Third Report

GB Cattle Health & Welfare Group

November 2016

www.chawg.org.uk

CHAWG
Cattle Health & Welfare Group

The work of the GB Cattle Health and Welfare Group would not be possible without the valued financial support of both AHDB Dairy and AHDB Beef and Lamb, which kindly fund the secretariat function for this cross-industry group.

The members of CHAWG are:

Agriculture & Horticulture Development Board (AHDB)
Animal & Plant Health Agency (APHA)
Animal Health & Welfare Board for England (AHWBE)
Animal Health Distributors Association (AHDA)
British Cattle Veterinary Association (BCVA)
Dairy UK
Department for Environment, Food and Rural Affairs (Defra)
Farmers Union of Wales (FUW)
Holstein UK/Centre for Dairy Information (HUK/CDI)
Livestock Auctioneers Association (LAA)
National Beef Association (NBA)
National Milk Records (NMR)
National Office of Animal Health (NOAH)
NFU of England and Wales (NFU)
NFU Scotland (NFUS)
Red Tractor Assurance (RTA)
Royal Association of British Dairy Farmers (RABDF)
Royal Society for the Prevention of Cruelty to Animals (RSPCA)
Scottish Government
University of Nottingham School of Veterinary Science
Welsh Government

CVOs' Foreword

The Chief Veterinary Officers for the UK, Scotland and Wales are very pleased to welcome the Cattle Health and Welfare Group of Great Britain's third biennial report. This report continues the successes of the previous editions as a resource for key information and, with those foundations to build on, enables the interpretation of the data they contain over time.

As we consider the possible impacts of the outcome of the referendum on leaving the EU, the importance of a GB focus on disease control is as important as ever, and is clearly reflected in CHAWG's approach. The healthier our animals, the more attractive our products. The better our animal welfare, the greater the confidence of consumers in our production systems.

Since the last report was published in 2014, antimicrobial resistance (AMR) has emerged as one of the main areas of concern for the cattle industry. The 'One Health' approach spanning human and animal use of medicines ensures that this will continue to be the case for the foreseeable future.

With the UK Government placing AMR at the top of its risk register alongside terrorism and pandemic 'flu, it is heartening to see that CHAWG, in common with other livestock sectors, has grasped the nettle in promoting this alongside the Responsible Use of Medicines in Agriculture (RUMA) Alliance, looking first at how the cattle sector can better capture data on use of antimicrobials.

Addressing AMR also helps us address other imperatives. An emphasis on sound animal husbandry and healthy animals kept to high welfare standards will help minimise routine reliance on antimicrobials – indeed, routine reliance on many chemotherapeutic products.

Success in controlling endemic disease is one area of considerable importance, and here we can highlight CHAWG's pivotal role in the development and promotion of national endemic disease control programmes. These include the launch of the BVDFree scheme in England earlier in 2016, ongoing progress with BVD eradication in Scotland, the development of a Wales BVD scheme, and the Action Johne's initiative developed by the Action Group on Johne's.

It is good to see solid progress in the control of mastitis and lameness too, and the improvements in longevity that are evidenced in the report – especially with breeding programmes underpinning much of this, focusing on prevention rather than cure.

Nigel Gibbens
Chief Veterinary Officer for the UK

Christianne Glossop
Chief Veterinary Officer for Wales

Sheila Voas
Chief Veterinary Officer for Scotland

Another area to highlight is cattle welfare, for which key metric to measure progress are highlighted. In 2016 CHAWG hosted a delegation from the EU's Food and Veterinary Organisation on dairy cow welfare, which was impressed by the availability of meaningful data CHAWG members were able to provide, with added insight from their depth and breadth of knowledge. We look forward to the fruits of these projects in coming months and years.

In summary, we congratulate CHAWG on progress made over the past 24 months, and are optimistic about further advancement in cattle health and welfare before the next report.

Contents

1 Introduction

Welcome to the third report on the state of Cattle Health and Welfare in Great Britain.

The Cattle Health & Welfare Group (CHAWG) originally started out as an England-only activity but it quickly became apparent that disease and indeed welfare issues do not recognise Offa's Dyke and Hadrian's Wall and thus the group has become a GB activity which in itself is logical, viewing England, Scotland and Wales as one biosecure unit.

This year we have seen the emergence of Antimicrobial Resistance (AMR) as a real issue and one that needs to be tackled by the whole farm livestock sector coordinated by The Responsible Use of Medicines in Agriculture (RUMA) Alliance, but at a species level CHAWG has established a sub group to look at the best way of collecting and coordinating data both to help the Veterinary Medicines Directorate (VMD) with their statutory duties but at the same time ensure that appropriate data is collected at first at veterinary practice level and then in due course on-farm.

This is not to say that other pieces of 'core' activity are being ignored. Effective farm health planning remains the bedrock of good practice, and it is pleasing to see real progress across all three GB nations on BVD control and eradication. Dairy cow welfare remains very important. Indeed the Agriculture and Horticulture Development Board (AHDB) asked CHAWG to organise a small group to meet with a delegation from the Food & Veterinary Office (FVO) of the European Commission to look at this subject. I think that they were impressed by the coordinated approach taken in this country. This does not appear to be the case in other member states.

I am extremely grateful to all members of CHAWG. Our quarterly meetings are well-attended and lively productive sessions and everyone has been happy and willing to make written contributions to this report. Many thanks to you all. However I would especially like to thank for their assistance "beyond the call of duty", Gareth Hateley the head of the Animal and Plant Health Agency (APHA) Cattle Expert Group and Charlotte Bullock, who provides the much needed administration/secretarial assistance to ensure our activities are properly coordinated and action-orientated. It would also be remiss of me to also not thank Brian Lindsay, the previous secretary to CHAWG who has now moved on to pastures new, for his many years of support. Finally CHAWG could not exist without the on-going financial support of AHDB Dairy and AHDB Beef & Lamb. For this we are extremely grateful.

Tim Brigstocke
Chairman, CHAWG

2 About CHAWG

CHAWG's remit is to:

1. Provide an industry forum that will encourage and coordinate a programme of economically-focused improvements to cattle health and welfare across Britain.
2. Act as a forum to prioritise the research, development and knowledge interaction needs of the GB cattle industry in relation to cattle health and welfare, to ensure knowledge gap identification, co-ordination and minimal duplication.
3. Assist in the dissemination of knowledge across the industry through the participating organisations within the group and others where appropriate.
4. Liaise closely with all stakeholders such as levy boards and educational institutions to promote consistent regional dissemination of national work and encourage the uptake of technological advances and best practice.
5. Provide guidance and be a resource for the Chief Veterinary Officers across GB and other relevant Government bodies on cattle health and welfare matters, including the early stages of policy development and other areas, where appropriate.

CHAWG published its first report in 2012[1], and with its limited resources, has focused on initiating work not currently being tackled by other bodies or initiatives but with the potential to impact heavily on the cattle industry, namely: Farm Health Planning (FHP); Surveillance and Monitoring; Bovine Viral Diarrhoea (BVD); and Dairy Cow Welfare – CHAWG is responsible for the GB Dairy Cow Welfare Strategy[2]. It took on the legacy of the Beyond Calf Exports Industry Forum[3], set up jointly by the cattle industry, RSPCA and Compassion in World Farming, in 2013. CHAWG runs the annual Farm Health Planning Seminars at the Livestock Show in collaboration with the British Cattle Veterinary Association, and provides a resource for Governments through the Animal Health and Welfare Board for England.

CHAWG does not cover bovine tuberculosis (bTB) as its prevalence, spread, impact and control measures are being managed collaboratively and extremely well through other sector organisations. CHAWG supports their efforts and directs any queries primarily to the TB Hub **www.tbhub.co.uk**.

3 Trends and demographic changes

a. Cattle numbers

▼ **Table 1: Cattle numbers and premises in Britain by purpose – dairy, beef and dual ('000)**

	2003 (previous)		2003 (new)		2005		2014		2015	
Beef	**Cattle**	**Prem**	**Cattle**	**Prem**	**Cattle**	**Prem**	**Cattle**	**Prem**	**Cattle**	**Prem**
England	3,121	52	3,120	54	3,212	44	2,812	43	2,824	43
Scotland	1,549	13	1,548	14	1,575	12	1,333	11	1,335	11
Wales	772	14	772	14	796	11	614	11	616	11
	5,442	**79**	**5,440**	**82**	**5,583**	**66**	**4,759**	**65**	**4,775**	**64**
Dairy	**Cattle**	**Prem**	**Cattle**	**Prem**	**Cattle**	**Prem**	**Cattle**	**Prem**	**Cattle**	**Prem**
England	2,634	28	2,630	29	2,453	21	2,345	21	2,343	20
Scotland	411	4	411	4	394	3	385	3	393	3
Wales	459	6	459	6	445	4	484	4	501	4
	3,504	**38**	**3,500**	**40**	**3,292**	**28**	**3,215**	**27**	**3,237**	**27**
Dual	**Cattle**	**Prem**	**Cattle**	**Prem**	**Cattle**	**Prem**	**Cattle**	**Prem**	**Cattle**	**Prem**
England	72	9	72	10	81	12	148	12	157	12
Scotland	30	4	30	4	33	4	47	4	50	4
Wales	15	2	15	2	16	2	18	2	18	2
	117	**15**	**116**	**15**	**130**	**18**	**213**	**18**	**226**	**18**

Note: rounded figures have been used therefore inconsistencies in sums may have occurred; 'Prem' = premises/holding.
Source: Defra/CTS

This table compares the cattle population in June of the years 2005 and 2015 and allows comparison between years. Please note that the method of deriving the data is different from that used in the 2014 CHAWG Report, so the 2003 data for both methodologies is shown for comparison purposes.

b. Milk production

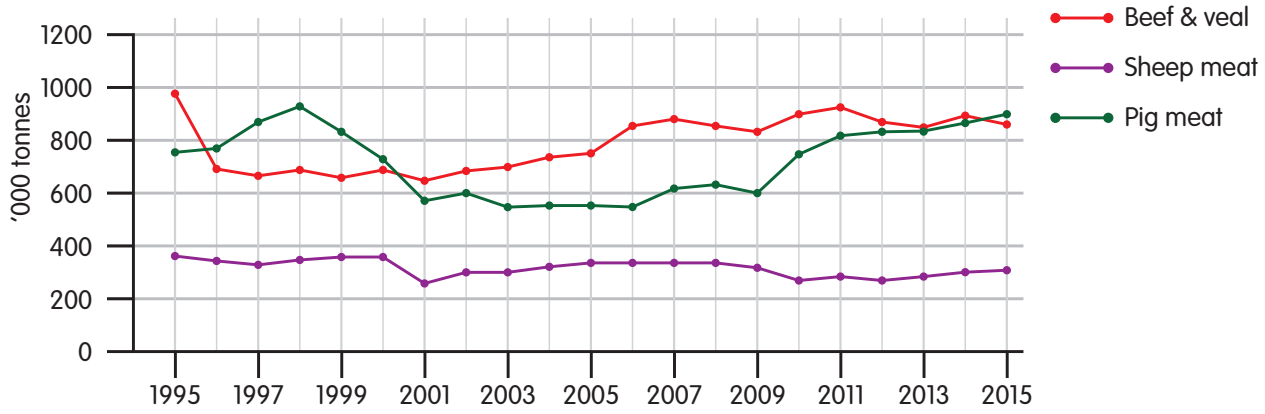
▼ **Table 2: Average dairy herd size, yield and total milk production in the UK**

	Average size of dairy herds in UK (cows)		Average yield in UK (litres/cow/annum)	Total milk production from UK national dairy herd (billion litres/annum)
2015	142	2014/15	7,870	14,64
2014	133	2013/14	7,712	13,92
2005	99	2004/5	6,886	14.18

Source: Defra

c. Beef production

Figure 1: Trends in red meat production, UK, 1995-2015



Source: Defra

d. Cattle slaughter

Table 3: Cattle slaughterings by type (UK) and region, 2011-2015 ('000 head)

