Antimicrobial prescription trends for canine and feline gastroenteric conditions in veterinary primary care in the United Kingdom: a mixed-methods approach

AACTING
Herd level antimicrobial consumption in animals
Collect | Analyze | Benchmark | Communicate

Quantification, Benchmarking and Stewardship of Veterinary Antimicrobial Usage

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The Small Animal Veterinary Surveillance Network

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UNIVERSITY OF LIVERPOOL

BBSRC
bioscience for the future

BSAVA
BRITISH SMALL ANIMAL VETERINARY ASSOCIATION

PetSavers
Improving the health of pets

Why?

Original article

Patterns of antimicrobial agent prescription in a sentinel population of canine and feline veterinary practices in the United Kingdom
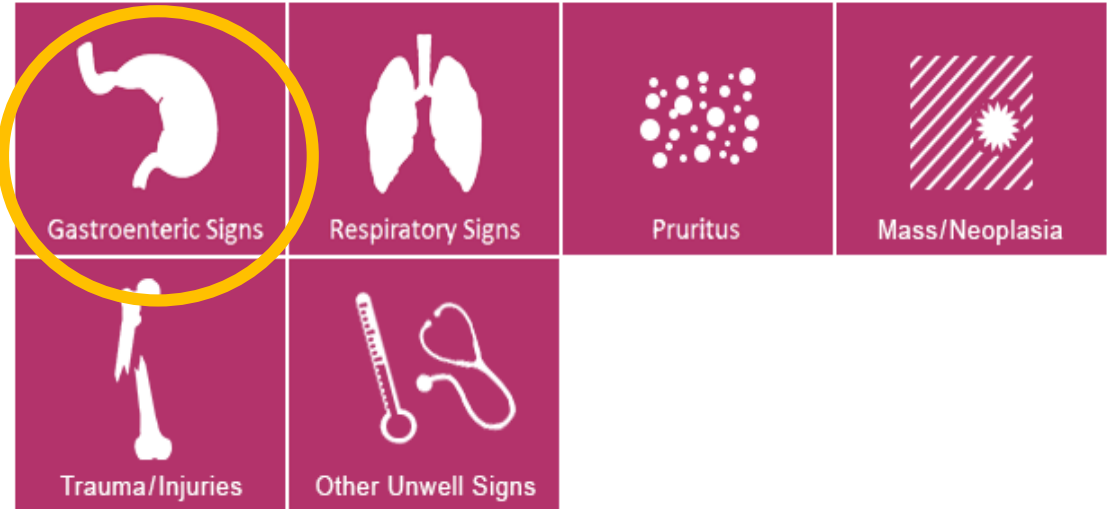
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| Main presenting complaint | | Dog | | | |
| | Number (%) of EHRs[a] | Total | | Systemic | |
		%	95% CI[b]	%	CI[b]
Pruritus	62,655 (6.8)	51.0	49.8–52.2	25.5	24.2–26.9
Respiratory	14,359 (1.6)	42.2	40.5–44.0	40.4	38.7–42.2
Gastroenteric	38,954 (4.2)	39.4	37.0–41.7	38.2	35.8–40.6
Trauma	58,033 (6.3)	26.7	25.5–27.9	21.3	20.3–22.4
Kidney disease	2607 (0.28)	29.1	26.6–31.7	26.8	24.3–29.3
Tumour	20,938 (2.3)	22.0	21.1–23.0	17.5	16.7–18.3
Other unwell	156,197 (17.0)	32.8	31.8–33.8	20.3	19.5–21.2
Post-operative	98,753 (10.8)	13.0	12.2–13.8	9.9	9.3–10.5
Vaccination	277,246 (30.2)	4.3	3.9–4.7	1.4	1.1–1.7
Other healthy	188,582 (20.6)	11.8	10.7–13.0	7.0	6.1–7.8

