

The Changing Paradigm of Antimicrobial Use in Veterinary Medicine

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Driven to DiscoverSM

Introduction

- In 2012 FDA published Guidance for Industry (GFI) #209 describing the overall policy direction regarding antimicrobial drugs
 - Limit medically important antimicrobial drugs to uses in food-producing animals that are
 - considered necessary for ensuring animal health
 - that include veterinary oversight or consultation



Introduction

- In 2013, GFI #213 was published, providing more detail on implementing the key principles in GFI #209
 - Defines “medically important”
 - Voluntarily remove claims relating to production uses (growth promotion / feed efficiency)
 - Bring remaining therapeutic uses under veterinary oversight by changing marketing status from over-the-counter (OTC) to veterinary feed directive (VFD) or prescription (Rx)
- Fully enacted by January 2017



Introduction

- “Medically important” antimicrobials include:
 - Aminoglycosides
 - Lincosamides
 - Macrolides
 - Penicillins
 - Streptogramins
 - Sulfonamides
 - Tetracyclines
- **Illegal** to use these products for growth promotion / feed efficiency or to use without the authorization of a licensed veterinarian



Introduction

- Veterinary Feed Directive (VFD) Regulation
 - Requirements relating to distribution and use of VFD drugs (feed-use drugs that require supervision of licensed veterinarian)
 - Updated regulations went into effect October 2015
 - Critical step for facilitating transition to veterinary oversight



Justification and Approach

- Antimicrobial use practices are changing due to FDA policy and consumer / customer demands
- Need to help veterinarians and production companies understand the impacts of antimicrobial use on AMR
- Focus on 3 different programs
 - USDA-NIFA funded field investigation of antimicrobial use and resistance
 - Broiler on-farm NARMS program
 - National industrywide on-farm antimicrobial use data collection effort



USDA-NIFA Study

- Quantify the effect that antimicrobials used for preventing necrotic enteritis in broiler chickens have on AMR in the broiler environment
- Pen trial was conducted over 3 successive flocks raised on the same litter. Birds were raised for 35 days with a 7-day downtime between flocks



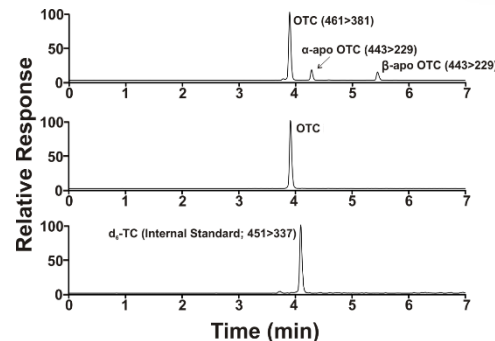
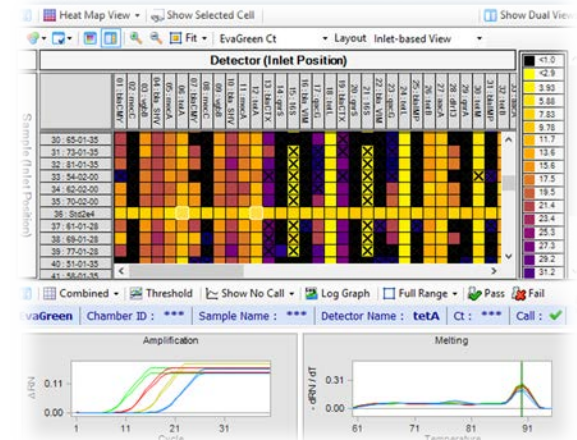
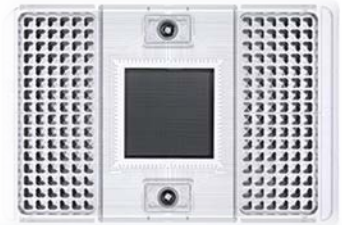
USDA-NIFA Study

