Testimony of the Natural Resources Defense Council on Senate Bill 785

Senate Committee on Healthcare
March 16, 2017
Position: Support with -1 amendments

I thank you for the opportunity to address the senate committee on healthcare today. My name is Carmen Cordova, Ph.D. and I am a microbiologist and staff scientist in the Food and Agriculture Program at the Natural Resources Defense Council (NRDC). On behalf of NRDC, I am here to testify in support of SB 785. Antibiotic resistance is an epidemic, and experts agree that our collective use and overuse of antibiotics is a chief driver of the problem. In short, we all have important roles to play in curbing overuse.

So, here's why that puts a spotlight on livestock and poultry production. The U.S. is among the most intensive users of antibiotics in its livestock sector in the developed world. Moreover, among all the antibiotics important to humans that are sold in the US, around 70% are sold for use in food animals. The vast majority (96%) of those antibiotics are administered to animals in food and water, including a large fraction that is administered at low doses for animals that are not sick. This generally translates to mass administration of antibiotics to large groups of animals.

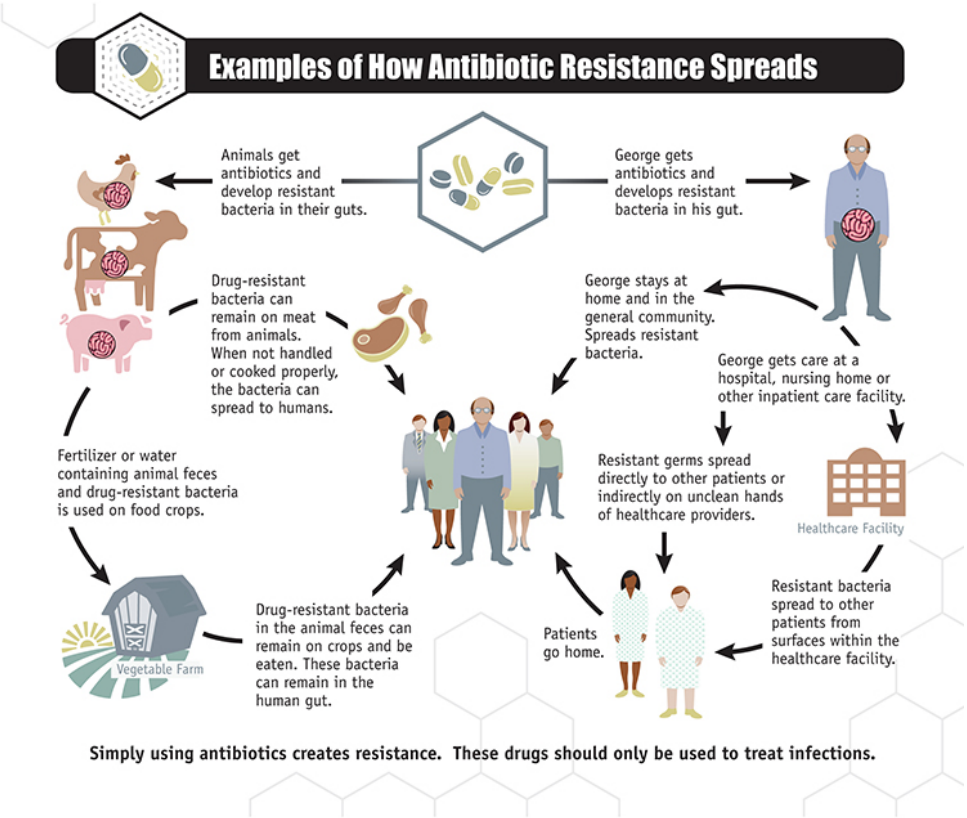
The CDC states very simply that "using antibiotics in people or animals can create drug resistance." In their latest report on antibiotic resistance threats, the CDC highlighted the 18 antibiotic resistant microorganisms that pose a risk to public health. A survey of the literature shows that eight of the 18 threats have been found either in farm animals or their facilities or on retail meat products in the US. This includes the two traditional food pathogens, *Salmonella* and *Campylobacter*.[i]

Table: CDC Resistant Threats and Food Animals

Threat	Detected in U.S. Food Animals	Detected in retail meat (*US* or globally)	On CDC threats list
Colistin-Resistant *Enterobacteriaceae*	Yes[ii]	Yes[iii]	No
Carbapenem-resistant *Enterobacteriaceae* (CRE)	Yes[iv]	Yes[v]	Yes
Extended spectrum Beta-lactamase producing *Enterobacteriaceae* (ESBLs)	Yes[vi]	***Yes***[vii]	Yes
Drug-resistant *Campylobacter*	Yes[viii]	***Yes***[ix]	Yes
Vancomycin-resistant *Enterococcus* (VRE)	Yes[x]	Yes[xi]	Yes

Multidrug-resistant *Pseudomonas aeruginosa*	Yes[xii]	***Yes***[xiii]	Yes
Drug-resistant non-typhoidal *Salmonella*	Yes[xiv]	***Yes***[xv]	Yes
Methicillin-resistant *Staphylococcus aureus*	Yes[xvi]	***Yes***[xvii]	Yes
Vancomycin-resistant *Staphylococcus aureus*	No	***Yes***[xviii]	Yes

Ultimately, this points to the fact that there is an increasingly blurry distinction between hospitals, farms, and communities in regards to the bacteria and the antibiotic resistance found in those environments and it underlines the importance of SB 785 to combat the antibiotic resistance threat to human health.