	Prime Cattle	Cows and bulls	Calves	Total cattle	GB	England	Wales	Scotland
2015	1,922	615	99	2,636	2,134	1,516	159	459
2014	1,960	597	112	2,669	2,149	1,529	151	468
2013	1,927	607	91	2,625	N/A	N/A	N/A	N/A
2012	1,965	642	74	2,681	2,240	1,605	155	480
2011	2,114	643	81	2,838	2,397	1,715	158	524

Source: Defra

e. Cattle imports

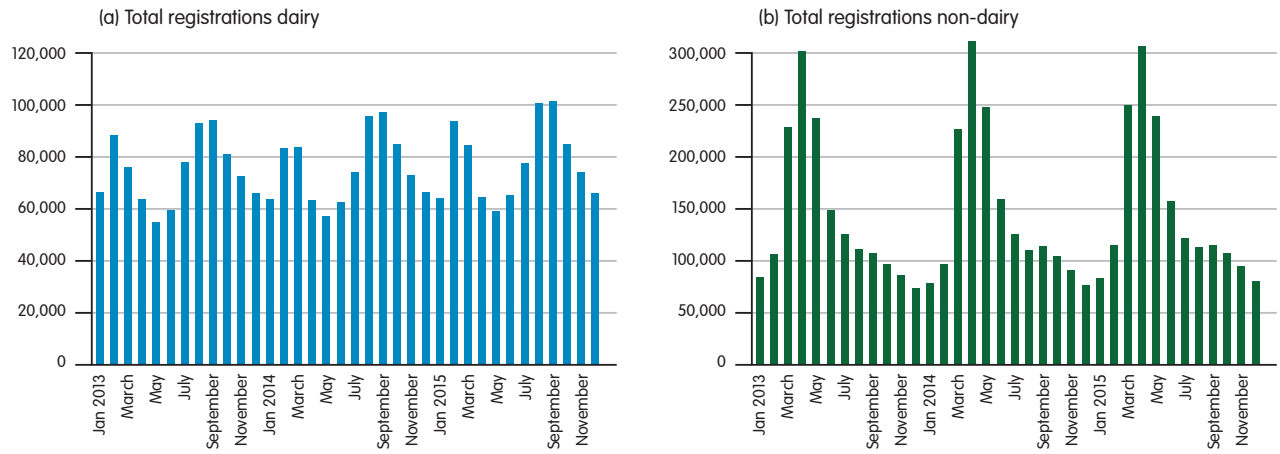
Table 4: Imported Cattle 2015 - numbers of animals imported to GB from main exporting countries

	England				Wales		Scotland				
	Breeding / Production		Slaughter		Breeding / Production		Breeding / Production		Slaughter		Total Animals
Country	Cmts	Animals	Cmts	Animals	Cmts	Animals	Cmts	Animals	Cmts	Animals	
N Ireland	289	4,664	63	1,964	12	63	440	8,165	250	5,304	20,160
Ireland	279	6,324	1	33	94	1,212	80	837	3	33	8,439
Netherlands	204	4,048	-	-	64	1,030	26	767	-	-	5,845
Germany	185	4,096	-	-	41	719	15	289	-	-	5,104
France	155	2,415	-	-	25	235	11	93	-	-	2,743
Denmark	121	3,245	-	-	13	331	20	531	-	11,280	4,107
Luxembourg	44	706	-	-	6	102	-	-	-	86	808
Belgium	15	238	-	-	72	1,124	-	-	-	-	1,362
Jersey	15	102	-	-	5	11	1	2	-	-	115
Others	22	320	-	-	3	30	4	9	-	-	359
Total 2015	**1,329**	**26,158**	**64**	**1,997**	**332**	**4,873**	**597**	**10,693**	**253**	**5,337**	**49,058**
Total 2014	**1,841**	**36,804**	**59**	**1,700**	**561**	**10,365**	**700**	**13,086**	**289**	**7,915**	**48,593**
Total 2013	**1,456**	**28,008**	**106**	**3,538**	**369**	**5,863**	**597**	**10,085**	**403**	**11,366**	**58,860**
Total 2012	**-**	**28,224**	**-**	**0**	**-**	**4,737**	**-**	**7,109**	**-**	**7,116**	**47,186**
Total 2011	**-**	**16,694**	**-**	**347**	**-**	**2,997**	**-**	**1,260**	**-**	**837**	**22,135**

Source: APHA; Cmts = consignments or numbers of lots in which cattle are imported

f. Calving patterns

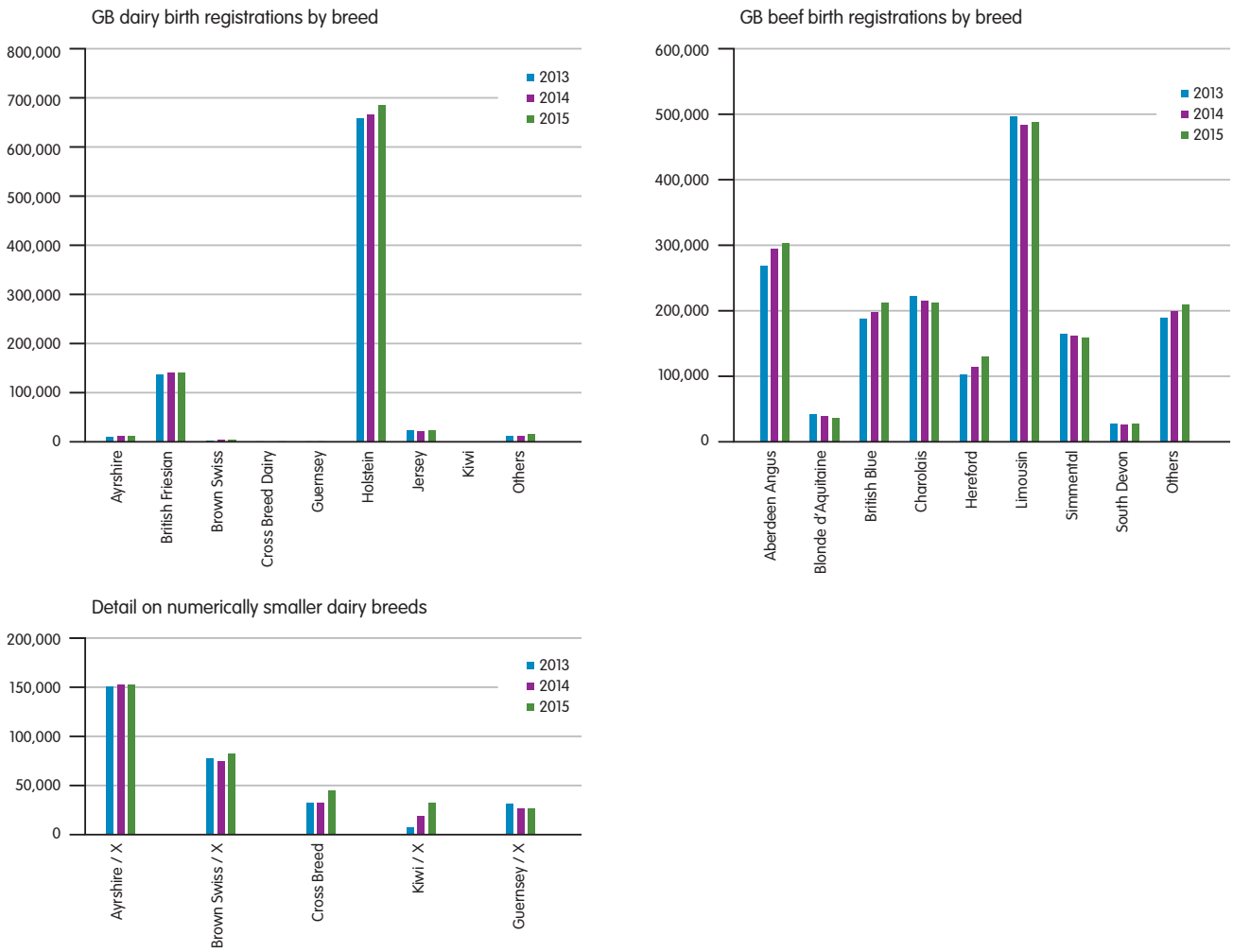
Figure 2: Seasonal distribution of calf registrations from (a) dairy and (b) non-dairy (beef) cattle in Great Britain



Source: BCMS

g. Predominant breeds

Figure 3: Predominant cattle breeds, beef and dairy



Source: BCMS

It is worth noting that among the numerically smaller breeds, there has been a rise in numbers. This is possibly due to changes in dairy systems with more emphasis on grazing regimes and breeds that can maximise their potential.

4 Availability of data

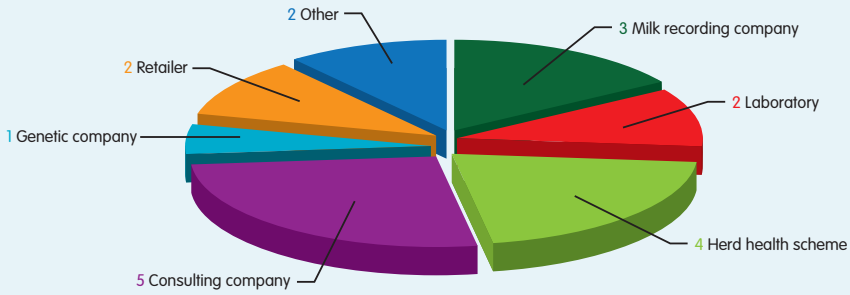
Industry Initiative: Data for the GB dairy herd

The problem of collecting and collating data was highlighted in the 2014 CHAWG report. Since then, researchers from the Royal Veterinary College (RVC) – as part of an AHDB Dairy-funded study – formally evaluated the ability of existing recording systems to generate accurate and reliable estimates of the incidence of a number of health conditions in the GB dairy herd[4].

Some 59 recording systems were identified, and the evaluated systems showed considerable differences in their geographical coverage, implementation and objectives. The majority recorded information on dairy cattle health and welfare and approximately half of them also recorded fertility and milk production data. There were overlaps in recorded conditions, with Johne's Disease, Bovine Viral Diarrhoea, mastitis and lameness being recorded by almost all of the systems. Nineteen of them were further assessed following the SuRveillance EVALuation framework (SERVAL) against aspects of the recording systems such as geographical coverage, data collection, analysis, management and completeness. Although individual systems can provide reliable estimates of health conditions for individual farmers, no one system could provide reliable and accurate estimates for any of the conditions of interest at national level. Common weaknesses included geographical coverage and standardisation of records.

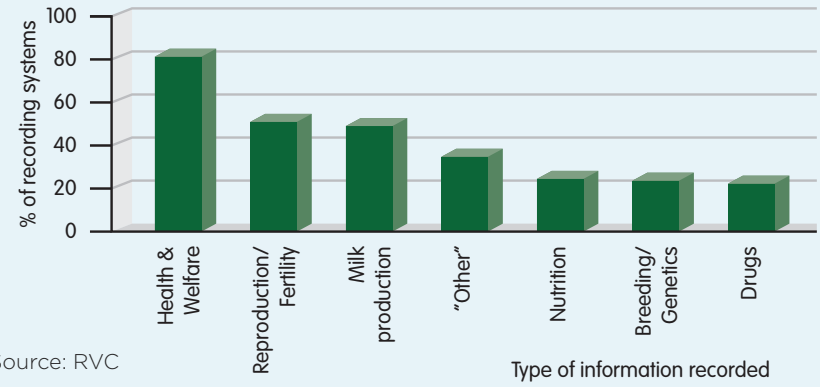
During the second phase of this study, data on the incidence and prevalence of health conditions of dairy cattle on 225 farms across GB were collected. Bulk tank milk samples were collected and tested for BVD, IBR, Johne's disease, liver fluke, gut worms *(Ostertagia ostertagi)*, salmonella, Leptospirosis, *Neospora*, Q fever and Chlamydia-like organisms. The data from this study will provide a baseline, which can be used to track future changes in disease status, guide priorities and monitor improvements in the health of the national herd. The results had not been published at the time of this report going to print.

