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Innovative approaches to stewardship in animal and human health:

Veterinary practice and animal husbandry

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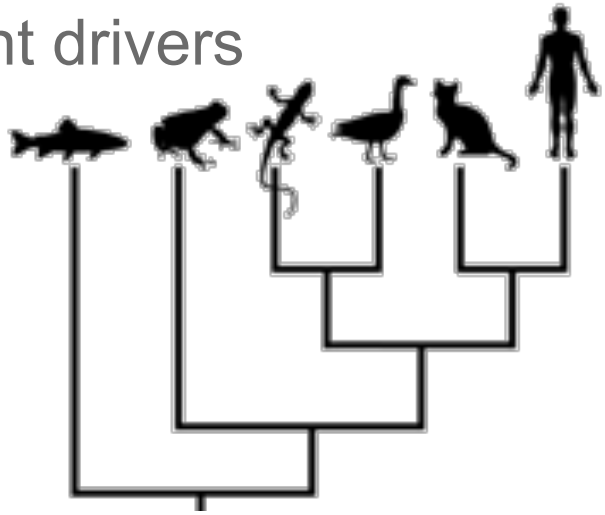
UK Chief Veterinary Officer

Department for Environment Food & Rural Affairs

What are the challenges?

- Diversity of species
- Different production systems
- Different businesses
- Different drivers



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What are the opportunities?

- Homogeneous populations
- Control over systems/movements
- No ageing population

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Our patients' living environments

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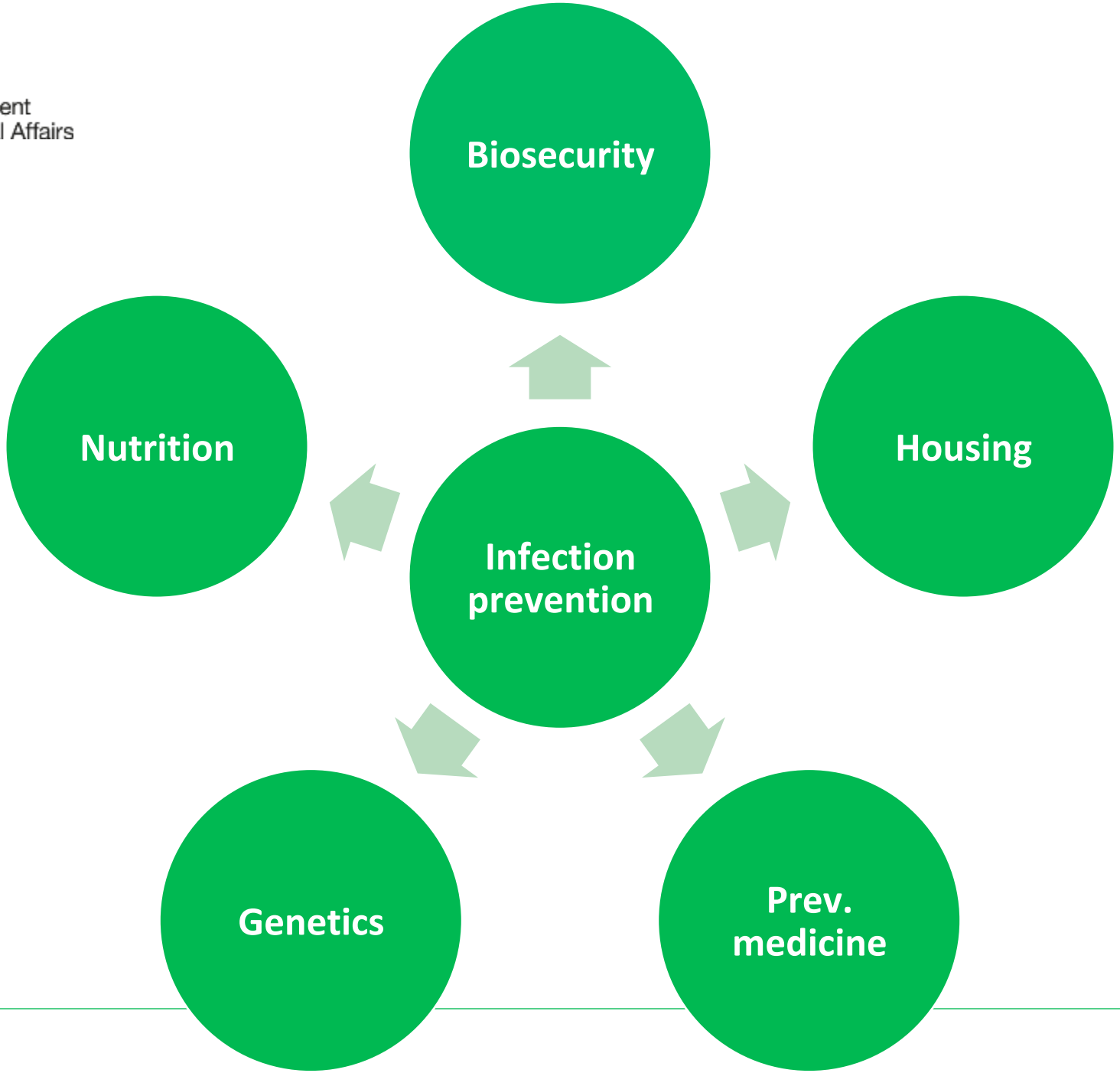

