Antibiotics on the Farm

Society is always looking for a low cost, quick fix to problems without concern for future generations. Now, more than ever, the use of antibiotics needs to align with the real possibility of future disaster. The overuse of antibiotics has expanded exponentially, resulting in microbial resistance and the endangerment of individuals throughout all stages of the life cycle. Resistant microbes have evolved in part due to overuse of antibiotics on industrial farms. This overuse is affecting the environment and the food supply; if not stopped it will have devastating effects on future generations.

Antibiotics are used in humans to treat health conditions caused by bacteria. This includes food poisoning, pneumonia, and infections, all of which are often treated with penicillin, tetracycline, and amoxicillin. These antibiotics were once made from natural compounds, but in recent years have been derived from synthetics (1).

Just like humans develop immunity against disease through vaccines, bacteria can develop immunity through antibiotics. Exposure to small amounts of antibiotic at one time does not eradicate all living bacteria. The fittest survive to pass on their ability to ward off antibiotic attacks. Resistant bacteria soon begin to thrive, rendering the antibiotic useless, and causing a need for more potent medications to be developed. For example, *Staphylococcus aureus* is what causes a staph infection in humans, and can develop into more serious conditions such as pneumonia. Almost every strain of *S. aureus* is now resistant to oxacillin, penicillin and amoxicillin. Some are even developing resistance to the new methicillin and vancomycin (1). This resistance is being accelerated by the overuse of antibiotics in humans and animals.

Antibiotics are used widely in the industrial farming industry. Since 1946 they have been mixed into animal feed to make animals more robust, grow faster, and put on weight more efficiently. This faster growth is used to compensate for the unsanitary conditions animals are forced to live in. The quicker they reach their necessary weight, the shorter their lifespan and the less likely disease is to take over (1). Because industrial farms are raising large amounts of animals in close confinement, the filth they must endure puts stress on their immune systems resulting in animals more prone to infection.

The antibiotics used in animal feed serves the duel purpose of weight gain and preserving health. It has been estimated that as much as 70% of the antibiotics used in the U.S. are fed to farm animals (2). This is where the majority of drug resistant bacteria develop, reaching the population through food, environment, and/or direct contact with the animals. Also weighing in on this bacteria resistant epidemic is the one billion tons of animal waste produced annually. This waste is filled with antibiotics and antibiotic resistant bacteria. Estimates say that 80-90% of the antibiotics given to animals are not digested. They then enter the environment

when sprayed on Confined Animal Feeding Operation (CAFO) fields and encounter new bacteria (1).

Farmers in charge of CAFOs see the use of antibiotics as a positive. These antibiotics cause animals to gain 4-5% more body weight, can be used in the treatment and prevention of animal diseases, allow livestock to live long enough to become proper weight, and extend the shelf-life of meat, poultry, eggs, and dairy (3). They choose to turn away to the negative connotations, which will play a major role in future generations and the effects can already be seen. Widespread antibiotic use in feed is leading to multi-drug resistant pathogens. The National Research Council and Institute of Medicine has concluded that antibiotic resistant human diseases have "clearly accelerated" from antibiotic treated livestock. A drug classification known as Fluoroquinolones can contribute to resistance in foodborne bacteria that affect humans. For example, the Minnesota Health Department discovered that 70% of chicken meat sampled contained campylobacter, and 20% was a resistant strand (1).

Despite the rise in resistance after the introduction of antibiotics into animal feed, and the fact that over 25 million pounds of antibiotics are used in animal feed each year (2), an article analyzed by *The Academy of Nutrition and Dietetics* was able to find no causal relationship between drugs used in livestock and antibiotic resistance. This was in a study conducted on select poultry waste dumps from September 2004 – December 2004. They do however believe, the lack of onsite waste treatment facilities represents a major threat to the environment and increases the risk for drug resistance (4).

In order to control the rapid use of veterinary prescribed antibiotics in animal feed, the Food and Drug Administration (FDA) has banned the use of certain drugs on animals; the most recent being a stop to the widespread injection of Cephalosporins into cattle, pigs, chickens and turkeys beginning April 5, 2012. Cephalosporin is commonly used to treat pneumonia, skin and tissue infections, and foodborne illnesses such as *Escherichia coli* and *Salmonella*. However, the FDA did not limit the use of cephapirin, an older antibiotic they do not feel contributes to resistance in people (5).