Figure 4: Type and number of the systems recording specific health and production information



Source: RVC

Figure 5: Frequency of recording of different type of information by the individual recording systems based on information collected through the questionnaire.
Note: Category "other" includes information such as financial statements, pedigree and biosecurity.



Source: RVC

Industry Initiative: Livestock Industry Data Exchange Hub (LIDEH)

The advantages of a functional and better-integrated system of information capture and flow were explained in the 2014 CHAWG report, and a project to facilitate this was described.

Two years on, we can report that Innovate UK funding has been secured to pilot development of a prototype system to facilitate data exchange between government, industry and private databases, in which key information will be identified, linked and presented through a single portal. Known as the 'Livestock Industry Data Exchange Hub'[5] (LIDEH), the initial focus is on animal disease with the intention to provide the cattle industry with a facility to underpin risk-based trading for economically important diseases through a sustainable, industry owned system. The system will be accessible at key transaction points in the food supply chain, for example at auction markets.

The project deliverables are:

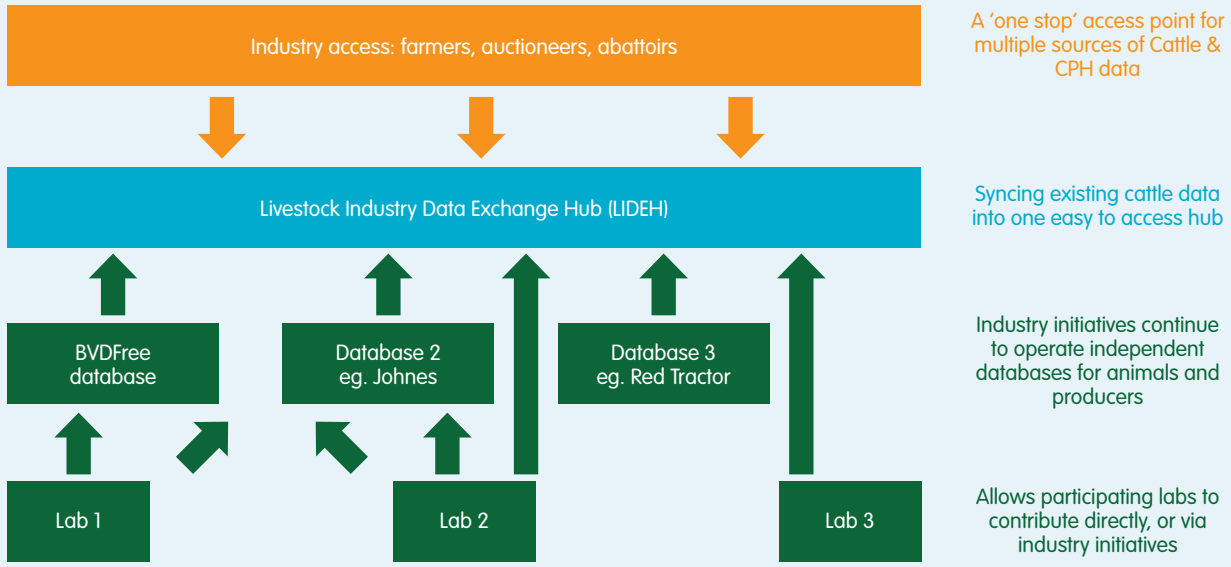
1) A framework for secure data exchange for the livestock industry.

2) Data available via the framework which can be used to underpin risk based trading of cattle in the UK for three endemic diseases, namely Bovine Viral Diarrhoea (BVD), Johne's Disease (JD) and bovine Tuberculosis (bTB).

3) A sustainable industry-owned model for the future operation of the LIDEH.

Key to the long-term future of the LIDEH is the development of a sustainable business model and securing a revenue stream for future operation. While the initial focus is on animal disease, providing a facility for risk-based trading for economically important diseases such as BVD and Johne's Disease, it is hoped that the framework developed can be expanded to other areas of data collection, which will further benefit the industry as a whole. Creating industry-agreed data exchange protocols will standardise the transfer of information, making it easier for all parties involved. More than 20 industry collaborators are involved in the project (listed in the 2014 CHAWG report). The feasibility study funded through the UK Agri-Tech Catalyst programme is due to complete towards the end of 2016.

Figure 6: Livestock Industry Data Exchange Hub (LIDEH)



Source: AHDB

5 Farm assurance

a. Overview

The predominant assurance scheme remains Red Tractor. However, individual supply chains are increasingly setting up their own monitoring and improvement programmes, some of which are branded or support their own label. It is worth mentioning that while membership of RSPCA Assured (Freedom Food) remains relatively low compared with other assurance schemes, the RSPCA standards for beef and dairy cattle are not restricted for use by Freedom Food members alone, and are being used more widely as a welfare benchmark by a number of stakeholders.

In Red Tractor Dairy and Beef and Lamb Assurance, some changes were made to the standards relating to the health and welfare of artificially-reared youngstock:

- Calves must be given two milk feeds per day until they are 28 days old and must have access to drinking water at all times.
- Calves in individual pens must be able to not only see another calf, but also touch them, in line with legal requirements.

b. Dairy assurance

Red Tractor

Red Tractor reviews its own standards every three years and version 3 was implemented on farm in October 2014[6], subsequent to the 2014 CHAWG report. In the Dairy sector, the annual vet review of health and performance records includes a review of medicine and, in particular, antibiotic use. It is also now recommended that producers body condition score their herd, in accordance with AHDB guidelines.

The top five non-conformances that directly concern dairy animal welfare were:

- An annual herd health and performance review must be undertaken by a vet.
- Housing must be constructed and maintained to provide a safe environment for livestock.
- Records of the health and performance of livestock must be maintained.
- The milking parlour must be kept clean and tidy.
- Structures within the milking parlour area must be sound, maintained and suitable.

Industry Initiative: Red Tractor dairy welfare outcome assessments

Red Tractor continues to work closely with AssureWel, a collaborative team including vets and welfare experts from the University of Bristol, Soil Association and the RSPCA, to introduce welfare outcome measures to its schemes. The scoring of welfare outcome measures during the farm assurance assessment helps refocus the assessment onto the animals.

Welfare outcome measures have formed part of the Red Tractor dairy farm assurance assessment since October 2013, covering over 11,000 farms. Data from these assessments are currently being analysed by Bristol University and more information will be made available in due course. The data will help provide a statistically significant picture of the prevalence of issues within the UK herd.

Red Tractor continues to work with AssureWel on developing welfare outcome scoring for beef cattle with pilots undertaken on a number of Red Tractor Assured farms.

Arlagården

October 2015 saw the UK roll-out of Arla Foods's farm assurance programme, Arlagården[7], which focuses on milk quality, food safety and animal welfare. Already in operation in Denmark, Sweden, Germany, Belgium and Luxembourg, the assurance programme aims to ensure all 12,700 Arla farmers in Europe are assessed to the same standards.

In the UK, Arla and Red Tractor worked closely together during the development of Arlagården and Arla remains fully supportive of the existing Red Tractor scheme. Arla farmers continue to meet the Red Tractor requirements but in order to implement Arlagården and its additional 16 standards, the 3,000 UK farmers who supply Arla now have Red Tractor and Arlagården conformity assessed at the same inspection.

c. Beef assurance

Red Tractor

In the Red Tractor Beef and Lamb standards there were more significant changes; the table below provides a summary.

▼ **Table 5: Summary of new developments in Red Tractor Beef and Lamb standards**

What's new?	Why?
The health plan (written with or without vet involvement) must include detail on how euthanasia is carried out and by whom. For breeding farms it must also include procedures to ensure newborns receive adequate colostrum.	Encourages important procedures to be formalised.
Health and performance records must be kept, including those for medicines, culling/mortality and abattoir feedback. An annual review must be undertaken, tallying incidences of health and welfare issues, identifying key points and developing action plans to try and control/prevent them.	Allows underlying problems to be identified and managed and encourages action to be taken.
Where prescription medicines are being used a vet must visit the farm at least once a year, look over livestock and review medicine and antibiotic usage.	The RCVS Code of Professional Conduct for Veterinary Surgeons requires that where medicines are being used, both the farm and its livestock should be known and under the routine care of a vet.

Source: Red Tractor

The top five non-conformances that directly concern beef animal welfare were:

- A Livestock Health Plan to proactively manage and improve health and welfare of livestock must be established and implemented.
- A documented plan for the effective management of serious incidents and potential emergency situations that threaten the welfare of livestock, food safety or the environment must be in place and known to key staff.
- Records of the health and performance of livestock must be maintained.
- Records of all medicines administered must be kept for five years.
- Housing must be constructed and maintained to provide a safe environment for livestock.

Industry Initiative: Red Tractor lifetime assurance

The delivery of lifetime assurance for beef, where animals will spend their whole lives on an assured farm to qualify to carry the Red Tractor logo rather than the 90 days before slaughter, continues to be an important objective to protect the integrity of the Red Tractor brand. Red Tractor's intention is to work closely with industry to achieve the move to lifetime assurance in a way that does not disrupt supply and is completed within a realistic timescale, at minimum costs to all links in the supply chain, not least farmers.

Quality Meat Scotland (QMS)

Scotland has run the QMS[8] cattle and sheep assurance scheme since 1990; it currently has over 9,500 members. Cattle eligible for the Scotch Beef 'Protected Geographical Indication' (PGI) brand must be born in Scotland and be 'whole of life' assured.

The farm assured standards are reviewed annually and incorporate significant animal health and wellbeing standards. The standards incorporate specific requirements in respect of written animal health plans and basic health and welfare data recording, colostrum or suitable substitute feed within the first six hours of life and the subsequent 28 days, and cattle housing and handling facilities. The standards also require medicine records be kept and retained for five years. Animal health plans must be reviewed annually, including antibiotic use, ideally in conjunction with a vet or suitably qualified person, signed and dated by the nominated person responsible for animal health and welfare.

Industry initiative: QMS Animal Welfare and Wellbeing Charter

The QMS Animal Welfare and Wellbeing Charter was introduced in early 2015; it recognises the five freedoms of animal welfare and wellbeing, and is now a guiding principle for all the QMS assurance schemes which are supported and approved by the Scottish Society for the Prevention of Cruelty to Animals (SSPCA). The SSPCA also carries out some joint visits to QMS-approved livestock farms with the farm assessors.

6 Developments in key health and welfare areas

a. Culling and mortality

Dairy

Data sets available annually from National Milk Records (NMR), analysed by the Veterinary Epidemiology and Economics Research Unit (VEERU) at University of Reading[9], show that over the past five years there has been a reduction in the culling/death rate in the first 100 days of lactation in both the median figures and the top 25%, alongside the expected increase in average milk yield. Age at exit in years and by lactation fell, but this could be indicative of economic rather than welfare-based decisions.

Table 6: A selection of Key Performance Indicators for the UK national dairy herd 2015

Parameter	Target "Best 25%"		Median	
Year	2015	2010	2015	2010
Culling rate	20%	18%	24%	24%
Culling/death rate in first 100 days of lactation	3%	4%	5%	7%
Age at exit (years)	7.0	7.4	6.3	6.6
Age at exit by lactations	4.2	4.5	3.7	3.9
305 day yield (kg)	8,813	8,300	7,905	7,400

Source: NMR/VEERU

Table 7: Dairy cow culling/leaving reasons – health related

Reason for cows leaving herd (% of leavers)	Kingshay		Kite	
Year ending March	2016	2011	2016	2011
Mastitis/high SCC	13.0	15.4	14.3	17.0
Not in calf/not seen bulling/ out of calving pattern	29.0	25.5	28.8	24.3
Lameness/legs & feet	8.8	10.4	11.4	9.9
Aborted	2.3	2.1	2.1	2.2
Accident/trauma/injury	5.2	5.6	3.7	4.6
Metabolic disorder	2.2	3.0	2.1	3.7
Calving injury/downer cows	3.8	4.2	3.0	4.0
Infectious disease inc Johne's & TB reactors	8.4	7.2	4.5	2.6
Leaving % of total herd	**26**	**27**	**27**	**26**
Mortality % of total herd	**1.5**	**1.7**	**2.8**	**3.0**

Source: The Kite Health Monitor[10] and Kingshay Dairy Costings Focus Annual Report[11]

Beef

The AHDB Beef and Lamb Stocktake report[12] suggested that, in general, mortality in 2015 was lower than in 2014 across most English beef production systems recorded. An overall increase in replacement rate suggested farmers were culling out problem animals to better manage the issues in the breeding herd which could cause mortality on-farm.