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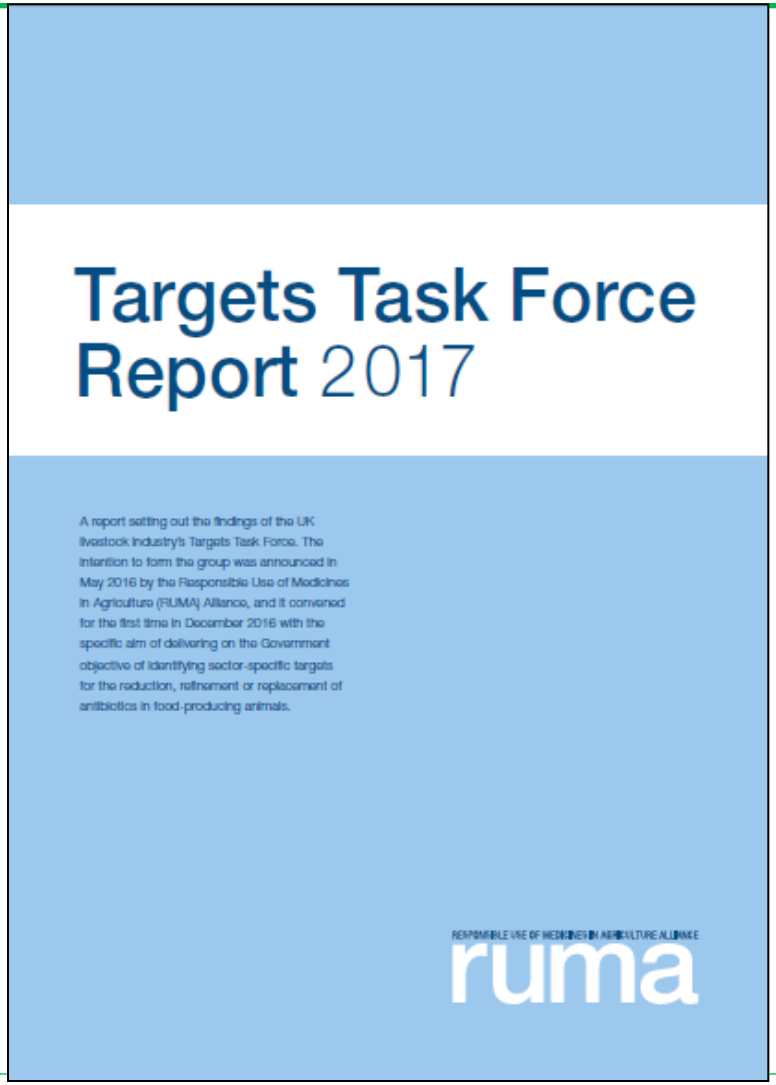
Veterinary/animal health stakeholder engagement

Publication Oct 2017 of Targets Task Force Report :

Delivering on the Government objective of identifying

sector-specific targets

for the reduction, refinement or replacement of antibiotics in food-producing animals.



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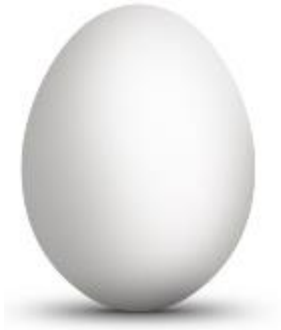
Sector specific targets



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Reasons for measuring farm level usage:

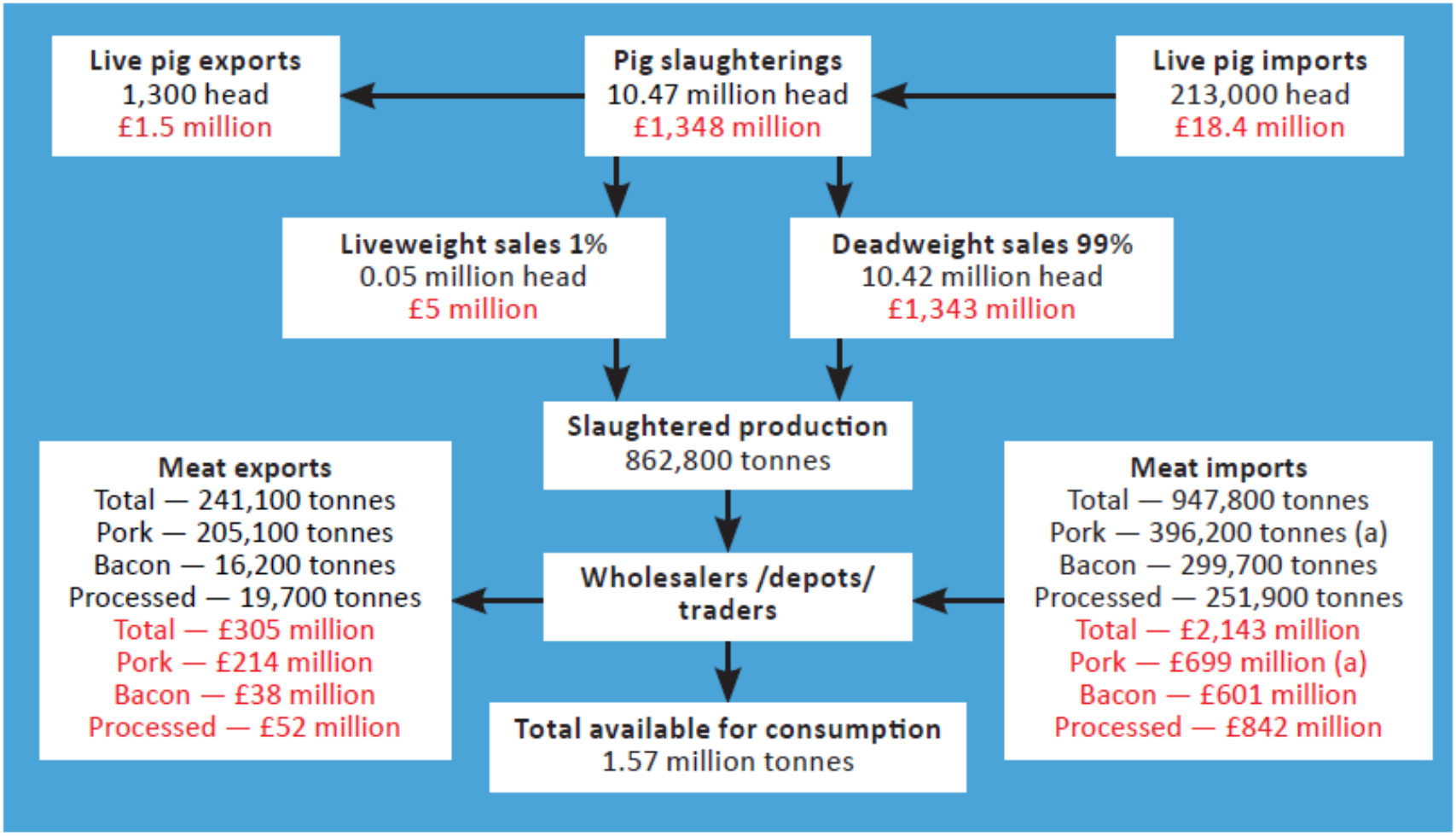
- Baseline to measure trends and effect of implemented measures
- Identify risk factors:
  - *Where volume of use is highest*
  - *Link to resistance data*
- Benchmarking (vet/farmer):
  - *Compare with peers/ identify good practice*
- Public confidence/ retailers:
  - *Be proactive*