| Main presenting complaint | | Cat | | | |
| | Number (%) of EHRs[a] | Total | | Systemic | |
		%	95% CI[b]	%	95% CI[b]
Pruritus	13,749 (3.9)	33.5	31.9–35.2	24.9	23.3–26.6
Respiratory	7681 (2.2)	52.0	49.8–54.3	59.9	47.6–52.2
Gastroenteric	11,206 (3.2)	29.8	27.4–31.8	28.9	26.7–31.1
Trauma	22,796 (6.5)	53.5	52.1–54.8	50.1	48.8–51.4
Kidney disease	4009 (1.1)	19.6	17.9–21.3	18.9	17.2–20.6
Tumour	5330 (1.5)	21.3	19.8–22.7	19.8	18.3–21.3
Other unwell	72,189 (20.5)	30.5	29.5–31.6	24.9	23.9–26.0
Post-operative	32,136 (9.1)	11.1	10.0–11.9	9.6	8.7–10.6
Vaccination	115,394 (32.6)	2.5	2.2–2.8	1.4	1.2–1.6
Other healthy	68,236 (19.4)	10.5	9.1–11.9	8.4	7.1–9.6

Gastroenteric

One of the most common clinical presentations for which antimicrobials are used

Qualitative study of factors associated with antimicrobial usage in seven small animal veterinary practices in the UK

Ana L.P. Mateus [a,*], David C. Brodbelt [a], Nick Barber [b], Katharina D.C. Stärk [a]

Contents lists available at ScienceDirect

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journal homepage: www.elsevier.com/locate/prevetmed

ELSEVIER

CrossMark

21 veterinarians
Semi-structured interviews
Thematic analysis

*'to identify intrinsic and extrinsic **factors that influence** the **decision-making process** involved in the **selection of AMs** by small animal veterinarians through qualitative methods'*

Guidelines

GASTROINTESTINAL INFECTIONS

Antibacterials are not indicated for:
- Acute vomiting
- Acute diarrhoea (including acute haemorrhagic cases)
- Pancreatitis
- Most gastric *Helicobacter* infections
- Most *Campylobacter, Salmonella, Clostridium perfringens* or *C. difficile* infections
- Chronic diarrhoea (except as part of a treatment trial)

Cats and dogs presenting with acute gastrointestinal signs, including dogs with haemorrhagic diarrhoea, that are systemically well **do not** require antibacterial therapy
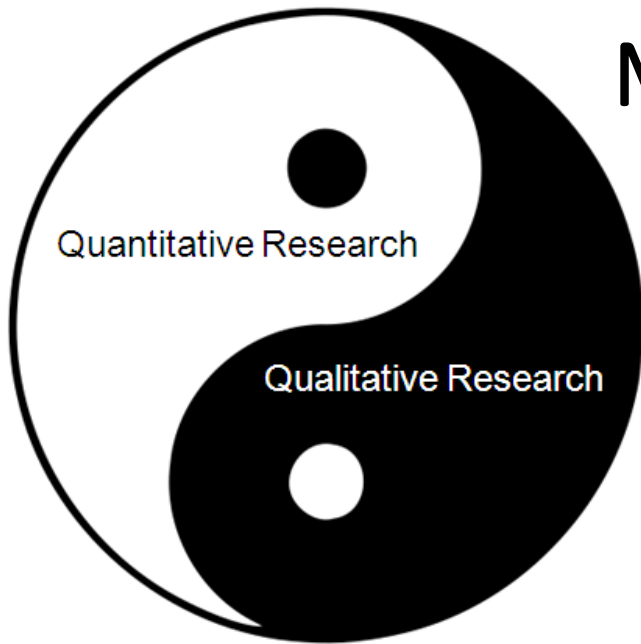
There is a need to understand how these are being applied in practice

