Control strategies to help deal with the worms that turned

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The need for worm control

- Major threat to health & welfare
- Huge impact on productivity

- Anthelmintics
  - Broad spectrum products for 40 years
  - Extensive use

- EU
  - 88 M cattle, 101 M sheep, 12 M goats, 7 M horses
  - Annual anthelmintics spend €400M

Anti-roundworm products

- Three classes - cattle, horses
- Five classes – sheep

Anti-fluke products

- Range varies in effectiveness against different worm stages

UK regulations

- POM-VPS – vets, SQPs, vet pharmacists
- POM-V – vets (vet pharmacists)

Anthelmintic resistance

- Worm populations
  - Large, genetically diverse
  - Selection pressure
  - Anthelmintic treatment = potent trigger for adaptation

- Resistance in a few years of each class being introduced
  - Total failure
  - Multi-class resistance
  - No reversion

Global status

Rapid resistance to first 3 classes
Monepantel resistance reported

Widespread resistance to first 3 classes
Monepantel resistance reported
Reduced efficacy of derquantel

Reports to all classes

Reports to all classes

Factors influencing resistance

- Treatment frequency
- Administration technique
- Host species and pharmacokinetics
- Application of appropriate quarantine

Best practice = evidence based control

- Target the right host
- Target the relevant parasite
- Dose/drenching method
- Non-chemical control methods
- Diagnostics
- Monitor efficacy
- Quarantine

Responsible use of anthelmintics

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Advice before or at point of prescribing

Integrated control plan

VMD project

- To study knowledge levels and practices of UK anthelmintic prescribing channels
  - Veterinarians, SQPs, vet pharmacists
- To assess uptake of industry recommendations at farm/yard level

Knowledge

Interactions

Information transfer

On-farm/yard practices

Prescriber MCQ
227 Vets, 57 SQPs

- 78 Qs
  - worms, best practice, legislation
- Vet mean correct 79.7% (34.0-100%)
- SQP mean correct 75.8% (38.5-100%)

- No significant difference overall

Easton S, Bartley DJ, Hotchkiss E, Hodgkinson JE, Pinchbeck GL, Matthews JB. 2016. Use of a MCQ questionnaire to assess UK prescribing channels' knowledge of helminthology and best practice surrounding anthelmintic us in livestock and horses. Prev Vet Med. 128:70-77.

Q set % correct
1. Helminthology:
Vets (p=0.001)
2. Legislation:
SQPs (p=0.032)
3. Best practice:
no difference

KNOWLEDGE GAPS IDENTIFIED

Farm, equine, mixed
1. Farm: no difference in best practice, legislation.
Helminthology: vets (p=0.02)
2. Equine: no difference in helminthology, best practice.
Legislation: SQPs (p=0.01)
3. Mixed: no significant difference in any Q type

Regression model
'channel', 'question set'
significant variables
SQP lower overall
Equine higher % cf. mixed

Prescriber survey
193 vets, 326 SQPs

- SQPs receive more post-certificate parasitology training, longer periods of training (p=<0.001)
- SQPs receive reference materials after training (p=<0.001)
  - ~1/3 stated training materials gave conflicting advice!
- Both groups want more parasitology CPD

Easton S, Pinchbeck GL, Bartley DJ, Hotchkiss E, Hodgkinson JE, Matthews JB. 2016. A survey of UK prescribers' experience of and opinions on anthelmintic prescribing practices for livestock and equines. Prev Vet Med 134:69-81.

SQP higher frequency face-to-face (96.1%) interaction cf. vets (76.4%)

Vets higher frequency telephone (73%) interaction cf. SQPs (55.1%)

Online contact low: 83.9% vets, 90.3% SQPs ‘Rarely-Never’ used this

90.6% SQPs, 48% vets described interactions as ‘Regular’

Vets more likely to agree that various factors limited interactions (54.1%) cf. SQPs (19.6%)

Factors deemed important in prescribing SQPs: face-to-face client contact ($p=<0.001$)

Vets considered results of diagnostic tests more often ($p=<0.001$), especially WRT sheep

Treatment recommendations SQPs considered:
number of animals ($p=<0.001$)
ease of administration ($p=<0.001$)
withdrawal period ($p=<0.001$)
brand ($p=<0.001$)
more often

Recommend FEC tests?

- Farm only: vets recommend testing for sheep > SQPs (p=0.0017)
- Mixed: vets recommended testing > for beef cattle than SQPs (p=<0.001).
  - Vets most often recommend for sheep cf. SQPs, equines
- Equine only: no significant difference in how often vets recommended testing compared to SQPs

Perform FEC tests?