A World Health Organization (WHO) report on infectious diseases ties this problem to the nations young. Infectious diseases are currently the biggest killer worldwide of children and young adults accounting for more than 13 million deaths a year. In one hour 1,500 people will die from an infectious disease. Half of those will be under the age of five. The majority of these people will be from developing countries, and lack access to essential drugs (6). These essential drugs include new, expensive forms of antibiotics that are developed synthetically due to resistance that has formed. These new therapeutic options will always be limited due to the need for FDA approval (7).

Children have young, undeveloped immune systems, which limit the amount of therapeutic drugs they can take, and increases the likelihood of encountering diseases they are unable to fight off. They also have a higher vulnerability rate, especially to foodborne illness such as *Campylobacter* and *Salmonella* (7). Yet they are being exposed to factory farm, antibiotic infested foods at higher rates, and without a choice. Industrialized farms have the capacity to raise more animals at a quicker rate than farmers who choose to raise crops and livestock organically or following natures lifecycle. Feeding animals what they originally evolved to eat keeps farm sizes down and allows for better management of overcrowding. This eliminates the use of antibiotics. Because of this, the prices of industrialized farms products tend to be less than those of farmers practicing more sustainable methods. The ability to make more products at a cheaper quantity is reflected in the price and the amount incorporated into the average citizens diet. Children are exposed to these products in greater quantities through the lunches they are fed at school. Factory farms such as Tyson, Jennie-O, and Butterball provide the bulk of poultry to school lunch programs. These farms, like all other industrial farms, use antibiotics to plump their poultry and reduce the amount of disease seen before slaughter. Their products are not only purchased for their cheap costs, which are necessary on school foodservice budgets, but also the ability to supply quantities great enough to feed students year round. Procurement is easier through one vendor than the management of multiple small farmers.

Today's most vulnerable population is being exposed to these antimicrobials at alarming rates, yet have no say in it. They cannot order organic meat, milk, fruits, and vegetables on the lunch line, or prevent farms from contaminating the environment they must continue to thrive in. Most importantly, is the fact that most antibiotics will be useless and the development of new alternatives will rest on their shoulders. All of this thanks to today's food practices.

Work Cited

1.) "Antibiotics, Antibiotic Use in Animal - The Issues - Sustainable Table." *Sustainabletable*. Web. 25 Feb. 2012. <http://www.sustainabletable.org/issues/antibiotics/index.php>.

2.) "The Challenge." *Human Health and Industrial Farming*. The PEW Charitable Trusts, 2010. Web. 25 Feb. 2012. ' <http://www.saveantibiotics.org/ourwork.html>.

3.) Eye, Jenn, Jen Paulson, and Joe Rager. "Pros and Cons of Antibiotics in Livestock Feed." *Welcome to the University of Delaware*. University of Delaware. Web. 25 Feb. 2012. <http://www.udel.edu/chem/C465/senior/fall98/AntibiotFood2/pros_cons.html>.

4.) "What Are the Health Benefits and Risks of Emerging Food Technology and Practices?" *Evidence Analysis Library*. Academy of Nutrition and Dietetics, 2012. Web. 25 Feb. 2012. <http://www.adaevidencelibrary.com/evidence.cfm?evidence_summary_id=251327>.

5.) "Animal & Veterinary." *Animal & Veterinary*. U S Food and Drug Administration. Web. 25 Feb. 2012. <http://www.fda.gov/AnimalVeterinary/default.htm>.

6.) "WHO Report on Infectious Diseases Chapter 16 Text." *World Health Organization Report on Infectious Diseases*. World Health Organization, 1999. Web. 25 Feb. 2012. <http://www.who.int/infectious-disease-report/pages/textonly.html>.

7.) Shea, Katherine, Karen Florini, and Tamar Barlam. "When Wonder Drugs Don't Work." *When Wonder Drugs Don't Work*. Environmental Defense Fund, 2001. Web. 25 Feb. 2012. <http://www.edf.org/health/reports/when-wonder-drugs-dont-work>.