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MIXED METHODS

Quantitative Research
Qualitative Research

To better understand antimicrobial choices of practitioners, focussing on gastrointestinal clinical cases
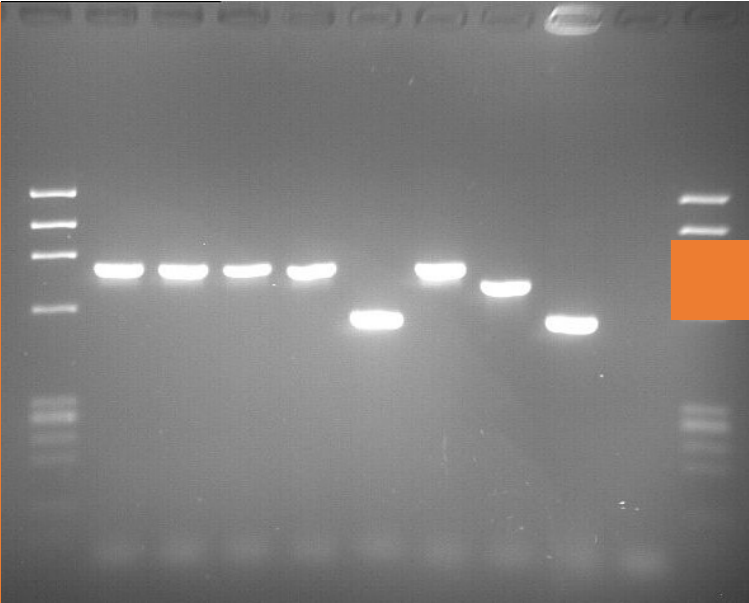
BIG DATA

Electronic Health Records

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Diagnostic Laboratory

10 000 records a day

237886 / **canine** / **westie** / **CH43** / **faeces** / **parvovirus PCR** / **positive**

Veterinary Practice

6 000 records a day

Owner postcode, Canine, Labrodor, Male, Neutered, DOB 01/10/2002, Diarrhoea last night and V o/n Temp 38.90 degC. exam bright colour good hydration fine abd palp nad relaxed non-rense rectal exam soft cowpat like stool no blood tmt as g/e adv strict bland diet 38h. Treatment Inject 1.50 mls Cerenia Injectable. Pro-Kolin 30ml Syringe VH 4 units twice daily for 1-3 days while stools are loose

Socio-demographic data
Climate

Research ready

Research priorities:

Climate and environment impact on disease, currently focused on ectoparasites, such as ticks

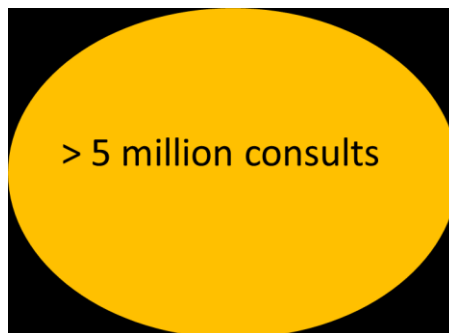Infection and zoonosis

Antimicrobial resistance

SAVSNET window

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> 5 million consults

Electronic Health Record

What is the main reason for this visit?

Gastroenteric Signs	Respiratory Signs	Pruritus	Mass/Neoplasia
Trauma/Injuries	Other Unwell Signs		
Vaccination	Other Healthy		Post-op Check

Owner wishes to opt out, or not eligible to give consent.

SAVSNET Ltd is a registered charity and is a joint venture between the British Small Animal Veterinary Association (BSAVA) and the Univesity of Liverpool.

Owner postcode, Canine, Labrador, Male, Neutered, DOB 01/10/2002

Diarrhoea last night and V o/n Temp 38.90 degC. exam bright colour good hydration fine abd palp nad relaxed non-rense rectal exam soft cowpat like stool no blood tmt as g/e adv strict bland diet 38h.

Treatment: Inject 1.50 mls Cerenia Injectable. Pro-Kolin 30ml Syringe VH 4 units twice daily for 1-3 days while stools are loose

> 5 million consults → Gastroenteric → In 10% a questionnaire pops up

Gastroenteric

~200,000 EHRs

~ 20, 000 EHRs questionnaire answered

Please indicate the clinical signs present*
Diarrhoea without blood
Diarrhoea with blood
Vomiting without blood.
Vomiting with blood.
Melaena.
Weight loss/failure to gain weight.
Poor appetite.
Other.

