Antimicrobial Prescribing Practices of Washington State Veterinarians

Heather Fowler, VMD PhD MPH DACVPM
Director, Producer and Public Health
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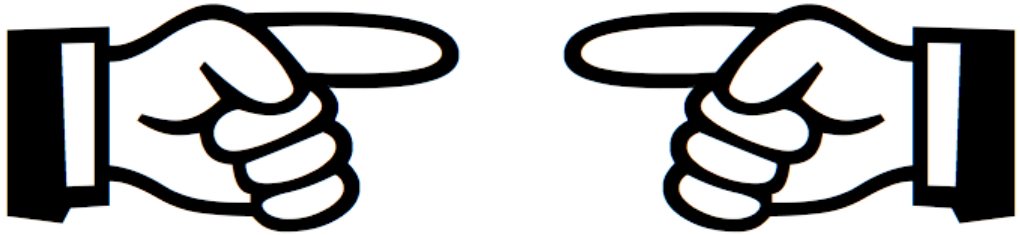
One Health

The collaborative effort of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals and our environment.

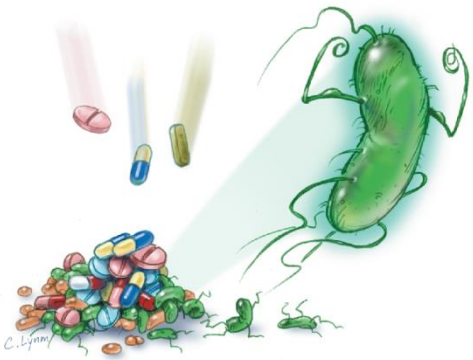
Antimicrobial resistance

- A major public health issue
- Spans all realms of health
  - Human
  - Animal
  - Environmental
- Polarized, political, and emotional topic



Washington State One Health Initiative

- Began in 2013
- Driven by the Department of Health
- “One Health in Action”
- Transdisciplinary collaboration with two main focus areas:
  - Surveillance and data integration
    - Antimicrobial resistance
  - Antimicrobial stewardship
- Veterinary work group formed in 2015



Veterinary prescribing practices

- Assess practices among veterinarians in Washington State regarding antibiotic prescribing
- Cross-sectional study
- Mixed methods approach
  - Quantitative➔What?
  - Qualitative➔Why?
- Identify influential factors, barriers and facilitators to judicious use of antibiotics
- Open to veterinarians licensed and practicing in Washington State
  - Launched at the 2015 Pacific Northwest Veterinary Conference and Trade Show in Tacoma, Washington

Survey design

- Demographics
- Attitudes toward antimicrobial resistance
- Factors, barriers, and facilitators for ordering C&S (open-ended)
- Commonly prescribed antibiotics used by system affected or suspected syndrome (open-ended)

Study demographics

Characteristic	n(%)
Years in practice, Mean +/- SD	21 +/- 12.8
Practice type	
Small Animal (including Exotic and Companion Avian)	**166 (82)**
Large/Food Animal	13 (6)
Mixed Animal	22 (11)
Zoo and wildlife	2 (1)
"Antimicrobial resistant infections are an important issue in veterinary medicine" (Strongly agree or Agree)	**184 (91)**

- 203 Washington veterinarians completed the survey
- 144/203 (77%) surveys were completed using the online version of the survey

59/318(19%) hard copy surveys were completed by PNWVC TS participants Vet population in Washington? 2500.

