



Utrecht University

Veterinary Medicine



ENOVAT

European Network for Optimization of
Veterinary Antimicrobial Treatment

Antimicrobial stewardship in companion animals: why, what and how?



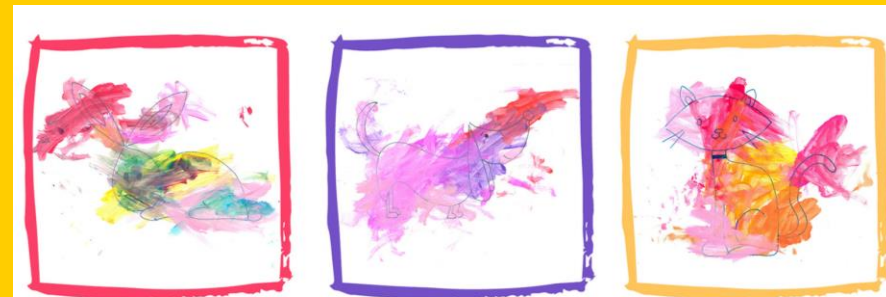
ESGVM

ESCMID STUDY GROUP
FOR VETERINARY
MICROBIOLOGY

European Society of Clinical Microbiology and Infectious Diseases

Els Broens

Associate professor / Director VMDC





Antimicrobial stewardship in companion animals

Why?

Why?



Regulation EU 2019/6 on Veterinary Medicinal Products



So far, focus on cattle, pigs and poultry



Limited data, actions and results in companion animals

Quantity versus quality



Close contact between companion animals and humans

Transmission of resistant bacteria

Regulation EU 2019/6

Legislation applicable to all animal species

Animal species for which AMU data are to be provided:

By 2024:

- **Cattle, pigs, chickens and turkeys**

By 2027

- **Sheep, goat, ducks, geese, fish, horses, rabbits, any other food-producing animals**

By 2030

- **Dogs, cats, fur animals**

By 2024	By 2027	By 2030
Cattle All production categories, and specifying use in bovines < 1 year ^(a)	Cattle All production categories, and specifying use in bovines < 1 year ^(a)	Cattle All production categories, and specifying use in bovines < 1 year ^(a)
Pigs	Pigs	Pigs
Poultry • Chickens • Turkeys All production categories or stages for each species, including breeders, layers, broilers for chickens, and fattening turkeys	Poultry • Chickens • Turkeys • Ducks • Geese All production categories or stages for each species	Poultry • Chickens • Turkeys • Ducks • Geese All production categories or stages for each species
	Sheep	Sheep
	Goats	Goats
	Finfish	Finfish
	Horses – both food-producing and non-food-producing	Horses – both food-producing and non-food-producing
	Rabbits (food-producing)	Rabbits (food-producing)
	Any other food-producing animals ^(c)	Any other food-producing animals ^(d)
		Dogs
		Cats
		Fur animals • Minks • Foxes

29-6-2023

So far, focus on food-producing animals



Data and results:

Europe (ESVAC) 2011-2021

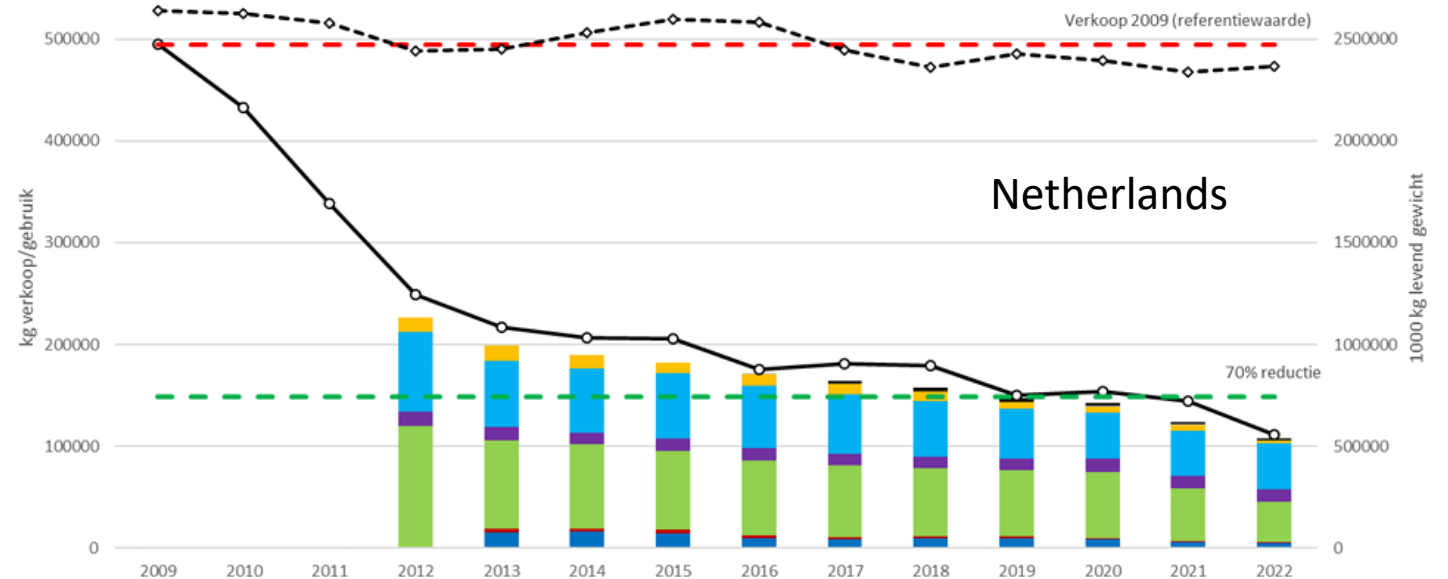
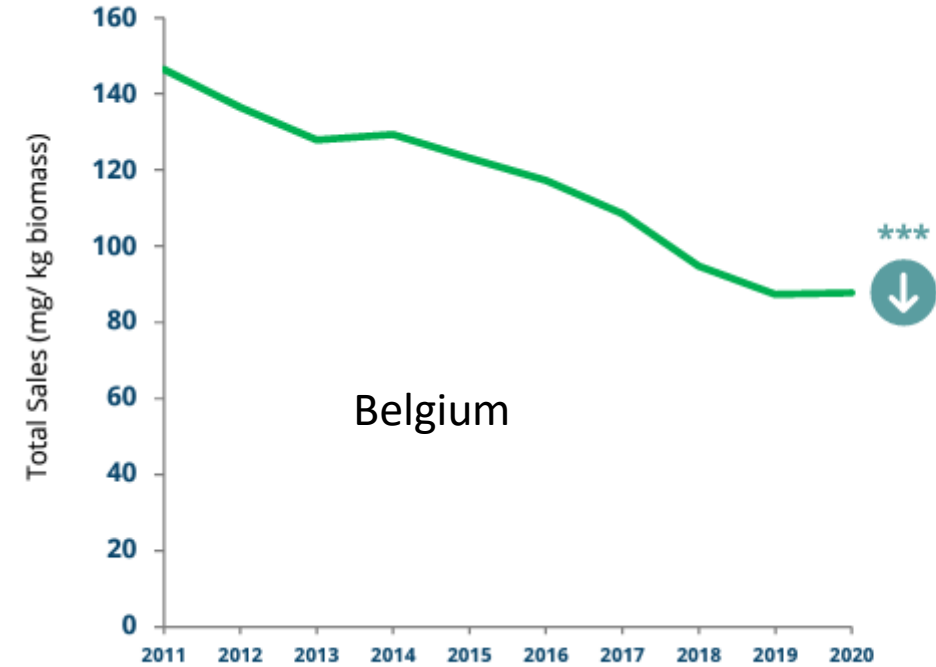
- **Decline 46.5% in mg/PCU**