Table 8: Mortality and replacement rates in English beef enterprises

	2015	2014
Non-SDA suckler herds		
Cow mortality (%)	2.3 (Non-SDA)	3.2 (Lowland & DA)
Herd replacement rate (%)	17.2 (Non-SDA)	15.8 (Lowland & DA)
Non-SDA suckler herds		
Cow mortality (%)	1.8	2.5
Herd replacement rate (%)	17	12.2
Spring calving suckler herds		
Cow mortality (%)	2.4	2.4 (Lowland)
Herd replacement rate (%)	17.9	17.3 (Lowland)
Autumn calving suckler herds		
Cow mortality (%)	2	3.2 (Lowland & DA)
Herd replacement rate (%)	19	15.8 (Lowland & DA)
Combined breeding/finishing		
Cow mortality (%)	2.2	2.9
Herd replacement rate (%)	18.2	16.3
Combined breeding/stores		
Cow mortality (%)	3.0	2.3
Herd replacement rate (%)	20.8	15
Beef finishing (<16 months)		
Mortality (%)	0.9	1.5
Beef stores		
Mortality (%)	1.1	2.9

Source: AHDB Beef & Lamb Stocktake reports 2014 & 2015; SDA = Severely Disadvantaged Area; DA = Disadvantaged Area

The Scottish national herd also saw an overall reduction in mortality in 2015 over 2014. However, performance in 2014 was affected by the legacy of poor weather in late 2012 and first half of 2013, which had implications for cow condition at mating. Cow replacement rates may also have been affected.

Table 9: Mortality and replacement rates in Scottish beef enterprises

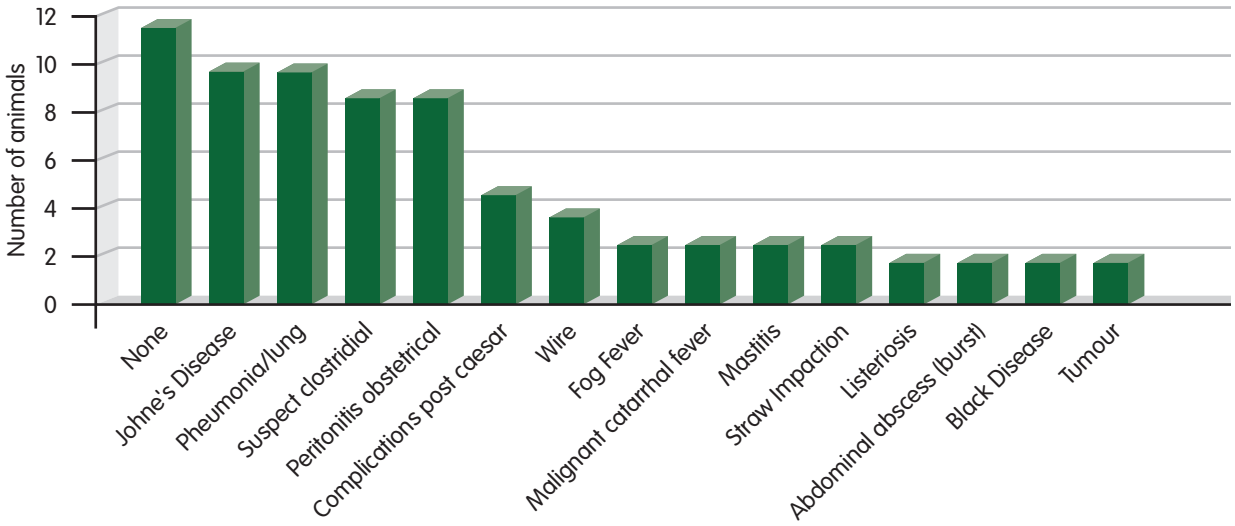
	2015	2014
Lowground (Non LFA) herds		
Cow mortality (%)	2.5	3.0
Herd replacement rate (%)	15	18
LFA extensive hill suckler herds		
Cow mortality (%)	2.3	2.8
Herd replacement rate (%)	11	12
LFA upland suckler producing yearling calves		
Cow mortality (%)	1.8	2.3
Herd replacement rate (%)	12	16
Rearer finisher herds		
Cow mortality (%)	2.8	3.5
Herd replacement rate (%)	15	17
Cereal beef finishing (<16 mths)		
Mortality (%)	1.3	1.0
Forage-based finishing (<22 mths)		
Mortality (%)	0.8	1.5
Forage-based finishing (>22 mths)		
Mortality (%)	0.5	0.5

Source: QMS Cattle enterprise profitability in Scotland

AHDB Beef & Lamb funded a pilot project to determine whether post mortem examinations carried out at a Fallen Stock Collection Centre (FSCC) could provide useful and timely animal health information for producers, vets and government[13]. The study ran from April 2014 until June 2015 across Northumberland, County Durham and North Yorkshire. A diagnosis was reached for 11% of the cases of bovine abortions, 78% for young calves, 80% for growing cattle and 85% for adult cattle.

In the same study, Johne's Disease was the most common diagnosis in suckler cows, despite the chronic nature of the disease and availability of accurate diagnostic tests. The need for many suckler herds to buy in replacements, usually of dairy origin, lays them open to risk of buying in animals carrying disease.

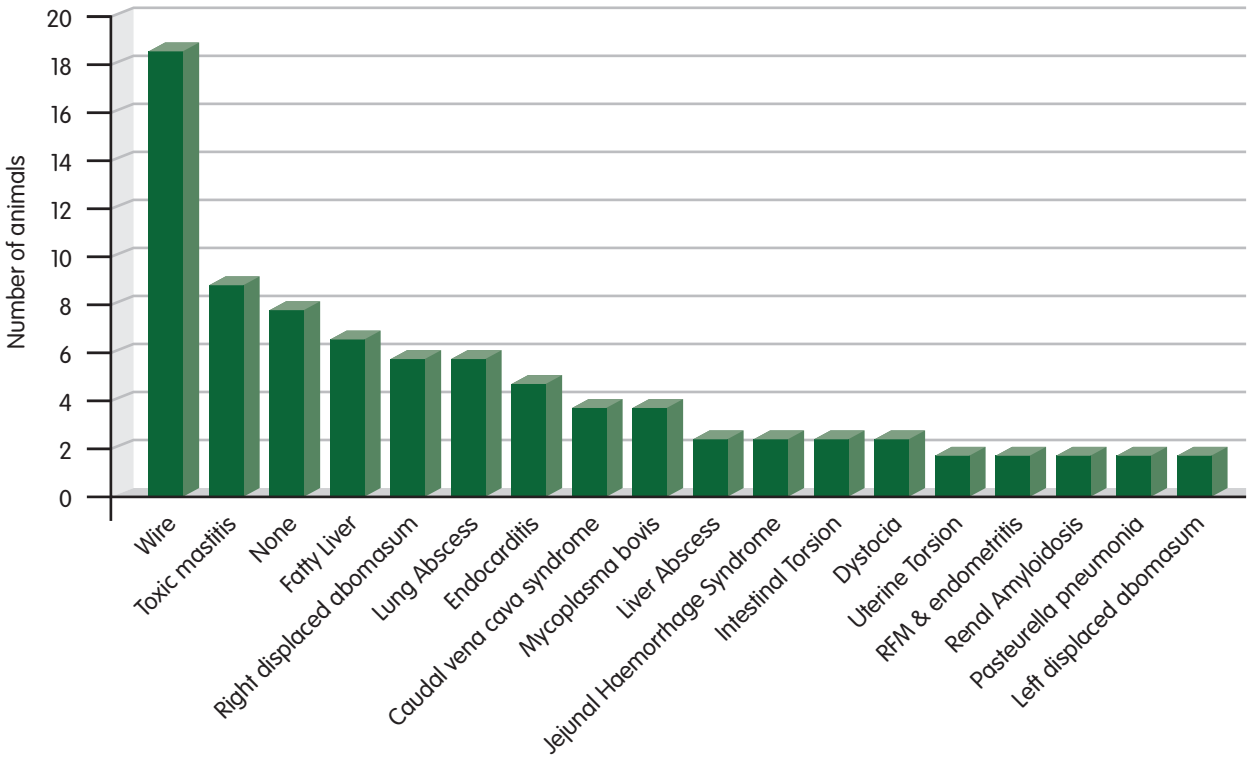
Figure 7: The most common causes of death in suckler cows



Source: AHDB Beef & Lamb Fallen Stock Project Bulletin Autumn 2015

In the same study, wire was by far the most common diagnosis for dairy cows, by almost twice the next-nearest cause of toxic mastitis.

Figure 8: The most common causes of death in dairy cows



Source: Farm Post Mortems Ltd

b. Dairy udder health

Individual cow somatic cell count (SCC) indices taken from a number of different data sources illustrate a clear improvement in performance in udder health since 2010.

Table 10: Percentage of somatic cell count samples from recorded dairy herds, by different criteria

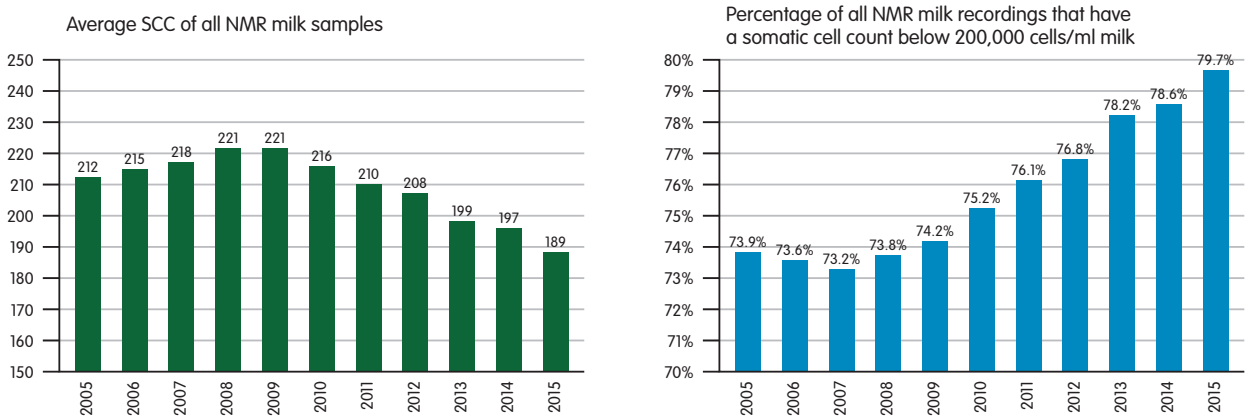
Parameter	NMR		QMMS		TotalVet		CIS	
Year	2015	2010	2015	2010	2015	2010	2015	2010
% milk samples SCC ≥200,000 cells/ml	20%	24%	18%	-	19%	25%	20%	24%
Dry period new infection rate	14%	16%	16%	-	15%	16%	10%	10%
Dry period cure rate	75%	74%	75%	-	75%	72%	74%	75%
Lactating period new infection rate	7%	-	8%	-	8%	9%	7%	8%
Lactating period chronic infections	11%	14%	9%	-	11%	16%	15%	18%
Average SCC ('000 cells/ml)	184	210	-	-	-	-	207	238

Key: Dry period new infection rate = % of new infections across the dry period; Dry period cure rate = % of cures during the dry period; Lactating period new infection rate = % of new infections at any recording during lactation; Lactating period chronic infections = % of cows remaining above 200,000 cells/ml for more than one recording during lactation.