Treatment Group	Duration (Days)	Pens	Birds / Pen	Coccidia Vaccine
Narasin (70g/ton)	0 – 28	5	60	N
Narasin (70g/ton) Bacitracin (50g/ton)	0 – 28	5	60	N
Narasin (70g/ton) Bambermycin (2g/ton)	0 – 28	5	60	N
Narasin (70g/ton) Oxytetracycline (100g/ton)	0 – 28	5	60	N
Narasin (70g/ton) Oxytetracycline (400g/ton)	0 – 28	5	60	N
Narasin (70g/ton) Virginiamycin (20g/ton)	0 – 28	5	60	N
No Narasin / No Antibiotic	0 – 28	5	60	Y

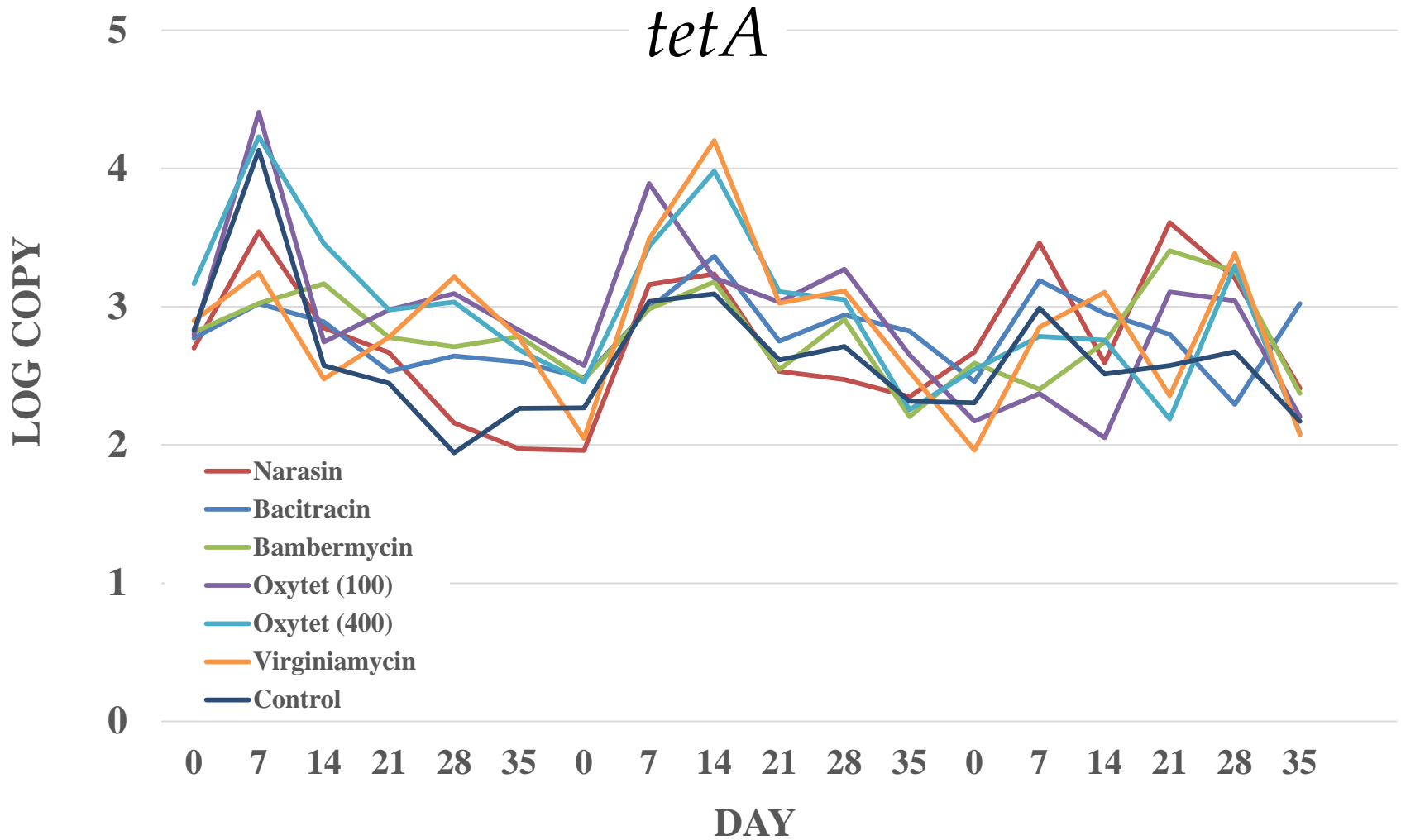


USDA-NIFA Study

- Weekly composite litter samples were collected from each pen
 - Cultured for *Salmonella* and *E. coli*
 - DNA extraction
 - Microbiome and Metagenome
 - qPCR analysis for 48 genes
 - Antimicrobial metabolites



USDA-NIFA Study



2016 On-Farm NARMS

- Goal: collect on-farm samples and antimicrobial use data from broiler farms throughout the U.S.
- Participation is voluntary and anonymous
- Current enrollment is between 50 and 75% of annual U.S. production
 - Between 10 and 15 companies enrolled, 118 total farms followed over time
 - Sample every flock cycle for *Salmonella* and *Campylobacter*



2016 On-Farm NARMS

Complex:				
Houses:	1	2	3	4
Trip 1	+	+	+	+
Trip 2	+	+	+	+
Trip 3	+	+	-	+
Trip 4	+	+	+	+
Trip 5	+	+	+	+

Serotype	GEN	STR	AUG	AXO	FOX	FIS	SXT	AZI	MER	AMP	CHL	CIP	NAL	TET	n
															2
															2
															1
															1
Enteritidis															4
Kentucky															2
Kentucky															7
Kentucky															2
Kentucky															4
Kentucky															8
Mbandaka															2
Paratyphi B															1
Schwarzengrund															2

Complex:				
Houses:	1	2	3	4
Hatchery Gentamicin	+	+	+	+
Ionophore	+	+	+	+
AGP	+	+	+	+
Disease Prevention	+	+	+	+



2016 On-Farm NARMS

Complex:				
Houses:	1	2	3	4
Trip 1	+	+	+	+
Trip 2	+	+	+	+
Trip 3	+	+	+	+