Netherlands (SDa) 2009 - 2022

- **Decline 77.4% in kg active substance**

Belgium (AMCRA) 2009-2020

- **Decline 40.2% mg/kg biomass**



Limited data companion animals



Quantification of AMU – different ways

- Total grams of active substances
- Number of packages / tablets sold
- Number of prescriptions / treatments
- **Defined Daily Dose Animal**
 - *DDDA = 2 implies that the average dog, cat and rabbit of this clinic has received 2 days of AM-treatment in a year*



Limited data companion animals

ESVAC:

Overall sales (tonnes of active substance), split by **tablets** (mainly used in companion animals) and all other product forms in 2021

- Total EU: 1.4%
- Belgium 1.4%
- Netherlands 2.2%

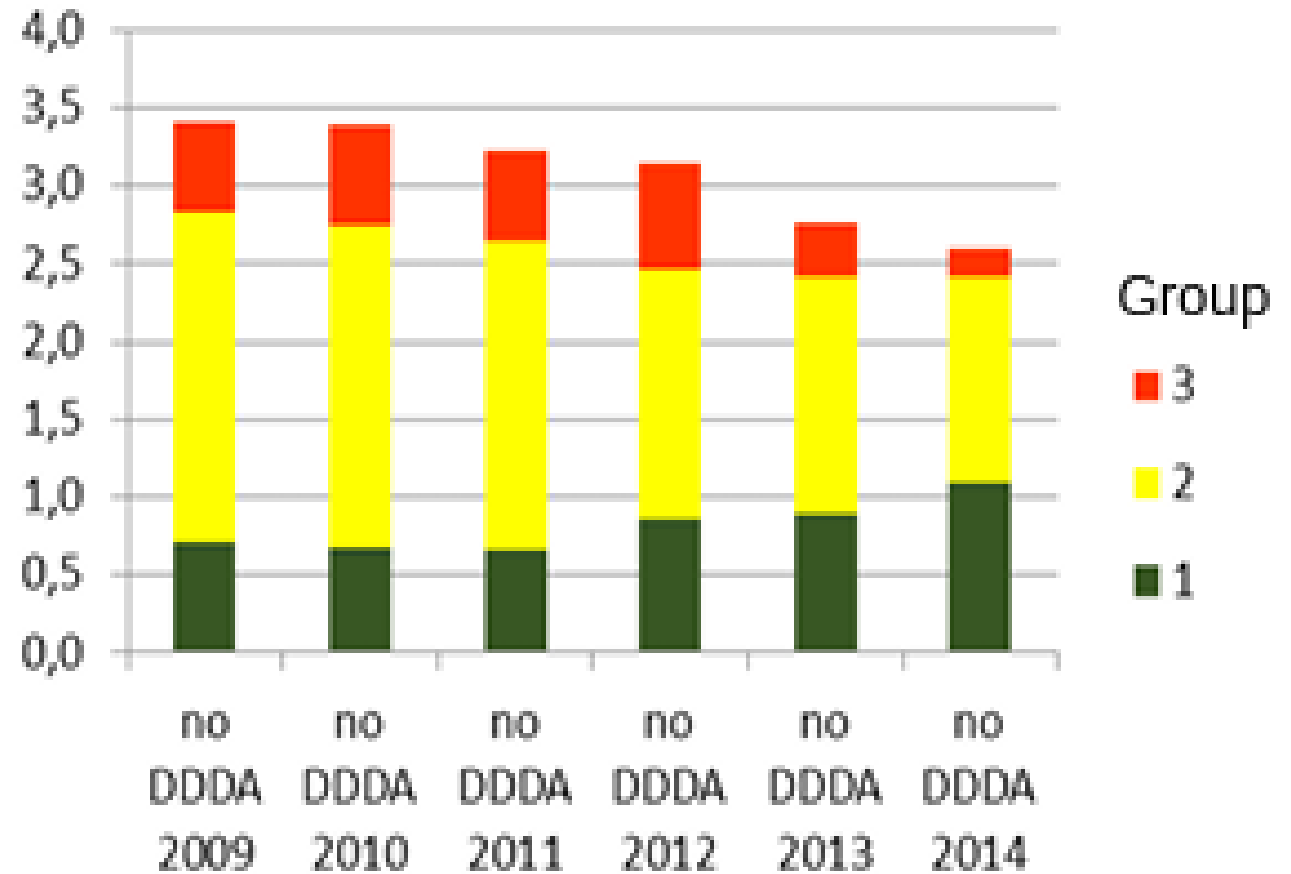
Table 7. Overall sales, in tonnes of active substance, split by tablets (used mainly in **companion** animals) and all other product forms (used mainly in food-producing animals), by country, in 2021