Sources: 500 National Milk Records (NMR) datasets selected as representative of milk recording herds, analysed by the Veterinary Epidemiology and Economics Research Unit (VEERU) at University of Reading[9]; 140 herds using Quality Milk Management Services Ltd[14]; 650 herds benchmarked using the TotalVet analysis software[15]; and 2,500 herds recorded by CIS[16]. Note – some differences will be due to subtle variations in how each parameter is calculated.

NMR/VEERU also carried out a study of SCCs in all 6.5 million milk samples collected by NMR each year, looking at, amongst other factors, the percentages of milk samples that have low cell counts (<200,000 cells/ml). It has been shown that the number of chronic high SCC cows kept in a herd is strongly correlated to herd bulk milk SCC. The data shows very clearly that the percentage of herds keeping high levels of chronic cows has dropped dramatically in recent years, reducing the reservoir of infection and hence the herd SCC.

Figure 9: Trends of reducing average herd SCCs and increasing percentages of recordings <200,000 cells/ml



Source: NMR/VEERU

Industry Initiative: Dairy Mastitis Control Plan

The AHDB Dairy Mastitis Control Plan (DMCP)[17] started in 2009 and remains a major nationwide mastitis control scheme with new vet and farmer participants receiving training every year. In 2016, there were 140 active or associated 'plan deliverers' – mainly vets – who are highly motivated deliverers and strong supporters of the plan. Between 2009 and 2016, 1,366 plans were implemented covering 219,354 cows. However, many more farms received either the full or part plan; feedback from plan deliverers suggest that a further 2,000 units have been influenced by the DMCP but have not sent data.

As part of an AHDB Dairy-funded research study, data from up to 231 herds which implemented the mastitis control plan between 2009 and 2013 were collated and analysed. There was an improvement in somatic cell count and clinical mastitis over the four years of monitoring. Over three years, bulk milk somatic cell count dropped by 24,000 cells/ml, a decrease of 12%. The proportion of herds above 200,000 cells/ml and the number of chronically infected cows fell by 9.7% and 16.1% respectively. The rate of clinical mastitis decreased by 20%. The estimated benefits of implementing a DMCP on farm have been shown to be in the region of £30 - £40 per cow per year after the costs of implementation.

Table 11: Summary of udder health from herds implementing the AHDB Dairy Mastitis Control Plan

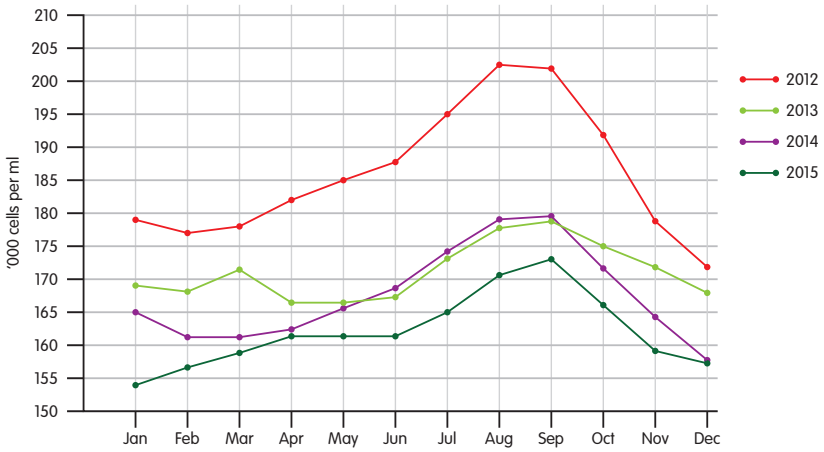
	Year of Plan Implementation			
(Median values presented)	0	1	2	3
No. of farms with SCC data	231	111	68	35
Bulk Milk SCC (000/ml)	200	184	168	176
Lactation New Infection (%)	8.50	8.30	7.35	8.00
Fresh Calver Infection Rate (%)	19.00	18.40	17.60	17.15
Proportion of Herd with >200,000 cells/ml (%)	21.60	20.90	19.15	19.50
Proportion of Herd Chronically Infected (%)	14.00	13.70	12.50	11.75
No. of farms with Clinical Mastitis data	194	93	57	31
Incidence Rate of Clinical Mastitis (/100 cows/year)	44.0	37.0	44.0	35.0
Incidence Rate of Cows affected (/100 cows/year)	44.5	39.0	46.0	38.0

Source: AHDB Dairy Mastitis Control Plan

Further research is being conducted on AHDB Dairy Mastitis Control Plan herds to investigate the relative cost effectiveness of different mastitis control interventions[18]. The aim is to encourage the evaluation of various strategies and identify the most cost effective approach in a range of herd circumstances. Results are being incorporated into a simple decision support tool to inform decision-making on farm and will be made available to the industry. Training for the AHDB Dairy Mastitis Control Plan remains ongoing and courses are currently run in conjunction with the BCVA Advanced Practitioner Course in Mastitis Control.

National bulk milk somatic cell count figures, collated by AHDB Dairy[19], are consistent with this. They indicate year-on-year improvement. The herd level average incidence rates of clinical mastitis are more difficult to gauge because of the lack of widespread recording of the condition. Results from the farm surveys conducted by Kite Consulting[10] and Kingshay[11] show a herd average incidence rate of clinical mastitis of around 38-50 cases per 100 cows per year, with indications of a decline in incidence over the past five years.

Figure 10: Herd mean bulk milk somatic cell counts 2012-15



Source: AHDB

Table 12: Herd Health data on mastitis incidence, cases per 100 cows per year

Year ending March	Kite	Kingshay
2016	36	49
2015	37	50
2014	40	52
2013	49	58
2011	50	59

Source: The Kite Health Monitor[8] and Kingshay Dairy Costings Focus Annual Report[9]

Industry Initiative: Mastitis research

Effective control practices[20]: The University of Nottingham undertook BBSRC and AHDB Dairy-funded research to look at the return on investment of different interventions to reduce mastitis incidence, studying results from 150 herds engaged in AHDB Dairy's Mastitis Control Plan. Most cost-effective for dry cows were: selective use of dry cow therapy; individual calving pens; dry-cow rations formulated by a qualified nutritionist; cubicle hygiene; and spreading bedding evenly. Milking newly-calved cows within 24 hours of calving and avoiding drying off cows during foot trimming when there is an increased risk of teat contamination also reduced infection. The interventions of most benefit to milking cows focused on hygiene: pasture rotation, lower stocking density while inside – for example, a focus on lying, feeding and loafing space, as well as ventilation, straw yard management, fly control and general biosecurity.

Know your pathogen[21]: The University of Nottingham also investigated more targeted ways of tackling mastitis, such as obtaining a deeper understanding of the pathogens. One type of *Streptococcus uberis* is contagious and spreads from cow to cow, is often persistent and recurrent, and may be difficult to cure; the other is environmental but opportunistic and while it can be severe, it has high curative rates. Genetic testing of strains on 52 farms experiencing more than 32 clinical cases of mastitis a year found just nine strains responsible for 40% of clinical cases across all herds – the contagious strains transmitting from cow to cow. Work is ongoing to find cheap, quick and easy ways of identifying the type of *S. uberis* on a farm experiencing problems.

c. Fertility

Dairy

Data taken from selected 500 Holstein Friesian herds recorded with National Milk Records[9] shows an overall reduction in calving interval and increase in numbers of animals conceiving within 100 days of calving over the past five years, indicating an improvement in fertility.

Table 13: A selection of Key Performance Indicators (KPIs) for the UK national dairy herd 2015 (Holstein Friesians)

Parameter	Target "Best 25%"		Median	
Year	2015	2010	2015	2010
Percentage conceived 100 days after calving	39%	33%	32%	26%
Calving to 1st service interval (days)	71	87	80	105
Calving interval (days)	396	409	410	424
Age at 1st calving (years)	2.2	2.3	2.3	2.4
Conception rate	39%	40%	32%	32%
Percentage eligible for service that were served	41%	37%	33%	27%
Percentage eligible for service that conceived	15%	13%	11%	9%

Source: NMR/VEERU

Beef

Comparative figures for beef are only available for 2015 and 2014, through Stocktake[12] benchmarking data compiled by AHDB Beef and Lamb. These indicate a tighter calving pattern in most of the English production systems, with more cows calving in the first three weeks and/or a shorter calving period, while the '-in-calf' rate has fallen and percentage of empty females has risen. However, as the farms used in each annual sample change, this may not reflect a national trend.

Table 14: Comparison of fertility performance in English beef suckler herds

	2015	2014
Non-SDA suckler herds		
Percentage of cows/heifers scanned in calf (%)	91 (Non-SDA)	-
Calves born alive per 100 cows/heifers to bull	89 (Non-SDA)	90 (Lowland & DA)
Calving period (first to last calf - weeks)	18.2 (Non-SDA)	20.3 (Lowland & DA)
Cows & heifers calving in first 3 weeks (%)	33.4 (Non-SDA)	29.6 (Lowland & DA)
Empty cows/heifers (%)	7.8 (Non-SDA)	8.3 (Lowland & DA)
SDA suckler herds		
Percentage of cows/heifers scanned in calf (%)	86	91
Calves born alive per 100 cows/heifers to bull	86	86
Calving period (first to last calf - weeks)	17.6	23
Cows & heifers calving in first 3 weeks (%)	31.9	28.2
Empty cows/heifers (%)	12	9.9

Continued...	2015	2014
Spring calving suckler herds		
Percentage of cows/heifers scanned in calf (%)	90	92 (Lowland)
Calves born alive per 100 cows/heifers to bull	88	87 (Lowland)
Calving period (first to last calf - weeks)	18.6	17.2 (Lowland)
Cows & heifers calving in first 3 weeks (%)	35.3	28.8 (Lowland)
Empty cows/heifers (%)	8.7	9.4 (Lowland)
Autumn calving suckler herds		
Percentage of cows/heifers scanned in calf (%)	95	-
Calves born alive per 100 cows/heifers to bull	92	90 (Lowland & DA)
Calving period (first to last calf - weeks)	14.3	20.3 (Lowland & DA)
Cows & heifers calving in first 3 weeks (%)	34.6	29.6 (Lowland & DA)
Empty cows/heifers (%)	5	8.3 (Lowland & DA)
Combined breeding/finishing suckler herds		
Percentage of cows/heifers scanned in calf (%)	92	91
Calves born alive per 100 cows/heifers to bull	88	88
Calving period (first to last calf - weeks)	14.4	15
Cows & heifers calving in first 3 weeks (%)	35.3	35
Empty cows/heifers (%)	9.8	9.4
Combined breeding/stores suckler herds		
Percentage of cows/heifers scanned in calf (%)	96	94
Calves born alive per 100 cows/heifers to bull	89	88
Calving period (first to last calf - weeks)	24.5	23.4
Cows & heifers calving in first 3 weeks (%)	23.6	28.8
Empty cows/heifers (%)	7.7	8.3

Source: AHDB Beef & Lamb Stocktake reports 2014 & 2015; SDA = Severely Disadvantaged Area; DA = Disadvantaged Area

Figures for the Scottish beef suckler herds also showed moderate improvements in calves born alive and empty cow rates, with the exception of extensive hill herds.

Table 15: Comparison of fertility performance in Scottish beef suckler herds

	2015	2014
Lowground (Non LFA) suckler herds		
Calves born alive per 100 cows/heifers to bull	91	86
Empty cows/heifers (%)	7	10
LFA extensive hill suckler herds		
Calves born alive per 100 cows/heifers to bull	90	92
Empty cows/heifers (%)	5	5
LFA upland suckler producing yearling calves		
Calves born alive per 100 cows/heifers to bull	90	88
Empty cows/heifers (%)	6	9
Rearer finisher herds		
Calves born alive per 100 cows/heifers to bull	90	89
Empty cows/heifers (%)	6	8

Source: QMS Cattle enterprise profitability in Scotland

BCMS data highlighted by Hybu Cig Cymru (HCC)[22] identifies the trend in calving interval and age at first calving, which are useful indicators of fertility. In general, both have reduced between 2011 and 2015.

