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

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

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

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

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 \( (p=\leq 0.001) \) and dairy \( (p=\leq 0.001) \)
- Mixed: vets perform testing more often for beef \( (p=\leq 0.001) \), dairy \( (p=\leq 0.001) \), sheep \( (p=\leq 0.001) \) and equines \( (p=\leq 0.001) \)
- 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

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

Route of purchase
Face-to-face - 234
Telephone - 31
Online - 226
• 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

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

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)
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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