Species examples of strategies to reduce/prevent disease:

Pigs

Features of the pig industry

Figure 1.1 UK product flows in the pig meat marketing chain in 2014



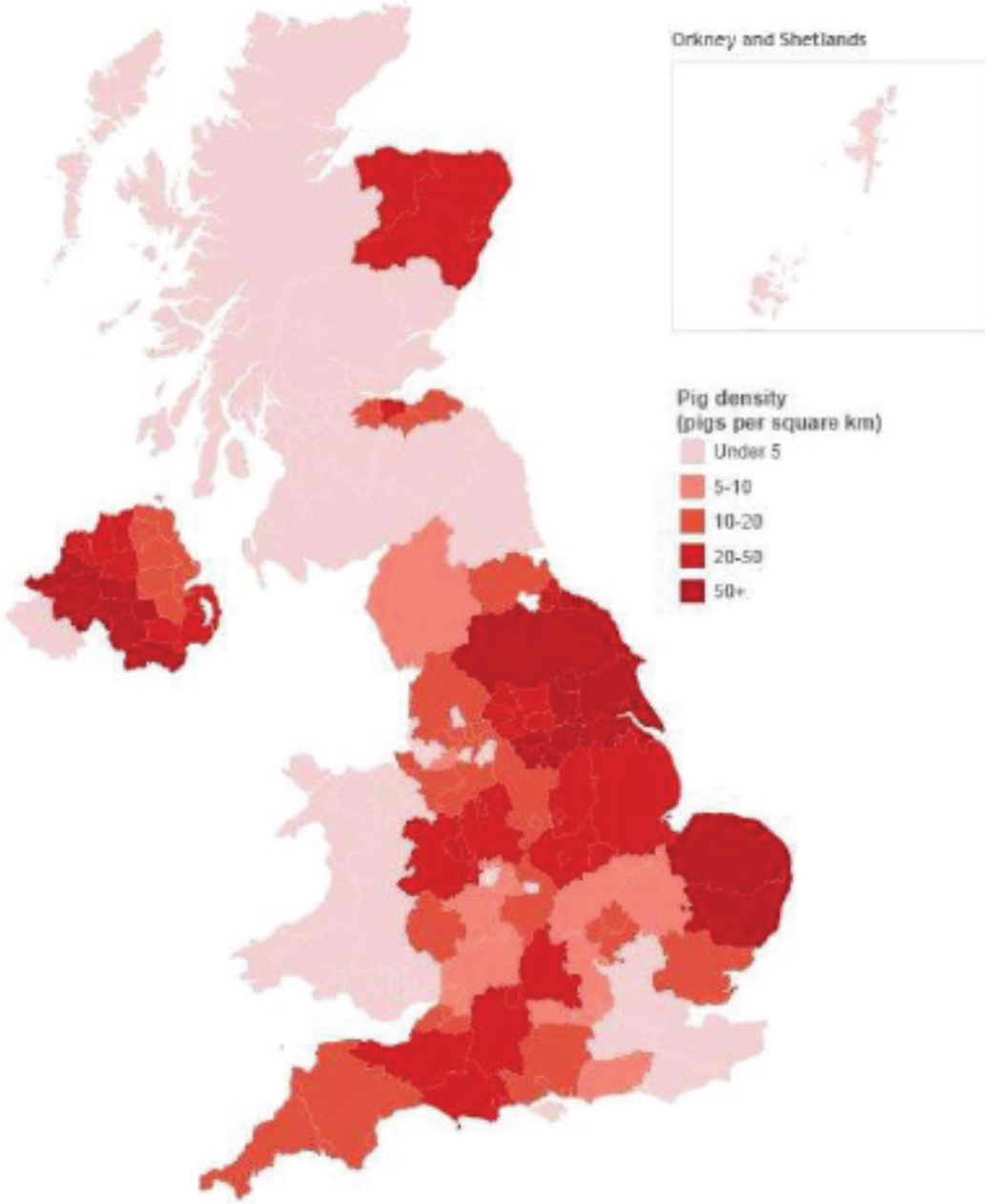
(a) Includes pork imports which are subsequently cured in the United Kingdom.

Source: AHDB Pork Pig Pocketbook 2016
http://pork.ahdb.org.uk/media/73791/pig-pocketbook-2015.pdf

Pig Density in the UK, June 2013

2009 survey: approximately 30 vet practices provide veterinary care for @85% of quality assured pigs

All assured pig premises are routinely visited on quarterly basis by vet



Data covers commercial holdings only.

Source: AHDB Market Intelligence, Defra, Welsh Government, DARD, Scottish Government

Size profile of all England abattoirs slaughtering pigs, 2016

Size group (head)	Number of abattoirs	Total throughput (head)	Average throughput (head)	Share of throughput (%)
1–10,000	79	208,502	2,639	2.3
10,001–30,000	18	288,870	16,048	3.2
30,001–100,000	9	448,953	49,884	5.0
100,001–500,000	4	870,005	217,501	9.7
> 500,001	8	7,191,688	898,961	79.8
Total	**118**	**9,008,018**	**76,339**	**100.0**

Source: AHDB data based on abattoirs operating in the calendar year.