2. If diarrhoea was present how would you describe it*
No diarrhoea.
Small intestinal diarrhoea.
Large intestinal diarrhoea/colitis.
Mixed pattern.
Don't know.

3. Please indicate disease severity
Mild illness i.e. normal apart from GI disease.
Moderately ill.
Severely ill/debilitated.

4. How does this consultation relate to this episode of illness

First presentation

Revisit/check-up.
Don't know.
Other.

5. How long approximately has the pet had this episode of illness?
Up to 2 days.
Between 3 days and 2 weeks
More than 2 weeks – less than 1 month.
1 month and over.
Don't know.

6. What diagnostic options will be used today for this episode of illness? *
None.
Faecal parasitology/bacteriology.
Faecal virology.
Virus serology.
Diagnostic Imaging.
Haematology/biochemistry.
Serum B12/Folate and/or serum TLI.
Canine/feline specific pancreatic lipase.
Urinalysis.
Other.

7. What advice did you give today? *
Change of diet.
Fasting.
Admit patient for treatment.
Refer patient.
Check-up in near future.
*indicates multiple options may be chosen

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First visit consultations

April 2014 - September 2018

225 volunteer veterinary practices

17,819 EHRs

82.1%

17.9%

Questionnaire answered EHRs

n= 17,819 EHRs

The most commonly reported clinical signs

non-haemorrhagic diarrhoea	non-haemorrhagic vomiting

47.1%
(95% CI, 46.2-48.0)

40.8%
(95% CI 39.0-42.6)

45.3%
(95% CI 44.2-46.3)

54.2%
(95% CI 52.4-56.1)

Use of diagnostic tests

Reported in only

18.9% *(95% CI 17.3-20.4)*

13.2% (95% CI 12.2-14.3)

Quantitative Results

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Questionnaire answered

n= 17,819 EHRs

Systemic antimicrobial agents prescribed

29.3% *(95% CI 27.4-31.1)*

23.5% *(95% CI 21.2-25.9)*

World Health Organization

Highest Priority Critically Important Antimicrobials (HPCIAs)

quinolones, 3rd and higher generation cephalosporins, macrolides and ketolides, glycopeptides, and polymyxins

RECOMMEND RESERVATION FOR HUMAN USE

4.8% *(95% CI 3.8-5.7)*

When AM prescription occurred

20.4% *(95% CI 18.8-22.1)*

0.7% *(95% CI 0.2-1.1)*

When AM prescription occurred

2.4% *(95% CI 1.89-3.0)*

NVIVO

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Categories/ 'Nodes'/ 'Containers of information'

"(...) D+ still leaving small amounts of blood around house after

defecating. very well in herself, eddu normal. (...) Clinical exam -

unremarkable, parameters within normal limits other than temperature

39.4. seemed sensitive around back end (...). elected to do a full course of

antibiotics. as owner unable to given oral meds elected to give convenia

today. owner to monitor clinical signs and recheck if at all concerned."

