug Administration. "FDA Approves New Antibiotic to Treat Community-Acquired Bacterial Pneumonia," FDA News Release, (August, 2019), https://www.fda.gov/news-events/press-announcements/fda-approves-new-antibiotic-treat-community-acquired-bacterial-pneumonia.
- 33 The Pew Charitable Trusts, "Groups Issue Framework for Antibiotic Stewardship in Food Animal Production," (December 18, 2018), https://www.pewtrusts.org/en/about/news-room/press-releases-and-statements/2018/12/18/groups-issue-framework-for-antibiotic-stewardship-in-food-animal-production.
- 34 Ben Williamson. "Five Domains vs. Five Freedoms of Animal Welfare", World Animal Protection US, (June 2021), https://www.worldanimalprotection.us/blogs/five-domains-vs-five-freedoms-animal-welfare
- Jim O'Neill. "Review on Antimicrobial Resistance Antimicrobial Resistance: Tackling a Crisis for the Health and Wealth of Nations." Review on Antimicrobial Resistance, 2014. https://amr-review.org/sites/default/files/160525_ Final%20paper_with%20cover.pdf.
- 36 As recommended by the WHO, medically important antibiotics should only be used to treat sick animals that have been diagnosed by a veterinarian or to control a verified disease outbreak, https://www.who.int/publications/i/item/9789241550130.