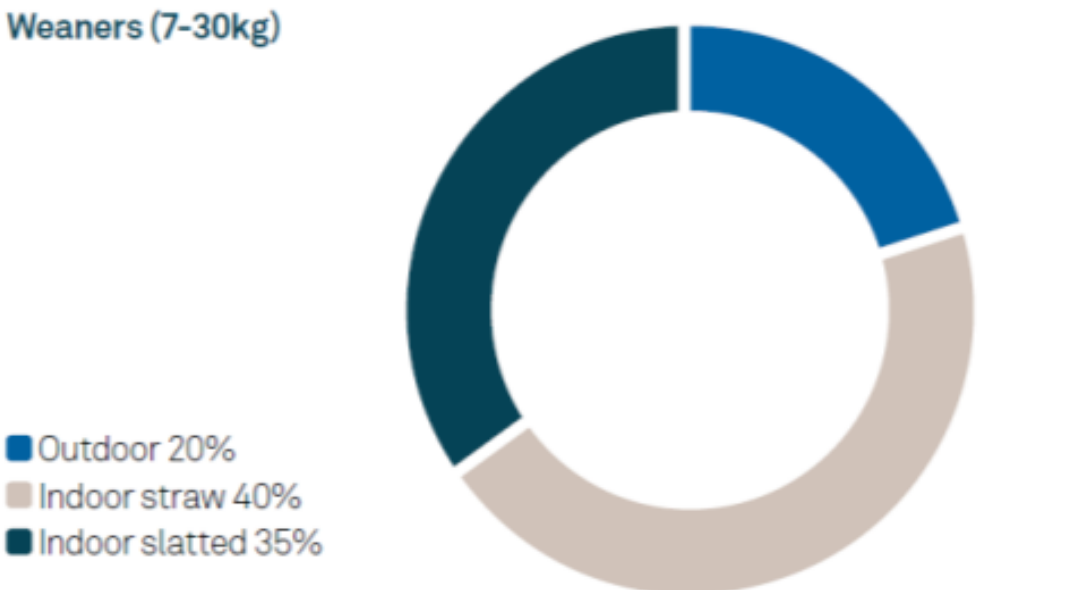
- Surveillance of lesions in slaughter pigs is feasible and useful
- Good biosecurity at abattoirs and for vehicles important to prevent them becoming a means for disease transmission

Source: AHDB Pork Pig Pocketbook 2017
https://pork.ahdb.org.uk/media/273703/pig-pocketbook-2017.pdf

Pig housing systems

40% of commercial breeding sows are kept outdoors

A large proportion of their progeny move indoors usually to a straw-based system at weaning or to finish