Table 16: Average age at first calving and calving interval in days in England and Wales

Year of First Calving	Average Age (days)	
	England	Wales
2015	1,017	1,022
2011	1,019	1,048
Year of Last Calving	**Average Calving Interval**	
	England	Wales
2015	424	428
2011	424	431

Source: BCMS/HCC; includes dams registered as 'non-dairy', born in or imported to and calving in England or Wales. Data includes multiple calvings.

d. Mobility

Lameness prevalence in dairy cattle still shows wide ranges, as illustrated in a new summary from AHDB Dairy[23]. However, a range of activity reported in the 2012 and 2014 CHAWG reports is beginning to have a positive impact, showing a downturn in lameness levels. Results taken from the table below show a lameness prevalence of 22% ranging from 7% to 42% across 51 farms the most recent study by RVC[24].

Table 17: Estimates of lameness prevalence

Year	Lameness prevalence	Numbers		Location	Reference
	Average (Min-Max)	Dairy herds	Dairy cows		
1989-91	20.6% (2 - 53.9%)	37	11,399	NW & SW England, Wales	Clarkson et al., 1996
2000-01	22.1% (0 - 50%)	53	7,407	SW & Midlands England	Whay et al., 2003
2002-04	24.2% (6.8 - 74.2%)	28		SW England	Huxley et al., 2004
2004-06	18% (4 - 42%)	80	28,698	Scotland, England, Wales	Rutherford et al., 2009
2000-03	15% - 39%	37	2,724	Scotland, England, Wales	Haskell et al., 2006
2006-07	36.8% (0 - 79%)	205	28,277	SW & Midlands England, Wales	Barker et al., 2010
2010-14	26.7% (3 - 77%)	207	26,289	SW England	Shepherd 2016
2011	18.2 (0 – 53.5%)	92		England, Wales	Heath et al., 2014
2012-13	32% (0 - 50%)	44	11,800	NW England	RDPE Report 2013+
2013-14	22% (7 - 42%)	51	10,899	South & Midlands England	Collins 2016

+Note: Part of a lameness intervention study and lameness prevalences reported are prior to intervention on farm.
Source: compiled by AHDB Dairy, based on various sources[25]

Industry Initiative: Cattle Lameness Academy

The Cattle Lameness Academy (CLA)[26] is steered by two veterinary practices: Synergy Farm Health[27] in Dorset and Bishopton Veterinary Group in North Yorkshire. It is dedicated to the improvement of lameness in cattle through the application of 'best practice' originating from peer-reviewed academic research, evidence-based medicine and years of clinical and on-farm experience. The academy brings together specialists in the field of lameness to deliver research, training, consultancy and bespoke services to the dairy industry. The academy builds on a long-term collaboration with the University of Nottingham Dairy Herd Health Group and the Royal Veterinary College, amongst others. The academy is working in partnership with these institutions and others partners across the UK and beyond to put lameness research into practice.

Additionally, some veterinary practices offer a mobility scoring service to farmers and this data can be aggregated to provide an insight into lameness prevalence on farm. Synergy Farm Health report an average lameness prevalence of 11%, ranging from 0 to 29% on 47 organic and conventional herds mobility scored in the year ending March 2016.

More and more qualified foot trimmers are using 'ruggedised' laptops to capture reliable data on hoof lesions on farm. These data can be retrospectively analysed to provide informative trends on lesion prevalence and incidence. In a study conducted by Synergy Farm Health[28] over three years the percentage of cows with a recordable lesion was 68% (2008), 53% (2012) and 54% (2015) on farms in SW England. Over 80% of all lesions were on the hind feet. These data were captured during routine hoof trimming visits of both lame and non-lame cows presented for trimming. Unfortunately, the cows were not recorded for their mobility status at the time of foot trimming so it is not possible to relate lesions to mobility scores.

Table 18: Prevalence of common foot lesions

Year	1989-91	2003-06	2008	2012	2015
Recorders	Farmers, Trimmers, Vets 1991	Farmers	Trimmers	Trimmers	Trimmers
No. of farms	37	31	25	120	142
Lesion numbers	8645	-	9121	11294	14260
Sole Ulcer (inc. Bruising)	36%	29%	31%	41%	43%
Infectious inc. Digital Dermatitis	18%	22%	30%	35%	30%
White Line Disease	22%	22%	39%	23%	26%
Hind Lesions	92%	80-94%	85%	86%	82%
Reference	Murray et al. 1996	Barker, 2007	Burnell & Reader 2009	Burnell & Reader 2013	Reader & Burnell 2016

Source: Synergy Farm Health, various

The National Association of Cattle Foot Trimmers (NACFT)[29] has just announced the creation of a register, which will be autonomous, acting independently from the NACFT, with its own powers, identity and website. The aim is to provide an independent advisory and disciplinary body to represent and help protect the interests of cattle farmers.

Industry Initiative: Dairy Cattle Mobility Steering Group

The Dairy Cattle Mobility Steering Group[30] was initially created to help manage the Healthy Feet Programme (HFP), which has now had 157 Mobility Mentors trained (2012 CHAWG Report: 70 mentors) and 333 farms registered on the Healthy Feet Programme (2012 CHAWG Report: 140 farms). The group now provides much wider strategic direction to the industry on lameness issues. It is independently chaired and comprises vets, hoof trimmers, lameness researchers and industry representatives. The main objectives are to:

1. Keep foot health on the dairy industry's agenda.
2. Provide an industry-wide forum/stakeholder group, promoting and providing a platform for collaboration on dairy foot health.
3. Identify opportunities to promote better foot health.
4. Collate knowledge and on-going research on cattle lameness and identify possible gaps.
5. Promote and encourage development of the Healthy Feet programme: to keep this under continued review as the main vehicle for engaging with dairy farmers on foot health.
6. Discuss and explore best methods to motivate and assist farmers to reduce lameness.
7. Encourage consistency of message and quality of technical information on foot health to dairy farmers, from whatever source.
8. Keep a watching brief on lameness prevalence and major developments, changes and technical advances in the industry with relation to lameness.

Industry Initiative: Lameness research

Understanding claw horn lesions[31]: The lesions of claw horn disruption (principally sole haemorrhage, sole ulcer and white line disease) are the most common causes of lameness on many farms. AHDB Dairy funding has recently supported some of the very first randomised clinical trials on the treatment of claw horn lesions, identifying first that lame cows with claw horn lesions benefit from the administration of non-steroidal anti-inflammatory drugs (NSAIDs) as part of their treatment protocol[32] and secondly that once lesions become chronic the lesions are difficult to cure[33], reinforcing the importance of early and effective treatment. Other work in this area has highlighted the inadequacies of current foot trimming recommendations[34], which risk further undermining welfare and foot health through over-trimming.

Impact of weight loss[35]: Research has provided new evidence to highlight the importance of the digital cushion and weight loss in early lactation as a risk factor for disease[36]. AHDB Dairy-funded work has recently proposed a novel, updated cause and development path for the claw horn lesions[37]. This has highlighted the significance of inflammation in the development of lameness, providing an explanation for the results observed in the treatment studies, and identifying the likely importance of NSAIDs to control this painful endemic disease.

Unravelling how Digital Dermatitis is transmitted[38]: Digital Dermatitis (DD) is responsible for 25% of all dairy lameness in GB, yet relatively little is known about how the bacteria causing DD survive and are transmitted between cows. The bacteria most often associated with DD are treponemes, which are notoriously difficult to cultivate in the lab. An AHDB-funded trial at the University of Liverpool has highlighted the importance of disinfecting hoof trimming knives between cows and between farms. The study found DD treponeme DNA on 97% (36 out of 37) of hoof trimming knives[39]. Following disinfection, the number of knives with treponeme DNA was reduced to 35% (13 out of 37). A logical precaution to limit the spread of DD is to disinfect hoof trimming equipment between cows and between farms.

e. Calves and youngstock

Dairy calves

Issues with extracting data on dairy heifer calf mortality means it is not possible to provide data in the same format as previous reports to allow comparison. An industry group comprising AHDB Dairy and APHA is being convened to address this and agree on key parameters and their definitions, so that a report could be run annually and provided to CHAWG.

It is reported that between 2006 and 2012, while live exports of male dairy calves decreased, the numbers of calves estimated to have been destroyed on-farm also fell from almost 85,000 to around 55,000. This was attributed in part to the efforts of the Beyond Calf Exports Industry Forum (referenced in the 2014 CHAWG Report) to encourage development of existing markets and find new markets for these calves such as dairy bull beef and rosé veal, and was reflected in a rise in male calves retained for beef production over that period.

More recent figures show retention of bull calves on-farm remains high.

Table 19: Male bull calves

	2006	2012	2014	2015
Retained male calves	245,586	390,140	381,162	392,473
% of total dairy sired calves	N/A	45%	43%	43%
Live exports	80,700	8,000	Negligible	Negligible

Source: BCMS data

Industry Initiative: Dairy sexed semen

Increased uptake of sexed semen is seen as one way to reduce the numbers of surplus male calves born in the dairy herd. Data collated by AHDB Dairy indicates a steady increase in purchases of Holstein sexed semen over the past three years. Commercial use of sexed semen in non-Holstein breeds has fluctuated over the same period. Sexed semen use is predicted to keep rising as confidence in the technology grows and a higher proportion of maiden heifers are artificially inseminated.

Table 20: Sexed semen sales as a % of national total

	2012	2013	2014
Holstein	12.6	15.7	16.7
Non Holstein	10.1	13.1	9.3

Source: AHDB Dairy

Calf health, welfare and survival is an area which has been highlighted in previous CHAWG reports as an area in need of industry attention. In response to this, several calf and heifer rearing initiatives are raising awareness to farmers of the need to improve calf management. These initiatives are delivering best practice information to farmers including Feed for Growth[40], Keep Britain's Youngstock Healthy[41], Calf to Calving[42], Lifetime Calf Response System[43], Keep Calves Healthy[44].

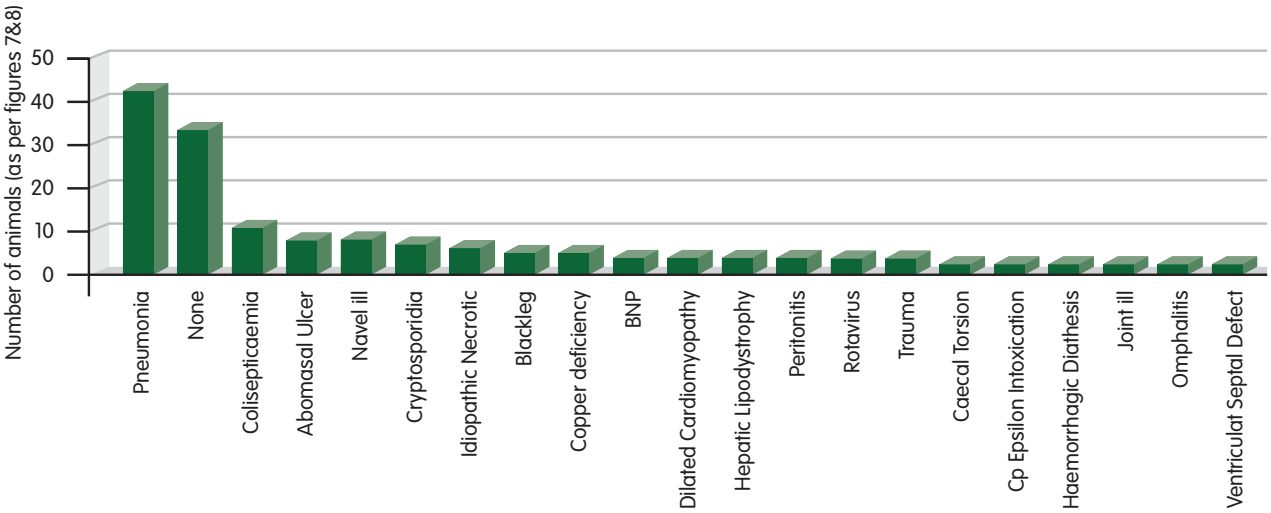
Industry Initiative: Calf to Calving

Launched by AHDB Dairy in 2016, Calf to Calving (C2C)[42] is designed to help dairy farmers achieve a measured improvement in survival, health and growth of their youngstock. The overall objective is to improve survival and growth rates, and increase the percentage of heifer calves that make it into the milking herd. Delivered through a knowledge transfer package of resources, tools, webinars and on-farm meetings for both dairy farmers and their advisors, it also works with a number of host farms in GB where 10 calves on each farm are tracked from birth to calving.