Country	Tablets		All other products forms		Total tonnes
	Tonnes	% of overall sales	Tonnes	% of overall sales	
Austria	0.59	1.5%	39.1	98.5%	39.7
Belgium	2.4	1.4%	168.6	98.6%	171.0
Bulgaria	0.14	0.29%	48.7	99.7%	48.9
Croatia	0.17	0.82%	20.7	99.2%	20.9
Cyprus	0.07	0.15%	45.1	99.8%	45.1
Czechia	1.2	3.2%	35.5	96.8%	36.6
Denmark	0.75	0.91%	81.9	99.1%	82.6
Estonia	0.18	3.2%	5.3	96.8%	5.5
Finland	1.0	10.6%	8.4	89.4%	9.4
France	17.9	4.9%	349.3	95.1%	367.3
Germany	11.4	1.9%	590.7	98.1%	602.2
Greece	0.55	0.46%	119.7	99.5%	120.2
Hungary	0.63	0.47%	131.6	99.5%	132.2
Iceland	0.05	8.1%	0.53	91.9%	0.57
Ireland	1.0	1.1%	93.2	98.9%	94.2
Italy	7.5	1.1%	661.7	98.9%	669.1
Latvia	0.14	3.4%	3.9	96.6%	4.0
Lithuania	0.09	1.4%	6.0	98.6%	6.1
Luxembourg	0.14	8.5%	1.5	91.5%	1.6
Malta	0.10	5.8%	1.6	94.2%	1.7
Netherlands	3.3	2.2%	147.2	97.8%	150.5
Norway	0.38	6.5%	5.5	93.5%	5.8
Poland	3.7	0.47%	775.1	99.5%	778.7
Portugal	1.3	0.79%	159.4	99.2%	160.6
Romania	4.0	2.3%	173.7	97.7%	177.7
Slovakia	0.43	4.3%	9.6	95.7%	10.0
Slovenia	0.48	7.6%	5.8	92.4%	6.3
Spain	2.3	0.17%	1,296.5	99.8%	1,298.7
Sweden	0.66	7.1%	8.6	92.9%	9.3
Switzerland	0.77	2.9%	25.9	97.1%	26.7
United Kingdom	12.9	6.1%	199.5	93.9%	212.4
Total 31 countries	76.2	1.4%	5,219.6	98.6%	5,295.8

Limited data companion animals

Dutch data 2009 – 2014:

- 100 veterinary practices
- Decline of AMU
- **2014: average DDDA = 2.6**
- Large differences between practices
- Second choice AMs most used (42%)
- **Amoxicillin, amox/clav, 1st gen. cephalosporins**
- Third choice AMs 7%
- **Fluoroquinolones and 3rd/4th gen. cephalosporins**