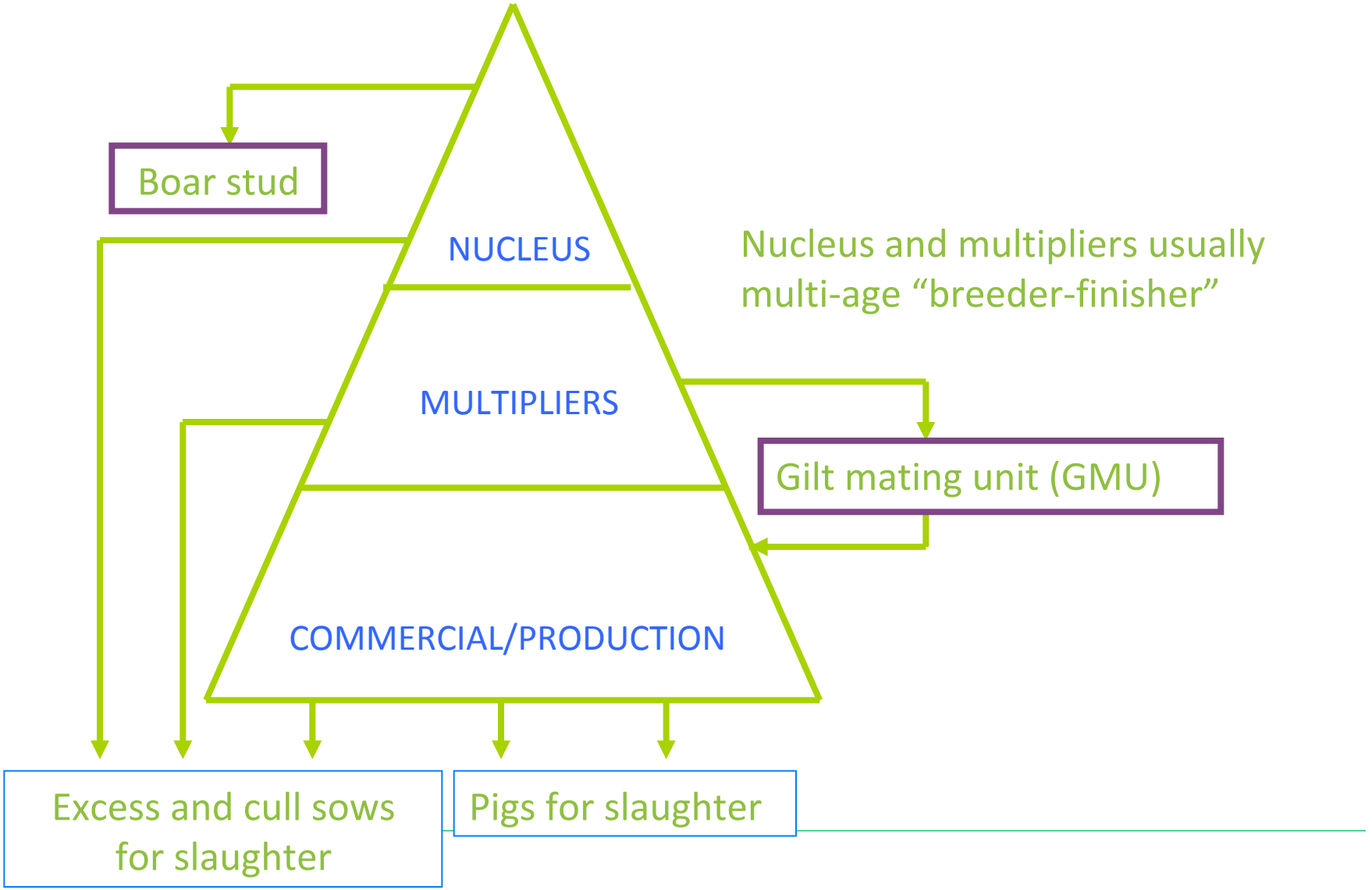


Source: Defra Pigs and Poultry Farm Practices Survey 2009

Typical outdoor breeding unit

40% of commercial breeding sows are kept outdoors

Pyramid structure of national pig breeding herd



Porcine Reproductive and Respiratory Syndrome virus - PRRSV

- Emerged in UK in the early 1990s (blue ear disease)
- High mutation rate and immunosuppressive during 1º infection
- Only PRRS-1 (subtype 1) in UK, PRRS-2 never detected which tends to be more virulent
- One of the main endemic diseases affecting GB pig health, welfare and productivity
- Considered to be one of the drivers of antimicrobial use on affected pig farms

Diagnoses concurrent with PRRS in 2016-17

Syndrome	Diagnosis	Number
	PRRS (total)	108
Systemic 33	Streptococcal *(mainly S. suis)*	28
	Porcine circovirus/PDNS	2
	Other systemic eg erysipelas	3
Respiratory 50	*Pasteurella multocida*	14
	Haemophilus parasuis	9
	Swine influenza	10
	Mycoplasma spp.	9
	Actinobacillus pleuropneumoniae	5
	Other respiratory diagnoses	3
Enteric 20	Salmonellosis	10
	Gastric ulceration	5
	E.coli, rotavirus	5
Other 8	Incl. mycoplasmal arthritis, greasy pig, torsion, *T. pyogenes*	8

PRRSV control plans

- Pig management – single age, all in-all out, one way flow
- Quarantine and acclimatisation of replacement gilts/boars
- Live attenuated vaccines used quite widely
- Improved biosecurity – internal and external
  - Veterinary advice and industry-run farmer workshops
  - Biorisk on line teaching tool and on-line biosecurity checks

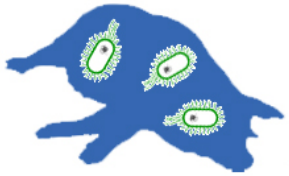
- Local and aerosol spread make elimination of infection difficult in pig-dense areas due to risk of reintroduction
- Regional control is necessary and requires
  - Industry and veterinary buy-in and leadership
  - Mapping of pig units with declared PRRS infection status

PRRSV control plans (continued)

- Increased use of diagnostics
  - PCR and sequencing to identify strains
  - ropes to collect saliva to monitor groups for infection
  - identifying concurrent disease