- Farm only: vets & SQPs test most often for sheep. Vets perform tests more often for beef (p=<0.001) and dairy (p=<0.001)
- Mixed: vets perform testing more often for beef (p=<0.001), dairy (p=<0.001), sheep (p=<0.001) and equines (p=< 0.001)
- Equine only: more vets stated they conduct testing cf. SQPs but difference not significant

Resistance and efficacy testing

- Discussions on AR similar frequency in both groups (high WRT sheep, horses)
- Less frequent discussions on efficacy testing
  - especially, cattle & pigs
- Equine only group discussed efficacy testing more often than mixed group (p=0.0004)

SQPs more likely to believe clients concerned about resistance particularly on own premises (61.0%) than vets (35.2%)

Vets more likely to believe clients concerned about resistance, but not on own premises (46.9%) than SQPs (28.7%)

(p=<0.001)

# Horse owner survey
n = 494

Purchase anthelmintics from ….
Vets - 60
SQPs - 256
Pharmacists - 42
>1 channel - 136

Route of purchase

Face-to-face - 234
Telephone - 31
Online - 226

Interactions per channel

Vets: face-to-face (81.3%)
SQPs: face-to-face (48.8%) or online (46.0%)
Pharmacists: online (76.2%)

- Horse owners who bought anthelmintics from vets more likely to
  - view time to talk to supplier/supplier knowledge
  - be recommended FEC testing
  - more likely to agree to POM-V

- Low uptake of efficacy testing in all groups

- Owners who purchased online less likely to consider prescriber advice/knowledge & indicated seller less likely to raise targeting of parasites

- Across all groups, many stated awareness of, or used, non-chemical control measures (dung removal) and FEC testing

Easton S, Pinchbeck GL, Tzelos T, Bartley DJ, Hotchkiss E, Hodgkinson JE, Matthews JB. 2016. Investigating interactions between UK horse owners and prescribers of anthelmintics. Prev Vet Med.;135:17-27

Farmer survey
380 farmers

Sheep - 81%
Beef - 54.5%
Dairy - 13.7%
Pigs - 6.6%

Bought from
Vets – 24
SQPs – 103
>1 channel – 198

Face-to-face (221)
online (75)
telephone (26)
No significant difference between channel used vs. route of purchase

- Farmers who bought from vets more likely to view supplier knowledge of animals ($p<0.001$), supplier knowledge of diagnostics ($p<0.001$) as important

- Farmers who bought from >1 channel most influenced by vets ($p=<0.0001$)

FEC testing & resistance management

Farmers who purchased from vets more likely to

- state seller discussed testing (p=<0.001)
- be recommended testing for beef cattle (p=<0.001), sheep (p=<0.001)
- state prescriber discussed management strategies to reduce reliance on dewormers (p=<0.001)

Efficacy testing performed

No significant difference between vet & SQP groups

Sheep farmers; 72.2% in vet group, 44.4% in SQP group, 56.5% in >1 prescriber group stated they had performed testing

Most beef/dairy farmers had not performed tests

High level of concern for AR in all groups
>96% concerned generally
>65% concerned re their own farm

Farmers who used vets
More likely to agree future classes should be POM-V (p=<0.001)
More likely to disagree that all anthelmintics move to POM-VPS in future (p=<0.001)

Farmers attributed responsibility across parties: highest level to themselves
No significant difference between prescriber buyer groups

Grouped on route of purchase

- Farmers that bought face-to-face more likely to value prescriber knowledge of parasites ($p=0.001$) and anthelmintics ($p=0.002$) than farmers that bought via telephone or internet

- Farmers who bought online less likely to consider prescriber advice than other groups ($p<0.001$)

Animal type farmed

Cattle/sheep (169), cattle only (60), sheep only (140)

- Cattle only farmers viewed convenience factors more than those that managed sheep or sheep/cattle
- Cattle only farmers significantly less likely to buy face-to-face ($p<0.001$) and more likely to consider ‘ease of administration’ as important ($p<0.001$)

Despite concern about resistance, gaps in discussions on best practice. Discussed rarely-never….

Weighing for dose 21-24%

Ensuring dose swallowed 15-22%

Calibrating equipment 31-39%

Correct storage 40-47%

Quarantine 29-49%

FEC testing 29-49%

Management to reduce infection 30-45%

In most cases, discussions least often between cattle farmers & prescribers

- Insight into knowledge gaps, training, prescribing behaviour, interactions, what end-users do
- Gaps: purchase route and livestock type
- Low uptake of some recommendations: deficit in information transfer at point of sale
- Improve interaction/quality of advice generally and, particularly, in online interactions

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