Beef calves

In the AHDB Beef & Lamb-funded Fallen Stock project[13] a total of 178 suckler calf carcases were submitted for post mortem examination. This formed the majority of calf submissions and probably reflects the livestock demographic in the catchment area of North East England.

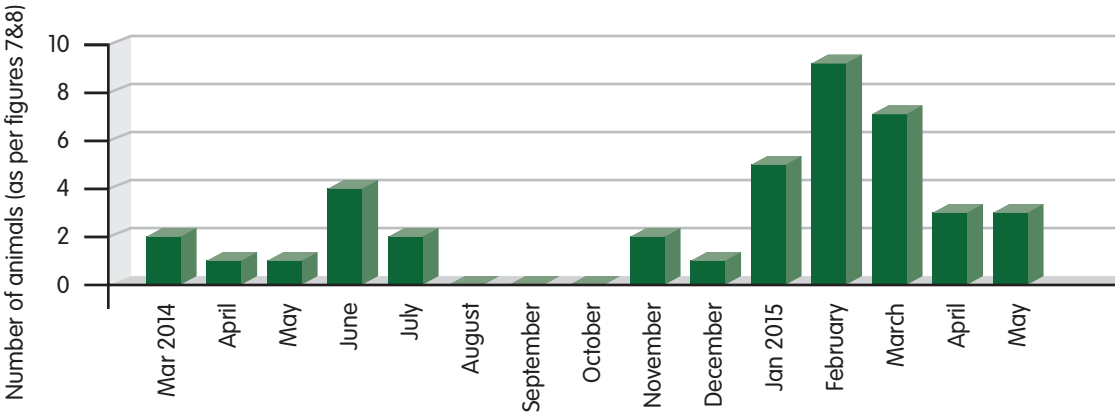
Figure 11: The most common diagnoses in suckler calves



Source: AHDB Beef & Lamb Fallen Stock Project Bulletin Autumn 2015

Pneumonia accounted for 25% of submissions, with primary bacterial pneumonia being the most common type of pneumonia diagnosed. As expected, it occurred mainly during the housed period.

Figure 12: Seasonal distribution of pneumonia in suckler calves (scale on left is number from sample)



Source: AHDB Beef & Lamb Fallen Stock Project Bulletin Autumn 2015

Thirty-six of the diagnoses made in suckler calves (20%) were diseases which could have been prevented by optimal perinatal calf management. These include navel or joint ill, peritonitis, *E. coli* scour and cryptosporidiosis. Some of the losses occurred in the perinatal period, but quite often the calf was left with a condition that would kill it later in life.

Suckler beef calves

Stocktake data on calf survival is only shown over the past two years and indicates little change in performance with mortality ranging from 2-4% between:

- Calves born dead per 100 cows/heifers to bull
- Calves died from birth to weaning per 100 cows/heifers to bull
- Calf losses from birth to weaning (% of born alive)

Industry Initiative: *Salmonella* Dublin control and calf health and welfare

SAC CVS carried out a pilot study in 2015 to assess the effectiveness of a control plan on calf health and welfare. Dairy farms with an outbreak of *salmonella enterica* subspecies *enterica* serovar Dublin (*S.* Dublin) within the previous three months were enrolled on the study. A risk assessment was carried out, using a tool adapted from the Danish *S.* Dublin eradication programme. Areas of weakness in *S.* Dublin control on the farm were identified and suggestions for improvements made. *S.* Dublin serology was used on sentinel calf groups to assess the extent of the spread of infection and also the effectiveness of the control measures.

The main conclusions from the study were as follows:

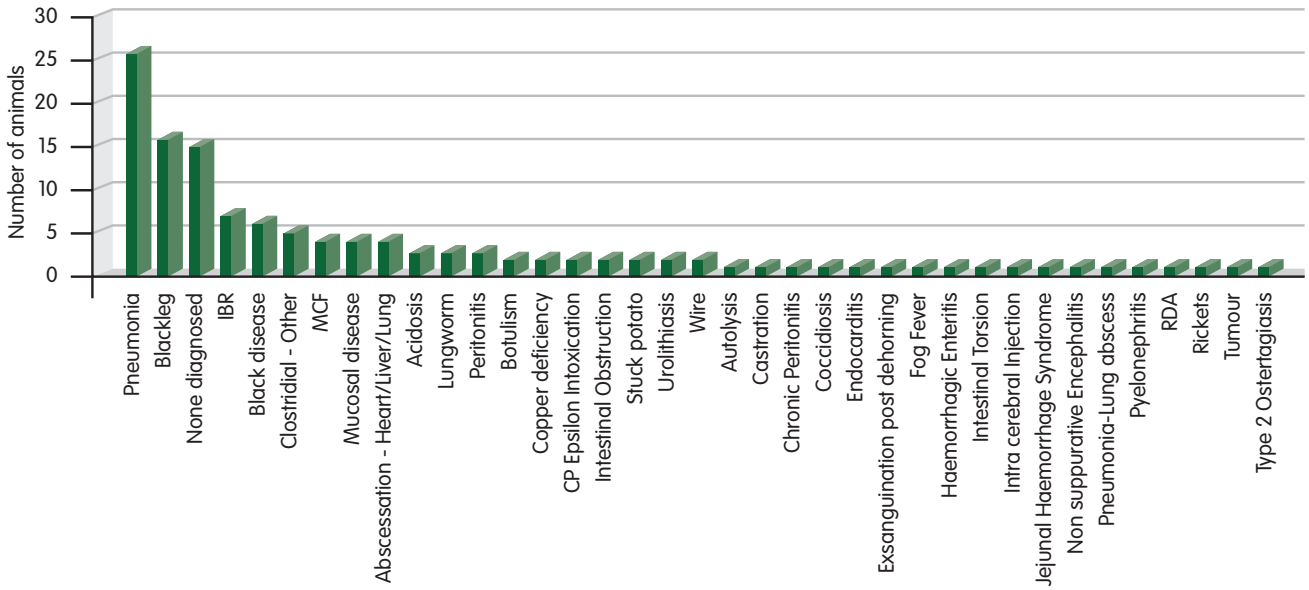
- The variation in the range of clinical signs that occur with *S.* Dublin means it may be overlooked or underdiagnosed. It remains an important differential diagnosis for herds with poor calf growth rates and high disease incidence.
- Management of the calving pen and pre-weaning calves were found to be critical areas in the spread of *S.* Dublin. Control programmes should focus on these areas to reduce the number of infected animals entering the herd, and break the cycle of infection.
- Barriers to the control of *S.* Dublin in these farms included a reluctance to introduce snatch calving – removal of calves from their dams at birth. The length of time the calves spent with the cows was of concern on all farms, and removing calves from their dams as soon as possible is known to result in improved control of neonatal calf disease in general. Housing and management arrangements, in particular the use of a limited number of automatic calf feeders, provided barriers to creating small stable groups of calves of similar ages.
- The use of serology provided an additional tool in the diagnosis of *S.* Dublin particularly in identifying how widespread the exposure had been. The project highlighted the need to sample from every batch of calves on farm, and suggested that nose to nose contact and the potential for faecal contamination between groups did not necessarily result in disease spread between neighbouring groups.

The project was funded by an MSD Ruminant Research Bursary.

Growing cattle

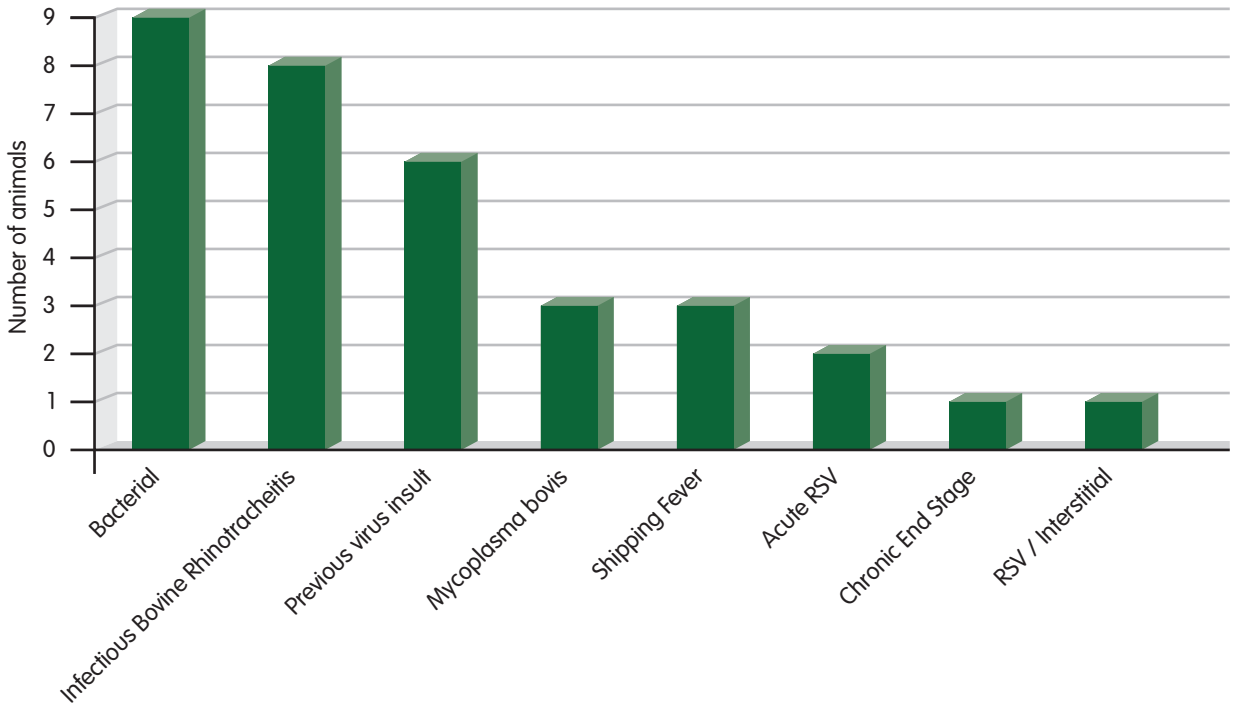
In the AHDB Beef & Lamb-funded Fallen Stock project[13] a total of 132 growing cattle (aged 6-24 months) were submitted for post mortem examination. Pneumonia and clostridial disease accounted for 42% of all diagnoses made. Pneumonia was the most common diagnosis made in this age group of cattle, accounting for 25% of submissions.

Figure 13: Summary of diagnoses in cattle 6-24 months of age



Source: Beef & Lamb Fallen Stock Project Bulletin Autumn 2015

Figure 14: Distribution of causes of pneumonia in cattle 6-24 months



Source: Beef & Lamb Fallen Stock Project Bulletin Autumn 2015

f. Breeding and genetics

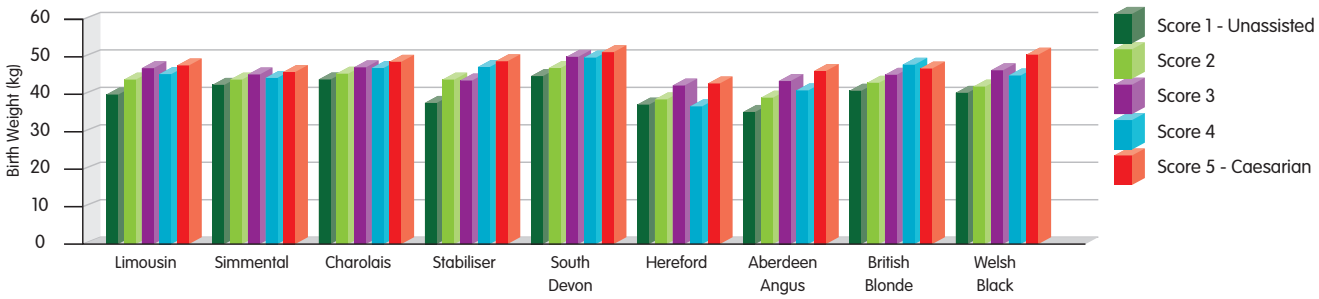
Beef

New data from Signet[45] shows the clear relationship between birth weight and calving ease – highlighting that regardless of breed, average birth weight is considerably higher for those calving events requiring assistance than those animals calving unassisted.