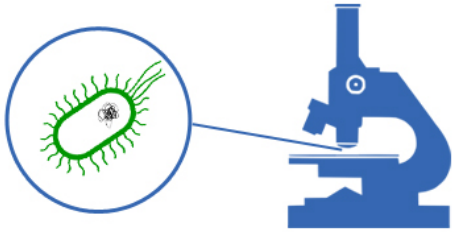
Autogenous vaccines

Production Process



Step 1

Viral and bacterial pathogens weaken the animal

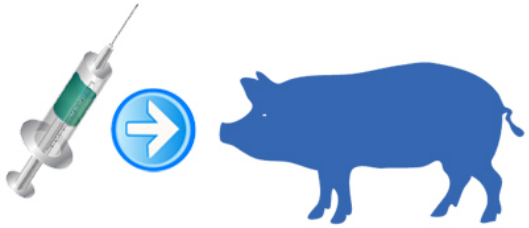


Step 2

Identification of the pathogen from tissue or sampling of the infected animal

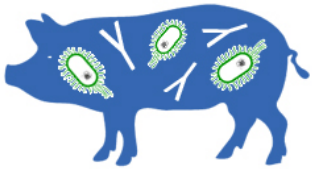
Step 3

Production of a herd-specific vaccine



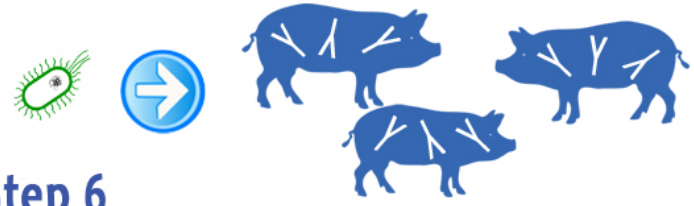
Step 4

Treatment with herd-specific vaccine



Step 5

After treatment the animal form antibodies against the pathogen



Step 6

Vaccine reduces morbidity from field infection

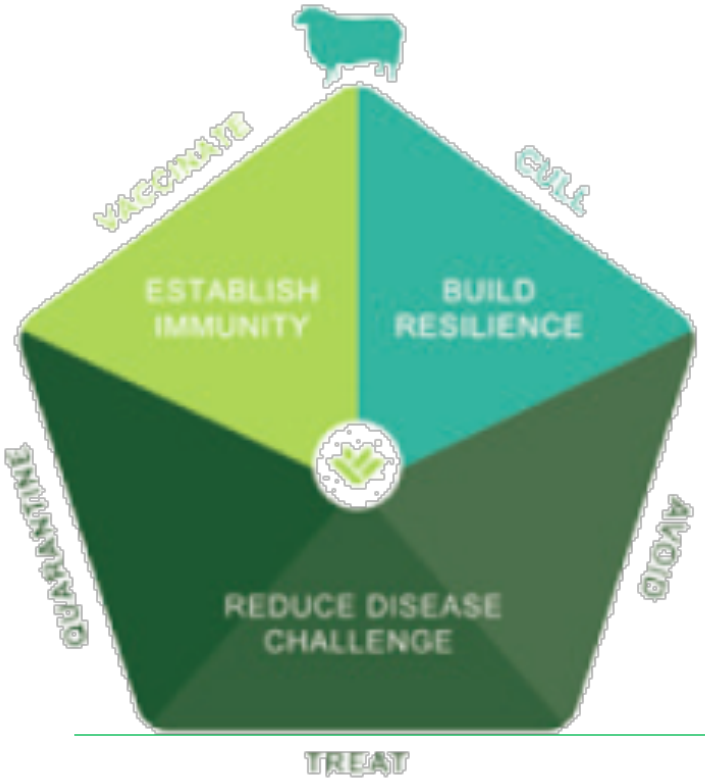
Credit: Oldcastle Laboratories Ltd

Species examples of strategies to reduce/prevent disease:

Sheep

Lameness

- Significant animal welfare and economic challenge to the sheep sector.
- Footrot cost the sheep industry @ £24 million a year.
- Causes are footrot, interdigital dermatitis (or scald) and contagious ovine digital dermatitis (CODD).



The five points plan:
Reduce lameness to 2% by 2021

- Cull to build resilience
- Treat, quarantine and avoid to reduce disease challenge
- Vaccinate to establish immunity

Risks

Some agri-environment schemes require the removal of sheep from their home farms to winter away.

This creates a risk of returning with infectious diseases, e.g. Digital Dermatitis, which subsequently require treatment with antibiotics and strict quarantine to prevent spread.

Watery mouth - Rattle belly

- Colonisation of the small intestine with *E. coli*.
- Bacterial challenge
- Affects lambs within 72 hours of birth with presenting signs of dehydration, evidence of ptyalism and distended abomasum.
- Often secondary to hypogammaglobulinaemia due to delayed ingestion of colostrum or poorly fed ewes in low body condition that are unable to produce sufficient colostrum.
- More common in small weak triplets and twins.
- Not a problem in extensively managed livestock.
- Improved hygiene standards in the lambing shed is vital.

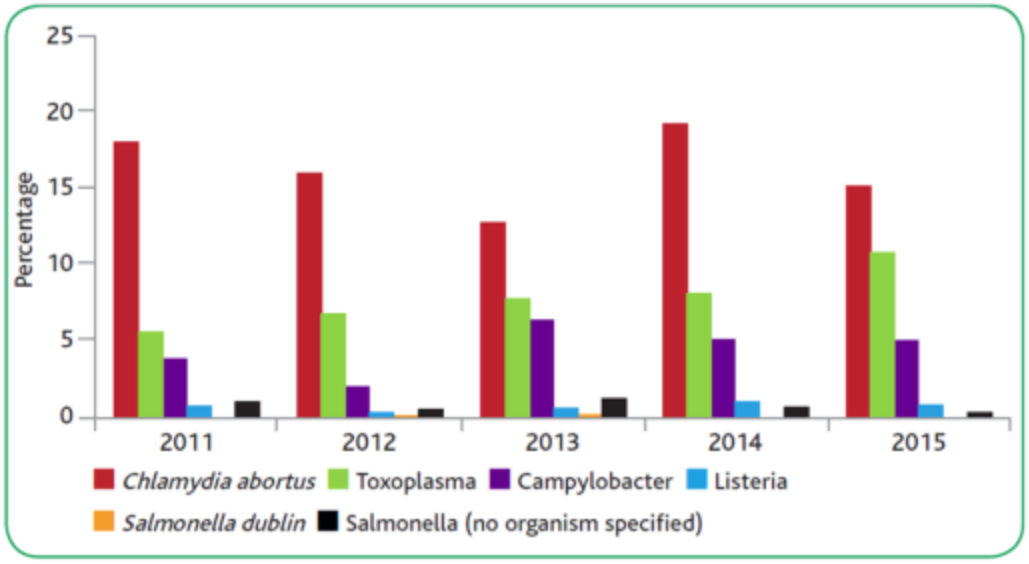
Treatment of newborn lambs

- The treatment of lambs with antibiotics to prevent watery mouth and joint ill, particularly in indoor lambing systems (50 – 75% of flocks), is relatively common.
- In a recent study of 207 sheep-only farms, oral antibiotics were prescribed to 47% of flocks
- Approximately 30% of farmers reported giving oral antibiotics to all lambs to prevent watery mouth and 10% reported treating all lambs to reduce cases of joint ill.
- This is a key area where behaviour and practices need to change to slow the rate of development of resistance and maintain efficacy in the licensed products, though these changes in behaviour will not have a large influence on volumes used.

Abortion

Enzootic Abortion of Ewes (EAE) is consistently the most common abortion diagnosis in sheep. Toxoplasmosis is the next most common.

There are effective vaccines against EAE and toxoplasmosis, with estimates suggesting that approximately one third of replacement ewes are vaccinated against EAE and one fifth against toxoplasmosis.