Adapted from CDC[xix]

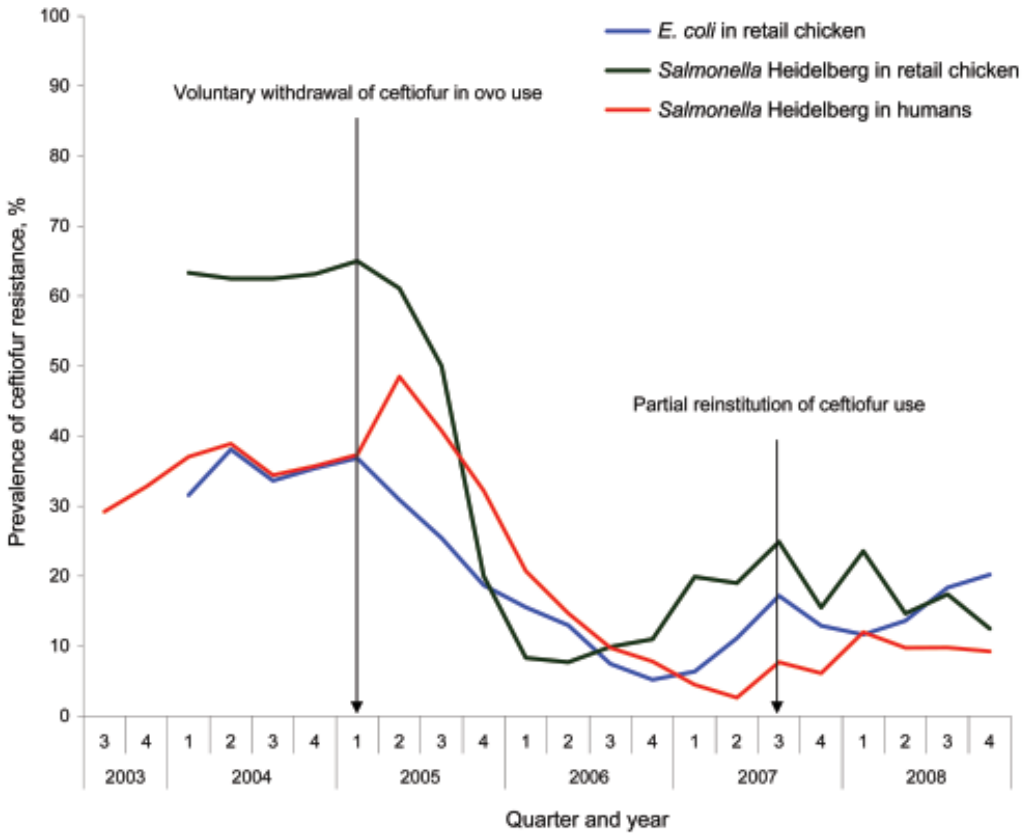
There is widespread consensus on the need for action now because of a large body of research showing how antibiotic resistant bacteria from poultry and livestock production can spread via several routes including through food, air, water, soil, pests, workers or via close proximity into communities.

(1) Antibiotic resistance can spread from farms to communities through fresh meats and vegetables, because of water and fertilizer use. For example, a recent study published by FDA scientists found that, in a survey of over 3000 retail meat samples from eight states, nearly 30% contained *Staphylococcus aureus*, and of those, 10% were resistant to multiple drugs, and a little less than 10% were MRSA. In the study, Oregon had the highest rate of retail samples that were positive for *S. aureus* and the highest rate of MRSA in retail meat.[xx]

(2) Air, water, and soil, or the immediate environment near animal feeding operations can become contaminated with antibiotic resistant bacteria. Bacteria do not respect borders and many studies have shown that antibiotic resistance can and does spread beyond the borders of the farm. For example, another study showed that both veterinary antibiotics – chlor- and oxytetracycline – and tetracycline resistance genes were detected in air particles blown downwind of Texas cattle feedlots.[xxi]

(3) Several studies have shown that workers can be carriers of antibiotic resistant bacteria like *E. coli* and *S. aureus* that have originated on the farm.[xxii] One recent study showed that in three of the leading broiler producing states (Georgia, Maryland, and Tennessee), the presence of broiler chicken operations is associated with higher rates of *Salmonella* infection in nearby communities and these infections were caused by *Salmonella* types commonly found in chicken, including *Salmonella* that were antibiotic resistant. The authors of the study offered two explanations: (1) workers could have brought *Salmonella* into their communities directly or (2) through the application of poultry litter on nearby fields, communities are placed at risk due to environmental exposure.[xxiii]