Serotype	GEN	STR	AUG	AXO	FOX	FIS	SXT	AZI	MER	AMP	CHL	CIP	NAL	TET	n
															1
															1
Enteritidis															1
I 4,[5],12:i-															1
Kentucky															2
Schwarzengrund															1
Schwarzengrund															7
Schwarzengrund															5
Typhimurium															2
Typhimurium															4

Complex:				
Houses:	1	2	3	4
Hatchery Gentamicin	-	-	-	-
Ionophore	-	-	-	-
AGP	-	-	-	-
Disease Prevention	-	-	-	-



National Antimicrobial Usage

- Each commodity group has initiated on-farm data collection efforts
- Poultry effort began in 2014 with support from U.S. Poultry & Egg Association
- Support now provided through FDA Cooperative Agreements



National Antimicrobial Usage

- Survey instrument designed collaboratively with USDA-APHIS
- Survey responses are coded and analyzed as a composite of the industry
 - Participation is voluntary and confidential
- Survey is designed to capture indication, route, dose, and duration
 - Organized by hatchery, growth promotion, disease prevention, treatment and control



National Antimicrobial Usage

- Trust in survey is critical
 - USDA-APHIS also serves an auditing role
- Broiler survey based on 6-month periods while turkey and layer surveys based on 12-month periods
- Data requested from 2013 to present



Conclusions

- Bottom-up and top-down approaches to quantifying antimicrobial use
- Terms like NAE and ABF do **not** mean that companies do not use antibiotics
 - Maintaining animal health and welfare is key
- No single best approach to maintaining health
- Need more efforts to evaluate changes in AMR as a function of changes in antimicrobial use
 - Improved antimicrobial stewardship and reductions in antimicrobial use are important but not the end goal



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