Ovine abortions as % of diagnosable submissions 2011 - 2015

Species examples of strategies to reduce/prevent disease:

Cattle

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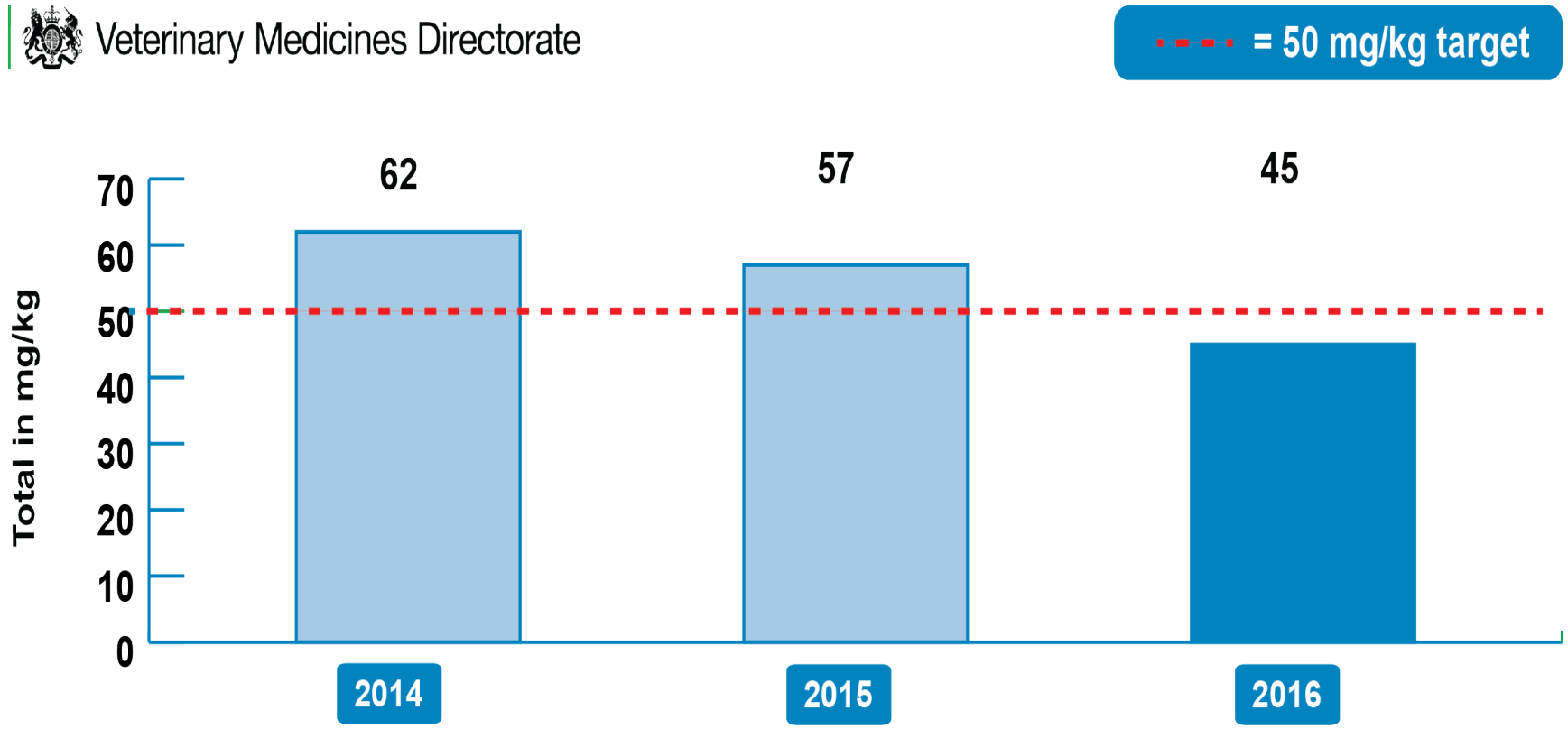
Selective Dry Cow therapy

Credit: vettime

What progress have we made so far reducing antibiotic use in animals?

Veterinary Medicines Directorate

50 mg/kg target: total sales (mg/kg) since 2014



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Antibiotic sales summary

Overall trends in mg/kg (using population correction unit)

Veterinary Medicines Directorate

	2012	2013	2014	2015	2016	Compared with 2015
Total (mg/kg)	66	62	62	57	45	⬇ 21%
Fluoroquinolones (FQ) (mg/kg)	0.33	0.36	0.35	0.34	0.24	⬇ 29%
3rd/4th gen Cephalosporins (mg/kg)	0.20	0.18	0.19	0.17	0.15	⬇ 12%
Colistin (mg/kg)	0.09	0.11	0.12	0.12	0.02	⬇ 83%
Total sales (tonnes)	464	436	445	408	337	⬇ 17%

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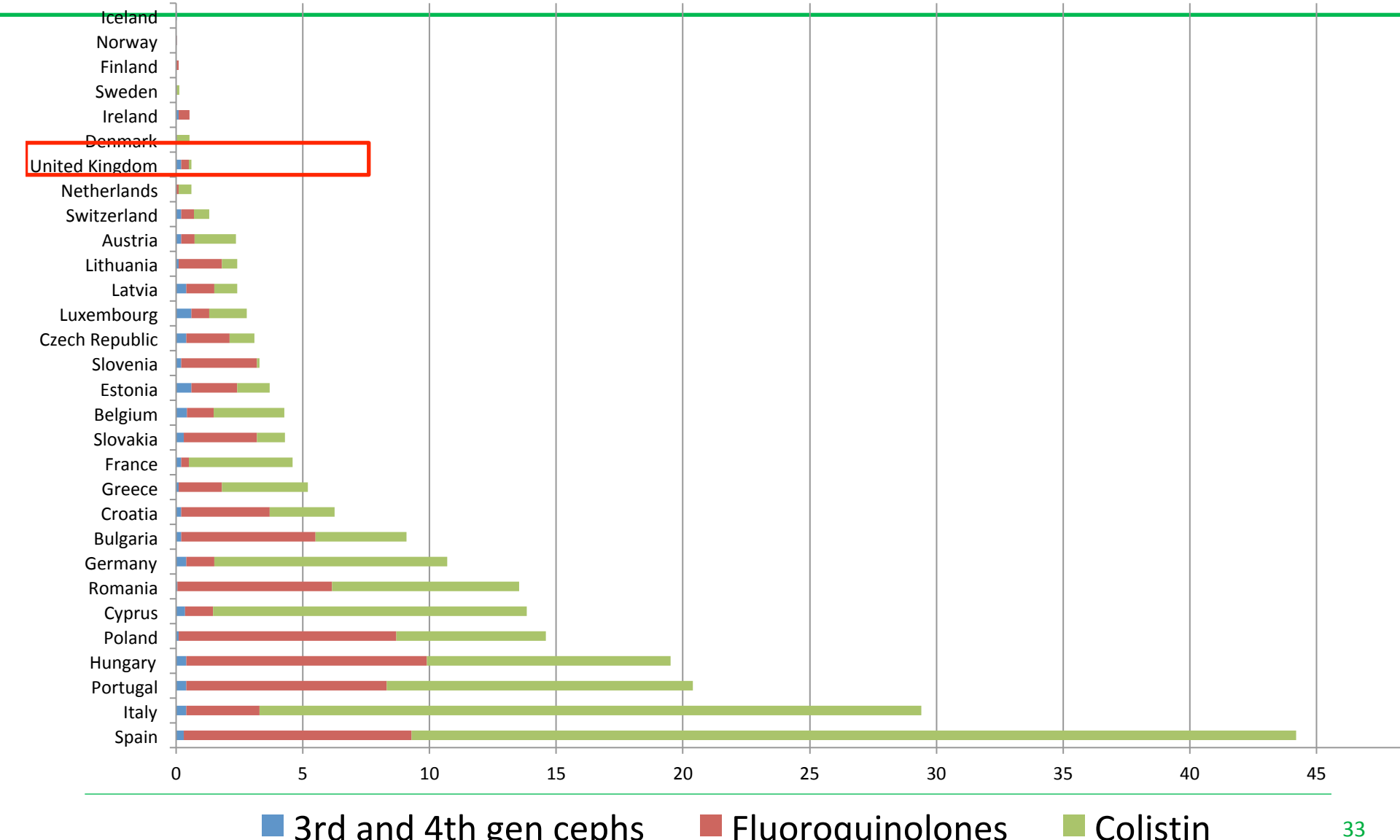
HP-CIA sales for 30 EU/EEA countries, 2015