It is important to mention that studies on antibiotic resistance after changes in antibiotics policy show that these interventions work and that reducing antibiotic use on the farm can result in a plateauing or lowering of levels of resistance that threaten public health.[xxiv] One study on the effects of a voluntary withdrawal of Ceftiofur from Canadian hatcheries, indicated that resistance levels lowered both in Salmonella Heidelberg found in chickens and in people. Resistance levels subsequently rose after injections of Ceftiofur in hatcheries began again.[xxv]



Adapted from: Dutil, L. et al., 2010

Beyond curtailing antibiotic use for disease prevention, data collection under SB 785 would ensure that farmers, policy makers, and the general public would remain informed about progress. At a national level, FDA has no programs to collect and report information about antibiotic use (as opposed to sales) on the farm. Use data would allow the state to track its progress, benchmark use, and direct resources where they are needed.

SB 785 is a necessary step to tackle the antibiotic resistance crisis, and help keep our antibiotics effective into the future for everyone. Doctors, nurses, and hospitals cannot do it alone, when 70% of the sales of medically important antibiotics are for livestock use. Livestock and poultry producers also need to limit the use of medically important antibiotics on animals that are not sick. These critical, life-saving medicines have to be preserved to so that we can continue to have effective medicines to treat sick animals and sick humans.

[i] https://www.nrdc.org/experts/carmen-cordova/new-who-list-underscores-need-maryland-antibiotics-bill

[ii] Centers for Disease Control and Prevention, Tracking mcr-1, https://www.cdc.gov/drugresistance/tracking-mcr1.html, February 24, 2017.

[iii] Giamarellou, H., "Epidemiology of infections caused by polymyxin-resistant pathogens," Int J Antimicrob Agents, 48(2016):614-621.
[iv] Mollenkopf, D. et al., "Carbapenemase-producing Enterobacteriaceae recovered from the environment of a swine farrow-to-finish operation in the United States, Antimicrobial Agents and Chemotherapy, https://aac.asm.org/content/early/2016/11/15/AAC.01298-16.abstract
[v] Yao, X. et al., "Carbapenem-resistant and colistin-resistant Escherichia coli co-producing NDM-9 and MCR-1, The Lancet Infectious Diseases, 16(3):288-289.
[vi] Davis, M., et al., "Recent Emergence of Escherichia coli with Cephalosporin Resistance Conferred by bla(CTX-M) on Washington State Dairy Farms, Applied and Environmental Microbiology, 81(2015):4403-4410.
[vii] Davis, G. et al., "Intermingled Klebsiella pneumonia Populations Between Retail Meats and Human Urinary Tract Infections," Clin Infect Dis. 61(2015):892-899.
[viii] Food and Drug Administration, 2014 NARMS integrated Report
[ix] Food and Drug Administration, 2014 NARMS integrated Report
[x] Donabedian, S. et al., "Characterization of vancomycin-resistant Enterococcus faecium isolated from swine in three Michigan Counties, J Clin Microbiol. 48(2010):4156-60.
[xi] Hammerum, A. et al., "Antimicrobial-resistant Enterococci in Animals
[xii] Kim, S. et al., "Antibiotic resistance and Caco-2 cell invasion of Pseudomonas aeruginosa isolates from farm environments and retail products, International Journal of Food Microbiology, 115(2007):356-363.
[xiii] Kim, S. et al., "Antibiotic resistance and Caco-2 cell invasion of Pseudomonas aeruginosa isolates from farm environments and retail products, International Journal of Food Microbiology, 115(2007):356-363
[xiv] Food and Drug Administration, 2014 NARMS integrated Report
[xv] Food and Drug Administration, 2014 NARMS integrated Report
[xvi] Smith, T., "Livestock associated Staphylococcus aureus: The United States Experience, PLOS pathogens, 2015
[xvii] Waters, A. et al., "Multidrug-Resistant Staphylococcus aureus in US Meat and Poultry, Clinical Infectious Diseases, 52(2011):1227-1230.
[xviii] Abdalrahman, L. et al., "Staphylococcus aureus is More prevalent in retail beef livers than in pork and other beef cuts, Pathogens, 4(2015):182-198.
[xix] https://www.cdc.gov/drugresistance/about.html
[xx] https://www.ncbi.nlm.nih.gov/pubmed/27889161
[xxi] https://ehp.niehs.nih.gov/1408555/
[xxii] Natural Resources Defense Council, "Antibiotic Resistance: From the Farm to You," March 2015, available at http://www.nrdc.org/food/files/antibiotic-resistance-farms-FS.pdf, accessed February 28, 2016.
[xxiii] Shaw, K. http://www.sciencedirect.com/science/article/pii/S0013935116302213
[xxiv] Silbergeld, E.K., et al., "Industrial Food Animal Production, Antimicrobial Resistance, and Human Health, Annu. Rev. Public Health 2008. 29:151-69.
[xxv] https://www.ncbi.nlm.nih.gov/pubmed/20031042