WSVMA 1300 (52%) membership

	Small Animal (n=166) N (%)	Large Animal (n=13) N (%)	Mixed Animal (n=22) N (%)	Zoo/Wildlife (n=2) N (%)	Total (n=203) N (%)
Perform Culture/Sensitivity (Yes)	130 (78)	8 (62)	15 (68)	2 (100)	155 (76)
In house (n=155)	3 (2)	3 (37)	2 (13)	1 (50)	9 (6)
Send out (n=155)	128 (98)	8 (100)	14 (93)	1 (50)	151 (97)
Do not perform (n=155)	1 (0.8)	0 (0)	0 (0)	0 (0)	1 (0.6)
Always perform Culture/Sensitivity (i.e. >75% of the time)	22 (17)	2 (25)	0(0)	2 (100)	26 (17)
Often or Always perform Culture/Sensitivity (i.e. at least 50% of the time)	49 (38)	3 (37)	2 (13)	2 (100)	56 (36)
Most commonly submitted specimen					
Wounds	12 (9)	2 (25)	6 (40)	0 (0)	20 (13)
Urine	95 (73)	0 (0)	7 (47)	0 (0)	102 (67)
Other	22 (17)	6 (75)	2 (13)	1 (50)	31 (20)
Clinic antibiogram (Yes)	13 (10)	2 (25)	1 (7)	0 (0)	16 (10)

[a] Number (percent) of participating veterinarians in the relevant category.

Clinic antibiogram

Hospital XXX Antibiogram										
		% of n isolates susceptible to each antibiotic listed								
Bacteria	Number of isolates tested (n)	TOB	CFP	CTZ	PTZ	IMI	CIP	OXA	VAN	DAP
E. cloacae	192	65	77	66	79	96	85			
E. coli	1462	86	94	90	90	99	65			
K. pneumoniae	379*	78	80	79	86	97	81			
A. baumannii	117	63	61	57	69	73	66			
P. aeruginosa	928	65	73	71	88	76	44			
S. aureus	1178						44	41	100¥	100
E. faecalis	572								99	100
E. faecium	206								43	96

*20% of isolates are ESBL-positive
¥23% of isolates have vancomycin MIC = 2mcg/mL
TOB = tobramycin; CFP = cefepime; CTZ = ceftazidime; PTZ = piperacillin/tazobactam; IMI = imipenem; CIP = ciprofloxacin; OXA = oxacillin; VAN = vancomycin; DAP = daptomycin
Example adapted from Utilization of the Antibiogram in Clinical Practice accessed at http://www.bugsvsdrugs.com

Factors influencing C/S ordering

Reasons for ordering C/S	Specific examples
Animal	Age, health status, severity of infection, novel pathogen, mixed bacterial infection, animal's value, history of conditions/previous infections
Best practices	Community standard of care or perceived best practices including educating owners on AMR, requiring test results before treatment, etc.
Experience	Comfort with drug, amount of time working in vet med
Money/Cost	Pet insurance, cost of test, if owner able to afford
Non-healing	Including reinfection, treatment failure
Other miscellaneous limiting factors	Post-op, mode of delivery, lab limitations, availability of test, etc.
Owner	Owner compliance, owner interest in ordering test
Sampling	Ease or difficulty of collecting sample, type of sample
Time	Time lag between ordering test and result

Nine main categories

Factors influencing C/S ordering, etc.

Reasons for ordering bacterial culture and sensitivity (Codes)	Is a Factor n(%)	Is a Barrier n(%)	Is a Facilitator n(%)
Animal	**75 (37)**	1 (0.5)	23 (11)
Best practices	13 (6)	1 (0.5)	**49 (24)**
Experience	4 (2)	0 (0)	4 (2)
Money/Cost	16 (8)	**132 (65)**	19 (9)
Non-healing	**109 (54)**	0 (0)	**55 (27)**
Other	1 (0.5)	1 (0.5)	10 (5)
Owner	9 (4)	17 (8)	20 (10)
Sampling	3 (1)	5 (2)	3 (1)
Time	1 (0.5)	13 (6)	3 (1)

Drug Class	Frequency of reported use by System/Syndrome, n						
	Bacteremia	Gastrointestinal	Fever of Unknown Origin	Dermatologic	Reproductive	Respiratory	Urogenital
Aminoglycosides	20	4	7	2	6	3	1
Beta lactams	**132**	**71**	**145**	**178**	**108**	**152**	**164**
Third Generation Cephalosporins	11	3	25	**94**	11	13	34
Dihydrofolate inhibitors	6	16	3	17	2	14	23
Fluoroquinolones	**111**	14	**69**	19	**43**	67	**63**
Lincosamides	5	3	10	17	2	8	2
Macrolides	0	19	0	1	2	21	1
Nitroimidazoles	19	**163**	6	0	1	3	0
Phenicols	5	0	2	1	1	8	1
Tetracyclines	9	10	33	6	4	**110**	5
Other	6	0	6	2	4	2	2
Missing	20	18	19	17	31	17	17
N/A	27	4	11	2	40	5	4

[a]The two most commonly reported drug classes are bolded for each column.