Nodes

Search Project

Name

- 1. Owner-related info
- 2. Clinical History
- 3. Clinical Examination
  - Diarrhoea (+ive)
  - Vomiting (+ive)
- 4. Diagnostic Testing
  - Testing Advised
  - Testing Done
- 5. Differential Diagnosis
- 6. Treament & Previous Drugs
  - Antimicrobial Agents
    - Prescribing-related
      - 1. Perceived risk of infection (pyrexia and other clinical signs)
      - 2. Perceived Compliance
      - 3. Perceived Efficacy (duration of AM therapy and others)
      - 4. Animal's clinical history (illness duration and others)
      - 5. Attitudes of Pet Owners
      - 6.Awareness for responsible usage
      - 7. Previous Experience
      - 8. Not Coded
  - Nutraceuticals
  - Other Pharmaceutical Agents
- 7. Advices & Next Visit
  - Diet
- 8. Without Narrative
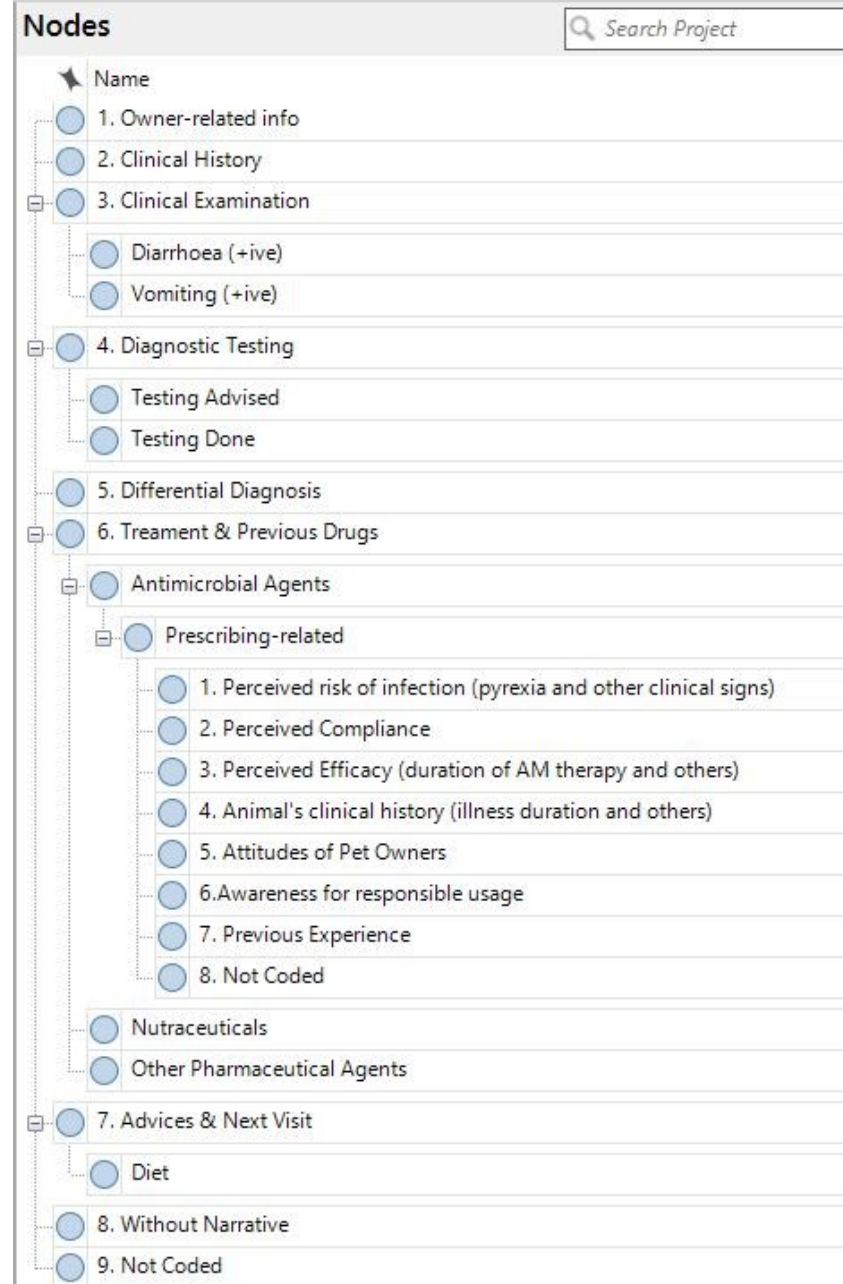- 9. Not Coded

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Electronic Health Records

NVIVO

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Categories/ 'Nodes'/ 'Containers of information'