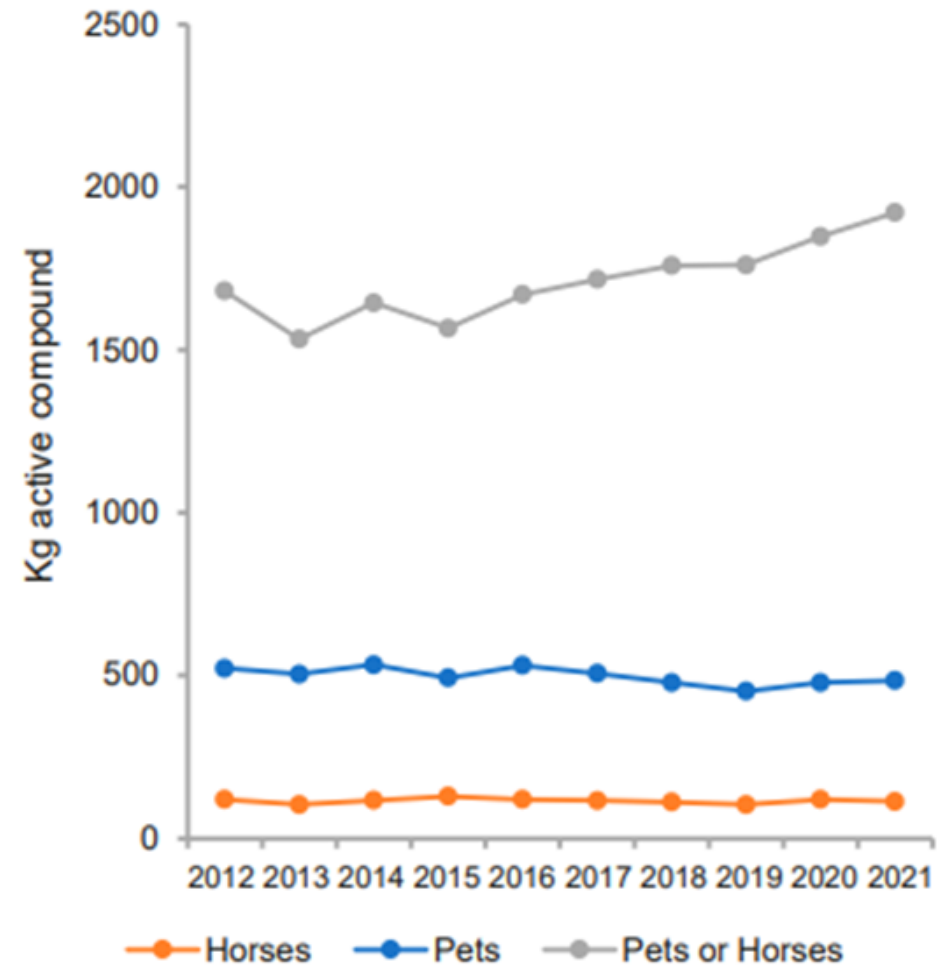


Limited data companion animals

Estimated AMU for horses and pets (kg)
in Denmark 2021

- **8% increase** between 2017-2021
- **Large proportion for dogs/cats is used for chronic or recurrent diseases**
- **Use of fluoroquinolones in companion animals**
90% of all FQ used in all animals
- **Use of cephalosporins in companion animals**
60% of all CFs in all animals
- **3rd and 4th gen. CFs only used in companion animals**

Figure 4.9 Estimated use of antimicrobial agents for horses and pets, kg active compound, Denmark DANMAP 2021



Limited data companion animals



- No central registration and quantification of AMU
 - Relatively low AMU compared to food producing animals
 - Average 1.4% of total use (kg active substance)
 - No or small decline in AMU compared to food producing animals
 - Use of critically important antimicrobials, including those registered for human use only, relatively high
- Focus primarily on quality/appropriateness of use, less on quantity

Close contact between companion animals and humans

- 98.3% of owners indicated at least one of the highly intense interactions
 - e.g. licking hand or face
- 30% of dogs slept in owner's bed



Close contact between companion animals and humans

- Resistant bacteria
 - widespread in companion animals
 - prevalence varies a lot
 - MRSA, MRSP, ESBLs, CPEs, etc.

Pet animals as reservoirs for spreading methicillin-resistant *Staphylococcus aureus* to human health

Human Colonization and Infection by *Staphylococcus pseudintermedius*: An Emerging and Underestimated Zoonotic Pathogen

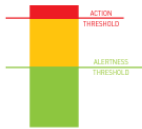
Carriage of Extended-Spectrum-Beta-Lactamase- and AmpC Beta-Lactamase-Producing *Escherichia coli* Strains from Humans and Pets in the Same Households

Carbapenem resistance in critically important human pathogens isolated from companion animals: a systematic literature review



AMCRA VISION 2024 – Action points focusing on **companion animals**

AMCRA VISION 2024 9 ACTION POINTS



Data collection and benchmarking of antibiotic use in all animal species



Data collection and benchmarking for all veterinarians



Individual coaching for intermediate and high users



Targeted control of farmers and veterinarians based on the benchmark reports



Extension of the legal conditions to all animal species for use of "red" antibiotics



Continued education of farmers on good use of veterinary medicines



Awareness raising and education are crucial



Focus on infection prevention



Increased monitoring and reporting of antibiotic resistance in animals



- Establish a system for monitoring AMU in **companion animals** (operational by 2024)
- Veterinarians in non-food-producing animal sector must report AMU data at practice level (**benchmarking**)
- Monitoring legitimacy of AMU only authorized for human use by cascade
- Regulations on restrictive use of 'red list' antibiotics extended to **all species**
- Monitoring of AMR will be extended to **non-food-producing species**



Antimicrobial stewardship in companion animals

What?



What is Antimicrobial Stewardship?