Common antibiotics in vet medicine

- The most commonly mentioned individual drugs included enrofloxacin (n=146), cephalexin (n=214), amoxicillin trihydrate/clavulanate potassium (n=479), and metronidazole (n=181)
  - listed individually or in combination with other drug classes
- Broad spectrum, clinically important antimicrobials including ciprofloxacin (n=20), enrofloxacin (n=146), and third generation cephalosporins (n=191) which included cefovecin, cefpodoxime, and ceftiofur were also reported
- Survey design prohibited drawing major conclusions from these findings

Washington study conclusions

- Surveyed Veterinarians in Washington State are concerned about antimicrobial resistance
- Intrinsic and extrinsic factors influence antimicrobial use and C/S ordering in veterinary practice
- Client factors, more specifically cost, appear to be the greatest barrier to judicious use in the survey population
- Veterinary personnel must find ways to leverage facilitators to overcome barriers to judicious use in clinical practice

Veterinary prescribing practices around the world

- Worldwide though concentrated in/around Europe
- Cover companion animal and food animal species
- Utilize qualitative and/or mixed method approaches
  - Focus groups and/or interviews
  - Chart Abstraction
  - Clinical vignettes
  - Diary entries of antimicrobial use
- Assess commonly prescribed medications with an emphasis on those that are considered medically important
  - Dose ranges and disease indications

At least 34 other studies on this topic

Influential factors in food animal production

- Farmers, Veterinarians, and other key stakeholders
- Clinical
  - Diagnosis/Condition to be treated and its response to therapy
  - Experience with a given drug
- Non-clinical/external pressures
  - Client/Farmer interactions (“Professional Stress”)
  - Legislation
  - Public perception
  - Cost
  - Time restrictions

10 studies looked at farm animals: mixed methods. Australia, US, UK x2, Irelandx2, NZ, Italy, Belgium/Netherlands(x3)

Influential factors in food animal production, cont'd.

Table 1. Characteristics of the respondents

Respondent ID	Animal species of main concern	(Co-)Owner versus payroll	Years of experience
R1	Poultry	(Co)-Owner	33
R2	Poultry	Payroll	8
R3	Veal calves	(Co)-Owner	19
R4	Poultry	(Co)-Owner	15
R5	Pigs	Payroll	10
R6	Dairy/veal calves	(Co)-Owner	26
R7	Dairy	(Co)-Owner	2
R8	Pigs	(Co)-Owner	20
R9	Dairy	(Co)-Owner	22
R10	Pigs	Payroll	17
R11	Veal calves	(Co)-Owner	10

R6 : 'And if you are going to act as a police officer, then you will lose lots of clients.'

R2 : 'When the chicks and the feed are of inferior quality, then you cannot expect chickens to arrive at the slaughterhouse without medicines.'

R8 : 'Then you immediately start with antimicrobial group treatment. Because treating 350 piglets individually, that is not feasible at that very moment. Then you also do not await a report from the Animal Health Service [veterinary laboratory - DS] or something. Then you need to act immediately. There was mortality already. Then really something must be done, otherwise you have to drag most of them to the road [for destruction – DS].'

Speksnijder, DC et al. Determinants associated with veterinary antimicrobial prescribing in farm animals in the Netherlands: a qualitative study. ZPH 2015 Apr;62 Suppl 1:39-51. doi: 10.1111/zph.12168.

Improving veterinary prescribing practices

- Antibiotics are an important tool available to veterinarians and other HCPs
- C/S should be used when appropriate
  - Collect proper specimens when possible
- Veterinary personnel must find ways to leverage facilitators to overcome barriers to judicious use in clinical practice

Other pointers:

Avoid faith-based

practices

Treat the patient not

the test result

Source: Weese, JS.

2016. clinicians brief