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Qualitative approach

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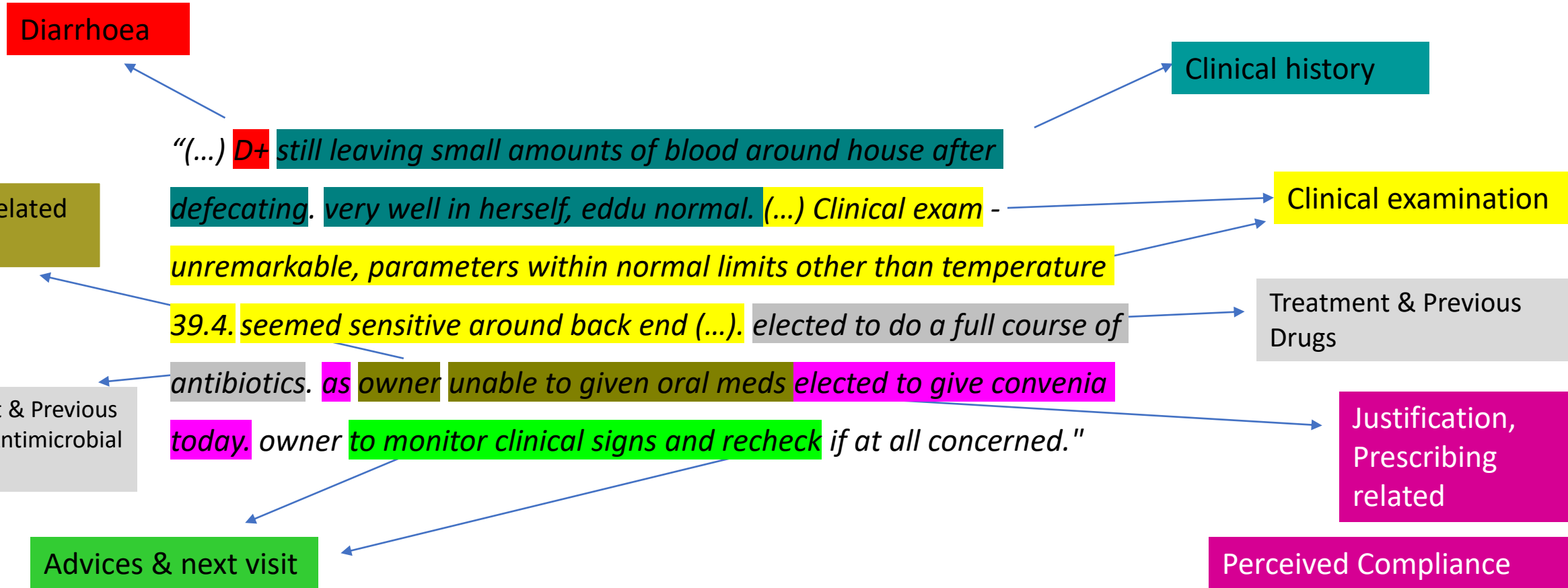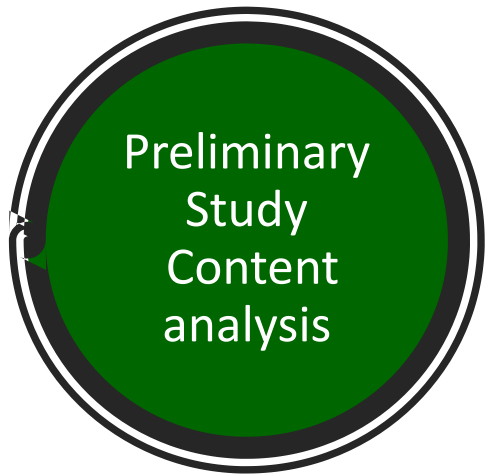
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- ○ 9. Not Coded

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Electronic Health Records

NVIVO

Categories/ 'Nodes'/ 'Containers of information'

Diarrhoea

Clinical history

Owner-related info

Clinical examination

Treatment & Previous Drugs

Treatment & Previous Drugs // Antimicrobial agents

Justification, Prescribing related

Advices & next visit

Perceived Compliance

"(...) D+ still leaving small amounts of blood around house after defecating. very well in herself, eddu normal. (...) Clinical exam - unremarkable, parameters within normal limits other than temperature 39.4. seemed sensitive around back end (...). elected to do a full course of antibiotics. as owner unable to given oral meds elected to give convenia today. owner to monitor clinical signs and recheck if at all concerned."