Antimicrobial Stewardship

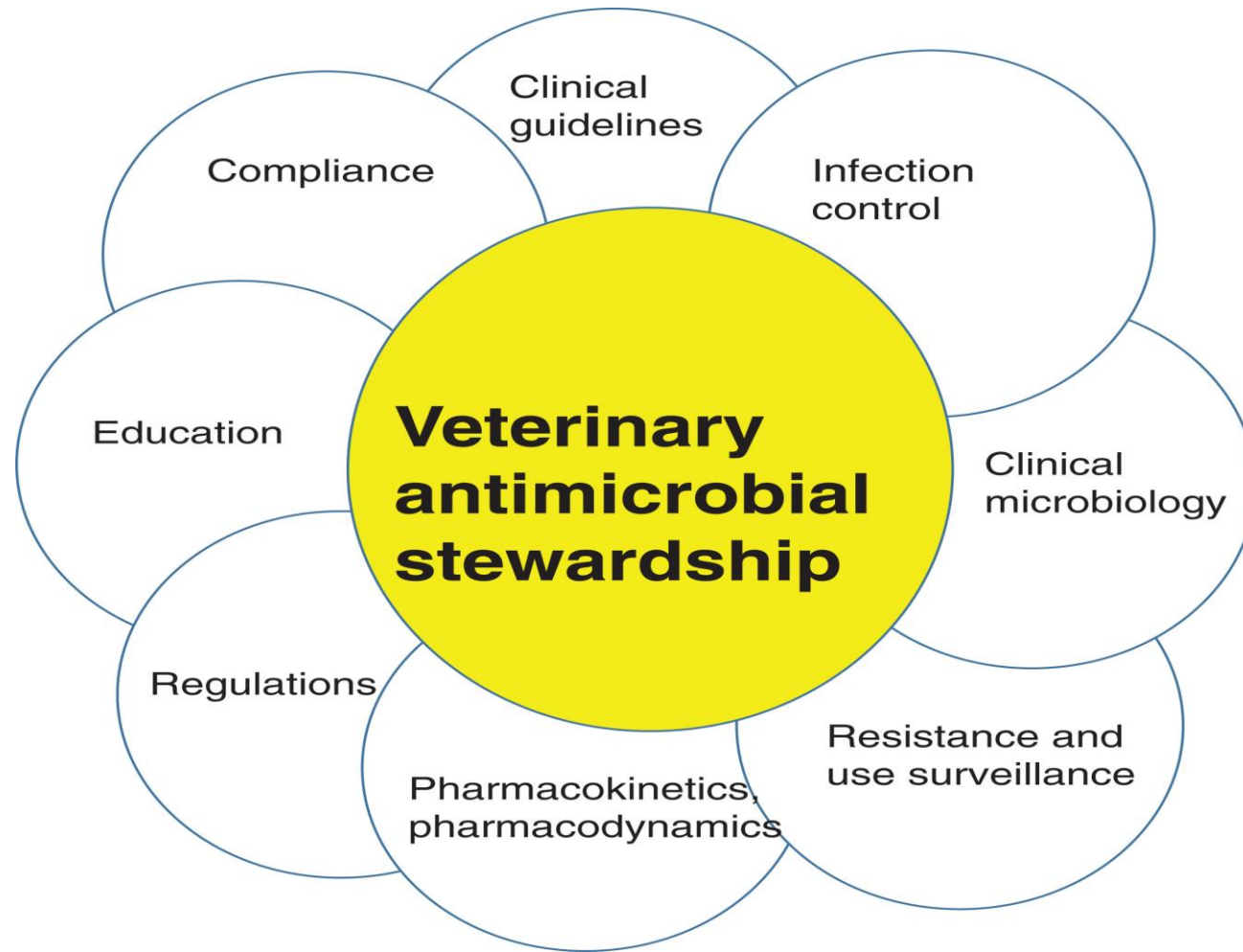
*“The primary goal of antimicrobial stewardship is to **optimise clinical patient outcomes**, while **minimising unintended consequences** of antimicrobial use, including toxicity, the selection of pathogenic organisms and the emergence of AMR”
(Dellit et al., 2007, Clin. Infect. Dis.)*

*“A coherent set of actions which promote using antimicrobials **responsibly**”
(Dyar, et al., 2017, Clin. Microbiol. Infect.)*

*The **persistent effort** by a health care institute to measure and improve the appropriate use of antimicrobial agents
(IDSA SHEA 2012)*

“As little as possible and only as much as necessary”

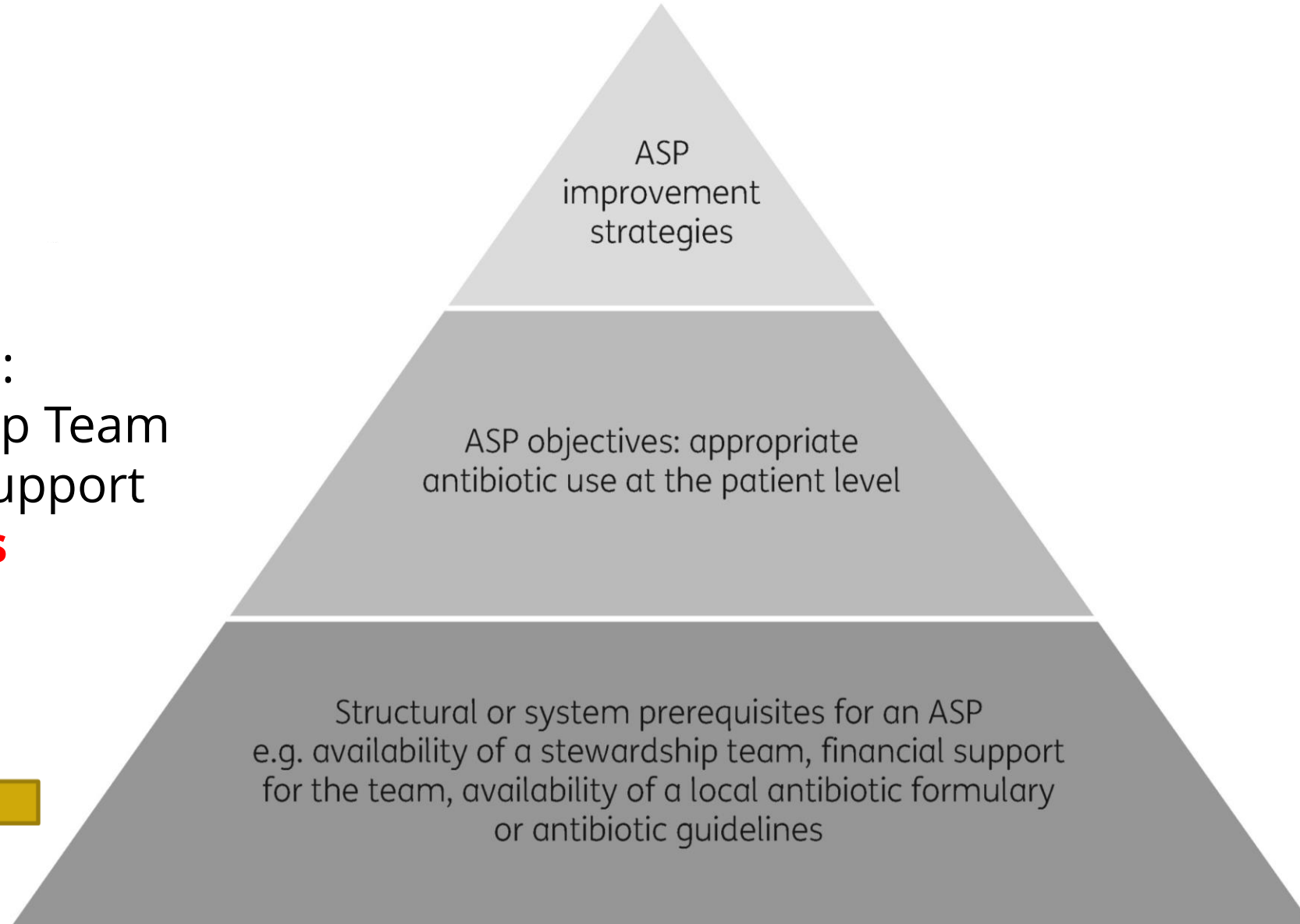
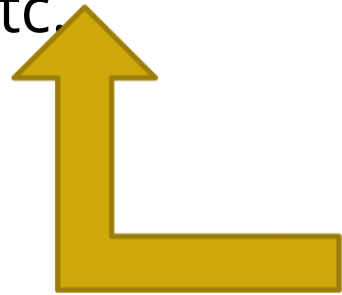
Veterinary antimicrobial stewardship