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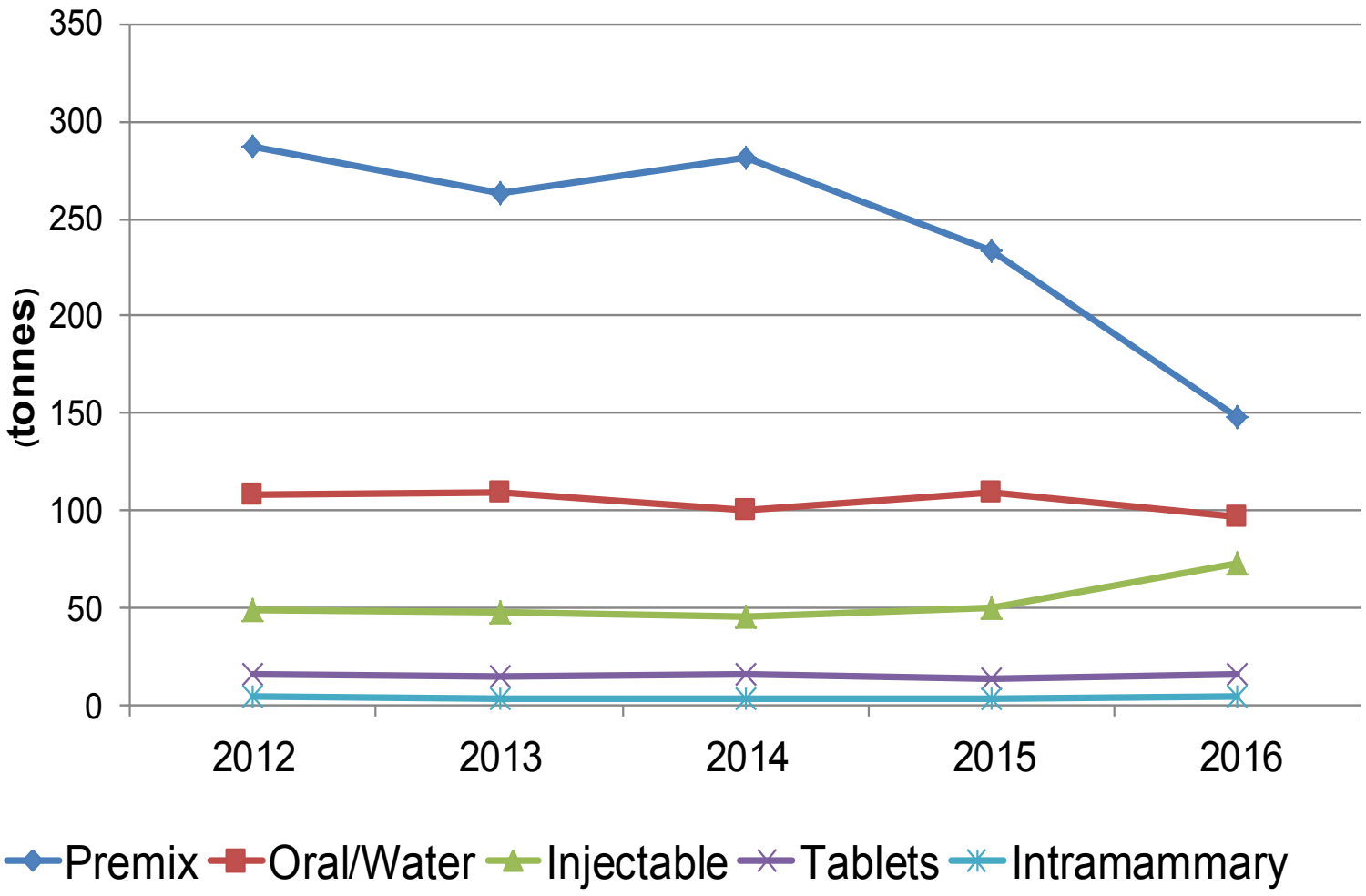
Sales: route of administration



Veterinary Medicines Directorate

UK VARSS Report

https://www.gov.uk/government/collections/veterinary-antimicrobial-resistance-and-sales-surveillance

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