Understanding a Role of Emerging Technologies in Veterinarians' Decision-Making about Antibiotic Use: A One Health Approach

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Abstract
Antibiotic resistance (AR) is a growing and urgent health threat to human, animals, and the ecology, and one of causes of AR is an extensive agricultural use of antibiotics. Taking a One Health approach, this study seeks to better understand clinical decision-making and antibiotic use among food animal veterinarians by learning what tools they use and need as they make decisions with a focus on the role of information and communication technologies in the context of AR.

Author Keywords
Information and communication technologies; antibiotic resistance; veterinarians; decision-making; one health; public health; food safety.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Background
Antibiotic resistance is a growing and urgent health threat to human, animals, and the ecology. One of causes of AR is an extensive agricultural use of antibiotics. In 2014, antibiotic sales for food animal

Goals of This Research Project

Goal 1: Examine decision-making processes and information practices of veterinarians in the context of antibiotic use.

Goal 2: Identify currently available public online data sources on antibiotic resistance.

Goal 3: Begin creation of a digital tool that can help stakeholders better understand the antibiotic resistance problem and optimize their decision-making around the use of antibiotics in animals.

production accounted for 70 percent of total medically important antibiotic sales, reporting a 23 percent rise since 2009 [3]. Antibiotic use in food producing animals can harm public health in several ways. For example, antibiotics used in animals are ingested by humans when they consume food, and affect environments as resistant bacteria from animal production facilities spread through air, water, and soil [4].

The science of antibiotic use and its impact on human, animal, and ecological health is complex and as a consequence, so is the information environment. Advances in computing and communication technology make it possible to provide producers and veterinarians with all the information they might desire for making decisions about antibiotic use. This information is available in massive quantities and in many forms. However, we have little knowledge about how much of this information is actually utilized by producers and veterinarians when making decisions in relation to antibiotic use. Creating technologies that can effectively communicate complex information regarding AR such as recent development or policy changes requires a deep understanding of information practices of the people who would use that information.

One Health Approach

One Health, is the concept that human, animal, and environmental health are interconnected and that the knowledge and study of these interconnections has benefit. Antibiotic resistance is one of examples of One Health challenges. The concept has gained traction globally over the last 10 years, largely in veterinary and human health disciplines (e.g., [5]), mainly as a way to promote cross-disciplinary training of clinicians. More recently, the concept has functioned as a research approach and incubator. In particular, it serves as a framework for studying complex systems and for bringing together diverse academic disciplines to examine these systems [1, 2].

Description of Research Project

This research project takes the One Health approach by taking human, animal, and environmental health into account in addressing antibiotic resistance. The first phase of this project, which is currently underway, involves interviews of food animal veterinarians. By learning how they make decisions about antibiotic use, and what tools they use and need as they make decisions, we seek to better understand clinical decision-making and antibiotic use among food animal veterinarians and their perceptions of the antibiotic resistance problem.

Contributions

Understanding information practices of veterinarians around decision-making and antibiotic use, and identifying tools they use and need would help designers create better tools and technologies for veterinarians and agricultural producers by informing designers of the needs of the key stakeholders. Given the importance of veterinarians' role in antibiotic use in food animals, it might also help figure out effective ways to mitigate antibiotic resistance, ultimately promoting food safety and public health.

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