Building blocks for a successful Antimicrobial Stewardship Program

Prerequisites:

- Stewardship Team
- Financial support
- **Guidelines**
- Etc.





Article

Overview and Evaluation of Existing Guidelines for Rational Antimicrobial Use in Small-Animal Veterinary Practice in Europe

- 15 guidelines (11 countries) reviewed

Main conclusions:

- Recommendations often based on expert opinion and extrapolation from human medicine
- Clinical data is lacking
- No transparency on the decision process
- No input or feedback from stakeholders (e.g. pet owners)
- No data on implementation and adherence of guidelines

Evidence-
based
antimicrobial
treatment
guidelines in
companion
animals



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ENOVAT's guidelines companion animals

publication planned 2024

Canine acute diarrhoea



Surgical prophylaxis





Antimicrobial stewardship in companion animals

How?

A Dutch example

ANTIMICROBIAL STEWARDSHIP AND PETS

EVALUATING AND OPTIMISING ANTIMICROBIAL USE
IN DUTCH COMPANION ANIMAL CLINICS



Nonke E.M. Hopman

Veterinary Medicine

Goal ASAP-project

To develop, implement and evaluate the effectiveness of an 'antimicrobial stewardship program' in companion animal practices

- To increase awareness on AMU
- To decrease total AMU (whenever possible)
- To shift AMU towards 1st choice AMs

Development

Antimicrobial Stewardship Program

Developed based on interviews, survey, literature, guidelines and expert opinion

Multifaceted approach:

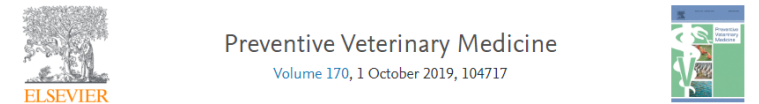
- Education on AMR and guidelines
- Quantification and benchmarking of AMU
- Individual feedback on AMU prescription
- Information leaflet for animal owners



Factors influencing antimicrobial prescribing by Dutch companion animal veterinarians: A qualitative study

Nonke E.M. Hopman^a, Marlies E.J.L. Hulscher^b, Haitske Graveland^a, David C. Speksnijder^a, Jaap A. Wagenaar^{a,c}, Els M. Broens^{a,*}

^a Department of Infectious Diseases and Immunology, Faculty of Veterinary Medicine, Utrecht University, Yalelaan 1, 3584 CL Utrecht, The Netherlands
^b Scientific Center for Quality of Healthcare (IQ healthcare), Radboud Institute for Health Sciences, Radboud University Medical Center, Geert Grooteplein 21, 6525 EZ Nijmegen, The Netherlands
^c Wageningen Bioveterinary Research, Hoornseweg 39, 8221 RA Lelystad, The Netherlands



Attitudes and perceptions of Dutch companion animal veterinarians towards antimicrobial use and antimicrobial resistance

Nonke E.M. Hopman^a, Lapo Mughini-Gras^{b, c}, David C. Speksnijder^{a, d}, Jaap A. Wagenaar^{a, e}, Ingeborg M. van Geijlswijk^f, Els M. Broens^{a, g}



AM yes or no?



2



Choice of AM?



Course length?

Implementation



- 44 companion animal clinics
- Baseline data before implementation (2012 – 2014)
- Implementation of Antimicrobial Stewardship Program
- Evaluation of AMU before, during and after implementation



Baseline data before implementation (2012-2015)