	EHRs Antimicrobial prescribed	EHRs Antimicrobial not prescribed
Not prescribing related content	99	65
Prescribing related content, justification	35	1
Total (n=200)	134	66

When antimicrobial prescription occurred, factors associated with justification prescribing were identified in only **26.1%** *(95% CI 19.4-34.2)*

Identified factors associated with prescribing: clinical narrative examples

Perceived risk of infection (pyrexia, other clinical signs)

Perceived Efficacy (duration of AM therapy, others)

'Gave convenia to cover possible infections...'

'as pyrexic have opted to treat with AB even in the absence of blood in f+.'

'Has improved /w antibiotics, so seven days more, wait seven days and re-sample.'

'and conveinia to try to see if improves'

Attitudes of Pet Owners

'o's going away for 2 weeks tomorrow so advise cover ab's'

'owner opted to see how goes with medical intervention today as thinks unlikely will have eaten a fb.'

Awareness for responsible usage

'if not improving then we will consider antbs'

Antimicrobial prescription **is common** in gastroenteric clinical cases

Whilst this suggests a gap with current recommendations targets, there remains a need to assess practitioners understanding of other systemic signs

Descriptive studies have helped quantify antimicrobials use

Qualitative approaches can help to identify themes, behaviours, and **to describe key clinical drivers** of antibiotic prescription

By applying mixed-methods, it is possible to provide a new and complementary insight into antimicrobial prescription

Justification for prescription is **uncommonly** explicitly **recorded**

Some of the themes identified so far, include: **perceived risk of infection**, **attitudes of pet owners**, **perceived compliance**, and **perceived efficacy**
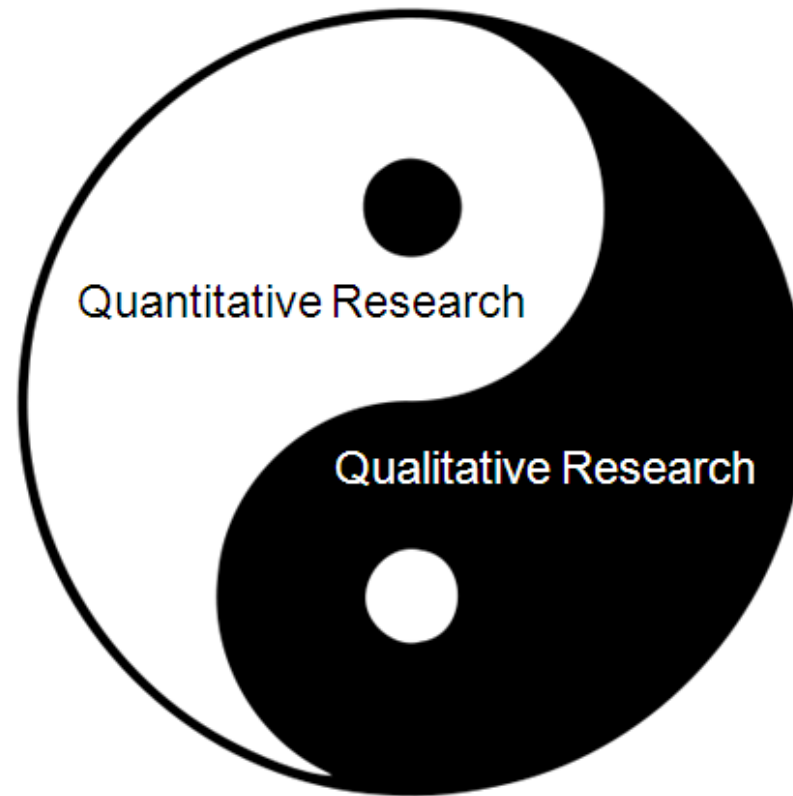
Acknowledgements

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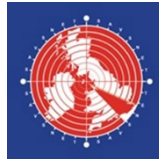
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All practices and laboratories taking part in the SAVSNET project!

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