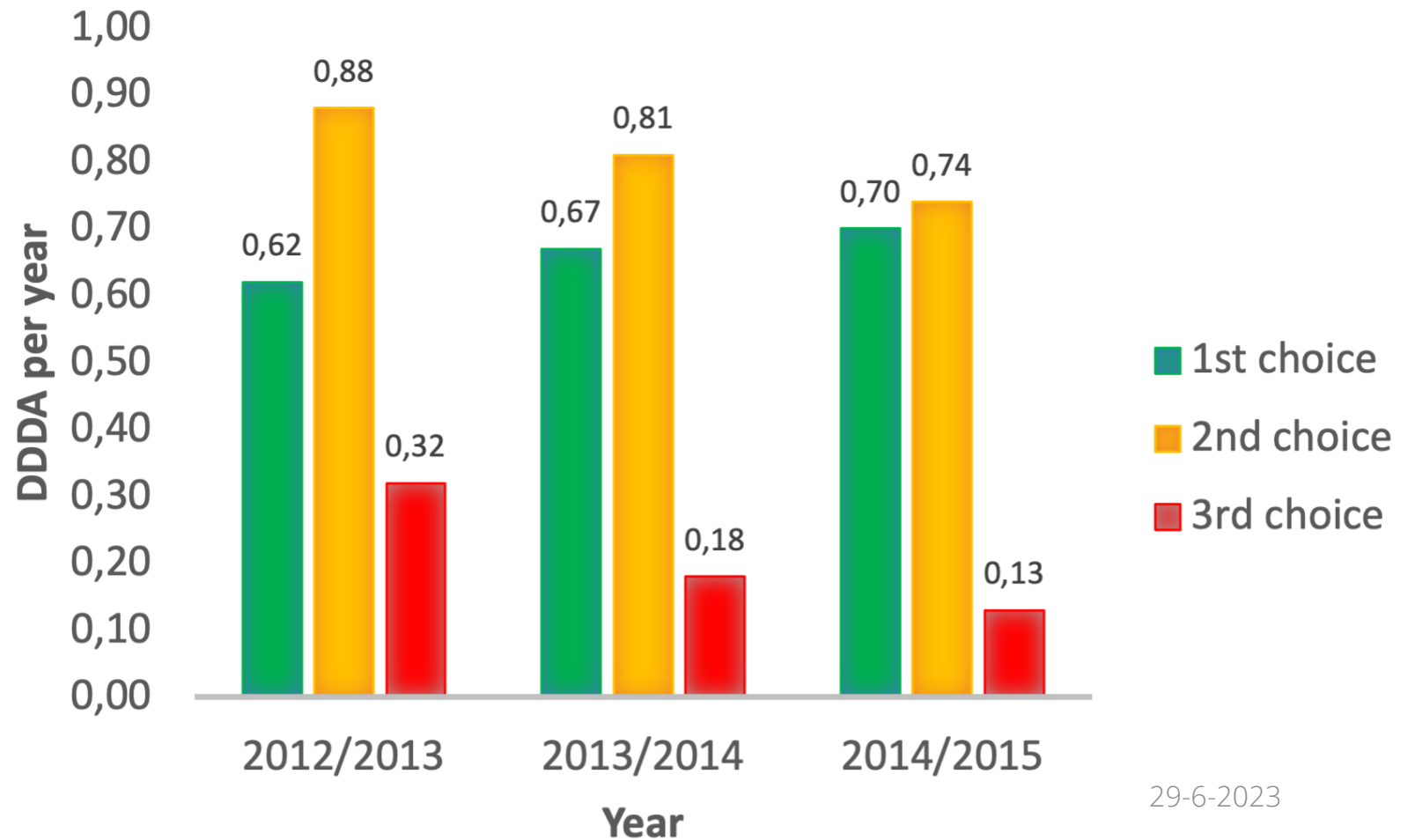
Time trends, seasonal differences and determinants of systemic antimicrobial use in companion animal clinics (2012-2015)



Nonke E.M. Hopman^a, Lützen Portengen^b, Dick J.J. Heederik^b, Jaap A. Wagenaar^{a,c}, Ingeborg M. Van Geijlswijk^d, Els M. Broens^{a,*}

- Total AMU decreases
 - 1.82 → 1.56 DDDA
- Shift towards 1st choice
- 2nd choice most used (40%)
 - Amox (+clav), cefalexin
- 3rd choice decreases

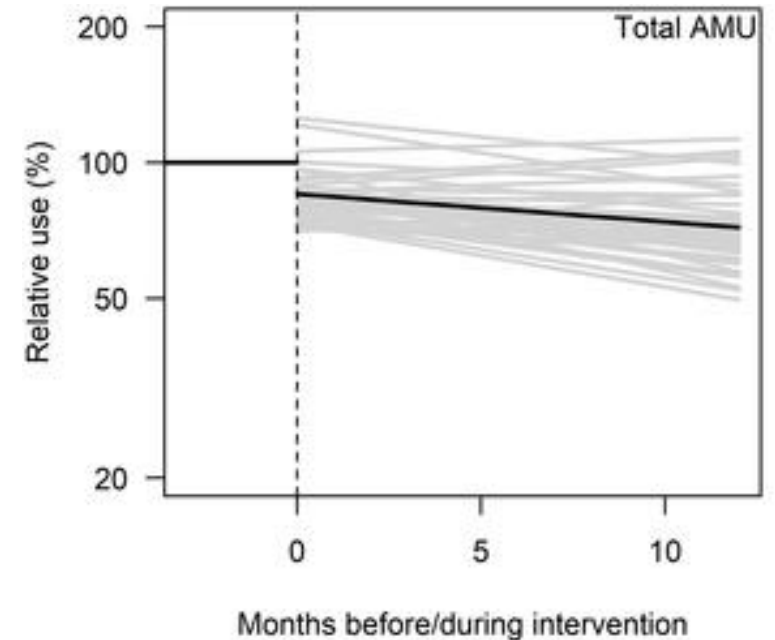
BASELINE AMU BEFORE ASAP



Evaluation after implementation ASP (2016-2018)

Results on top of the ongoing (decreasing) time trend before implementation ASP:

- Significant decrease of 15% in total AMU and a steeper slope
- Significant decrease of 15% in 1st choice AMU
- Significant decrease of 26% in 2nd choice AMU
- No significant decrease in 3rd choice AMU





Conclusions ASAP

- Baseline data showed a decrease in total AMU and a shift towards 1st choice AMs already
- Implementation of a multi-faceted antimicrobial stewardship program resulted in a further reduction and optimisation of AMU
- Participants indicated increased awareness of AMU
- Individual feedback and advice appeared to be effective, however this is **very time-consuming**





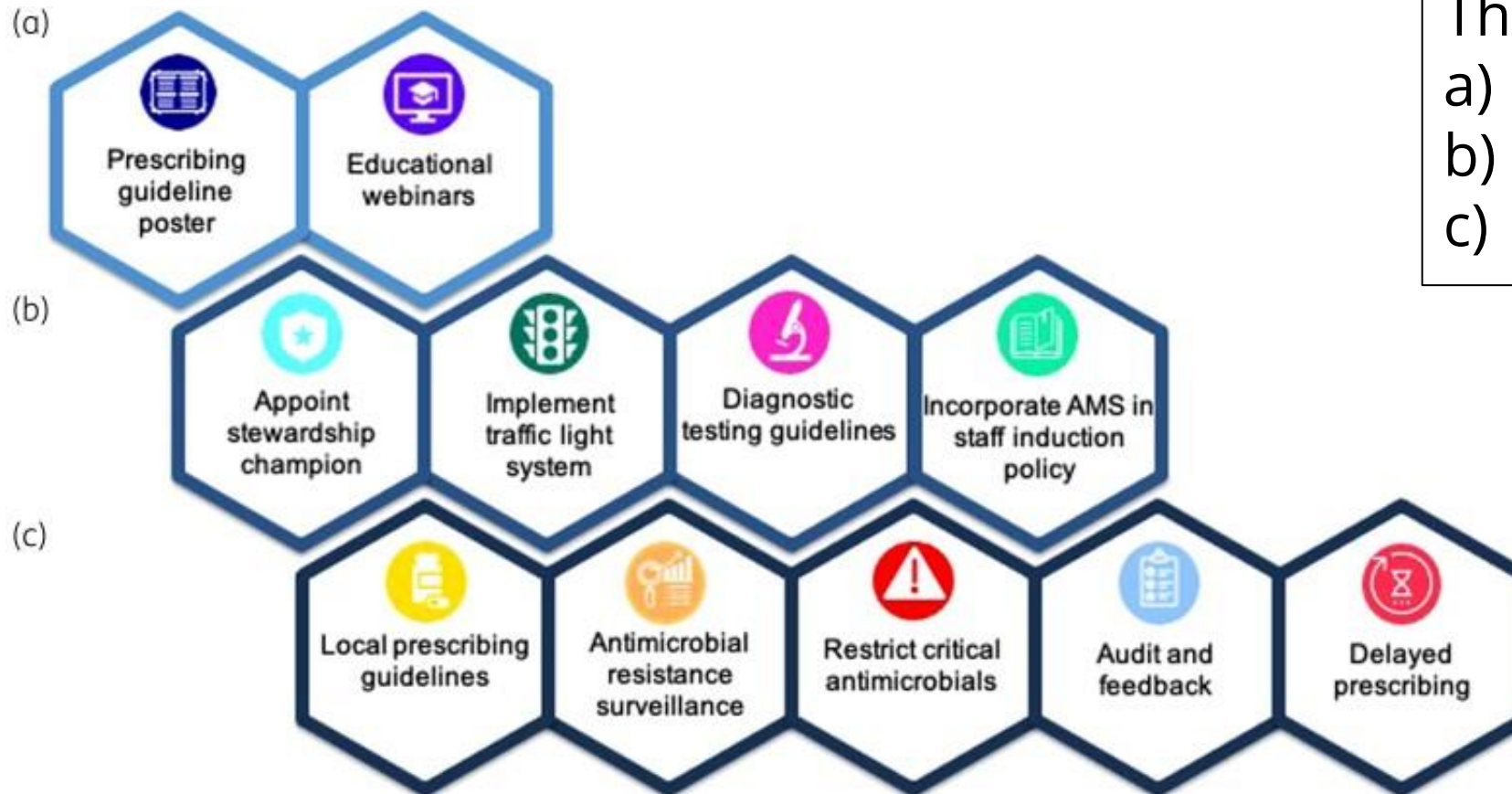
Antimicrobial stewardship in companion animals

How?

Another example

Antimicrobial stewardship in companion animal practice: an implementation trial in 135 general practice veterinary clinics



L. Y. Hardefeldt ^{1,2*}, B. Hur^{1,3}, S. Richards^{1,2}, R. Scarborough^{1,2}, G. F. Browning ^{1,2}, H. Billman-Jacobe^{1,2},
J. R. Gilkerson^{1,2}, J. Ierardo⁴, M. Awad⁴, R. Chay⁴ and K. E. Bailey^{1,2}



Three levels:
a) Education only
b) Intermediate intervention
c) Intensive intervention



Antimicrobial stewardship in companion animal practice: an implementation trial in 135 general practice veterinary clinics

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J. R. Gilkerson^{1,2}, J. Ierardo⁴, M. Awad⁴, R. Chay⁴ and K. E. Bailey^{1,2}

- Overall reduction of AMU for all three levels
- Shift towards prescribing low-importance AMs
- Greater reduction achieved with intensive ASP compared to less intensive ASPs
- Greatest impact in the top 25% high-prescribers

Antimicrobial stewardship

- Antimicrobial prescribing behaviour influenced by many factors
- Need for bundled interventions, attuned to the *specific setting and influencing factors* of AMU
 - Quantification / benchmarking
 - Education / awareness
 - Guidelines / diagnostics
 - Incentives / resources
 - Dedicated people
 - Time and money
 -



Antimicrobial stewardship in companion animals: why, what and how?

Why?

- Legislation, limited data and close contact with humans

What?

- Guidelines and quantification

How?

- Multifaceted Antimicrobial Stewardship Programs





Thanks for listening & enjoy the rest of the day

Questions?



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