The four Estimated Breeding Values (EBVs) that influence the ease with which a calf is born, influencing the welfare of both cow and calf, are:

- Birth weight – with smaller calves tending to be born without assistance.
- Calving ease direct – the ease with which the calf is born.
- Calving ease maternal – the ease with which the cow gives birth.
- Gestation length – with shorter gestation lengths associated with easier calvings.

Figure 15: Relationship between birth weight and calving ease of male calves recorded over different time periods



Source: Signet Breeding Services / AHDB Beef and Lamb

Industry initiative: Focus on suckler cow size

Performance recording services provided by Breedplan, Signet and the British Limousin Cattle Society enable producers to change the genetic merit of cattle for a range of traits that influence health and welfare. One of the indirect consequences of selecting for a genetic increase in calf growth rate is an associated increase in cow mature size/weight. This increase in cow mature size comes at a financial cost to most commercial suckler herds, as the cow has increased feed requirements – a welfare challenge if these feed requirements cannot be met, particularly in extensive, low input grazing systems.

If producers are able to keep smaller-framed suckler cows with a lower maintenance requirement they should retain a higher body condition during their life when faced with environments with low nutritional availability.

An example of this is the Stabiliser breed (a multi-breed composite of the Angus, Hereford, Simmental and Gelbvieh) which has worked hard to obtain an assessment of cow mature size in recent years. Work undertaken by SRUC/EGENES[46] has recently produced new genetic estimates of both cow mature size and body condition score – with Estimated Breeding Values (EBVs) generated for both. The use of these tools could lead to cows of optimum size, with the ability to maintain body condition more readily.

Table 21: New estimates of heritability for a subset of traits in the Stabiliser and Limousin breeds

Trait	Stabiliser	Limousin
Birth weight	29%	30%
Calving ease	11%	12%
Maternal Calving ease	1%	5%
Gestation length	N/A	40%
400 day weight	45%	44%
Docility	N/A	40%
Calving interval	4%	4%
Age at first calving	34%	20%
Lifespan	16%	10%
Mature cow weight	36%	N/A
Body condition score	36%	N/A

Source: SRUC/EGENES funded by AHDB

2015 data in Table 22 shows the difference in EBVs between the top 10% and the bottom 10% animals within a breed. Calving ease shows a 10% difference between the top and bottom 10% animals – this is equivalent to a 5% difference in the number of unassisted calvings that could be expected in bulls purchased between the top and bottom 10% of the breed. At a commercial level this is a massive potential benefit.

Table 22: Difference in EBVs between the top 10% and the bottom 10% animals within beef breeds (2015)

	Birth weight (negative = reduced)	Calving ease (higher = easier)	Calving ease – daughters (higher = easier)	Gestation length (negative = shorter)
Aberdeen Angus	-3.6	8.5	5.3	-2.4
Charolais	-2.9	17.6	11.4	-2.3
Hereford	-3.5	7.9	5.6	-1.9
Red Ruby Devons	-1.7	7.3	6.3	-1.2
Simmental	-3.1	9.1	5.8	-2.1
South Devon	-3.9	11.9	7.3	-2.0

Source: Signet Breeding Services / AHDB Beef and Lamb

Industry initiative: Easier calvings

Between 2015 and 2016, AHDB Beef and Lamb completed a series of workshops[47] for commercial producers to remind them of the ways they can improve the health and welfare of the new born calf. These meetings undertaken by Paragon Veterinary Group and XLVets, and AHDB Beef and Lamb, were attended by over 200 farmers and their advisers – with additional material used within webinars and literature. The genetic component within these presentations were:

- Calving Ease - Direct
- Calving Ease - Maternal
- Birth Weight
- Gestation Length

Industry Initiative: Dairy Inbreeding Checker

The AHDB Inbreeding Checker[48] launched in July 2016 is an additional tool within the Herd Genetic Report. This tool enables farmers to check individual matings between a list of selected mating sires and the females selected for breeding, and indicates whether the resultant level of inbreeding of a mating is safe, and below the recommended maximum of 6.25%.

Industry Initiative: Genetic Evaluations for lameness and mastitis

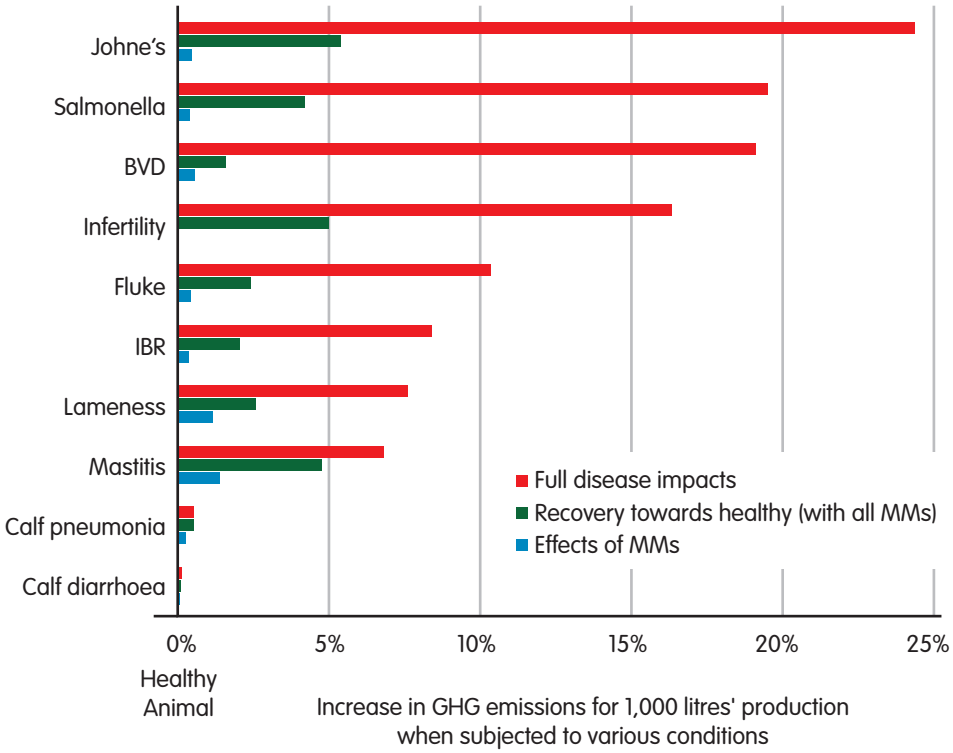
Research is nearing completion for the possible launch of genetic evaluations for lameness and mastitis incidence. Both traits have been recorded for some time now through the various national recording organisations in the UK (including Cattle Information Services, National Milk Records, United Dairy Farmers of Northern Ireland and Holstein UK). Pilot projects conducted by AHDB Dairy have identified reasonable heritabilities, which will be further validated during 2016.

g. Endemic diseases

Impact of endemic disease on greenhouse gas (GHG) emissions

In 2015, ADAS examined the impact of controlling endemic cattle diseases on productivity, performance and greenhouse gas (GHG) emissions[49]. Mitigation measures (MM) were applied to treat the disease and the impact in terms of GHG emissions is shown below. The overall results (ranked by impacts of each single condition) indicate increases in GHG emissions per unit of milk of up to 25% for animals suffering from Johne's disease, followed by salmonella and BVD.

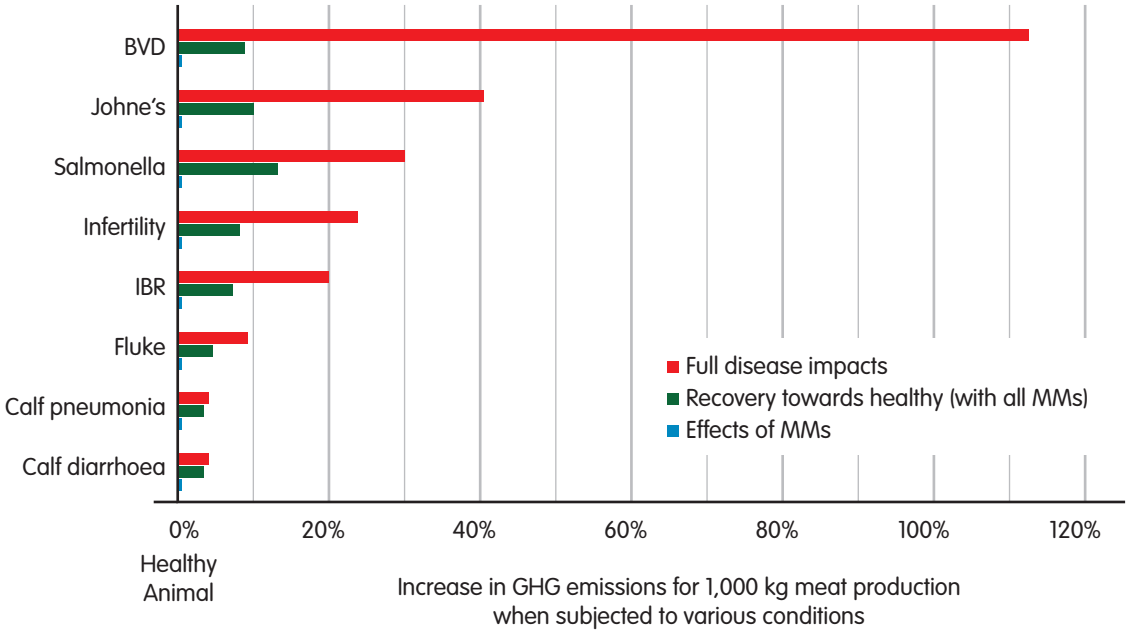
Figure 16: Effects of conditions and treatments on GHG emissions from milk production



Source: Defra/APHA study conducted by ADAS

The green bar represents the increase in emissions associated with the treated animal which is recovering. The difference between the red and green bars represents the effectiveness of the health intervention, and the blue bar, the emissions due to implementing the controls (eg, emissions due to vet travel, building construction, medicines etc). In both suckler and dairy beef, the greatest returns for effective treatment are shown for BVD. This is followed by Johne's and salmonella.

Figure 17: Effects of conditions and treatments on GHG emissions from suckler beef production



Source: Defra/APHA study conducted by ADAS

Costs of Bovine Viral Diarrhoea (BVD)

One disease that poses a constant threat is BVD. From a study conducted by the Royal Veterinary College (RVC)[50], 4–8% of farms (both vaccinated and not vaccinated against BVD) tested positive for BVD virus in quarterly testing.

However, the study reported many more farms are at a constant risk of introducing the virus due to unknowingly moving infected animals, nose to nose contact with animals from neighbouring farms or contact with infected animals at market or at shows. RVC has also estimated the potential costs associated with BVD infection on the English beef and dairy sectors.

Table 23: Cost of BVD in affected herds

Estimates by RVC		BVD impact (£/year)	
Prevalence of BVD in affected herd - (PI %)	Best (1%)	Average (1.5%)	Worst (2%)
Impact at cow level – dairy	21	31	43
Impact at cow level – beef	27	40	54
Impact at farm level – dairy	3,133	4,625	6,266
Impact at farm level – beef	1,151	1,127	2,302
Impact at national level – dairy	6,173,977	9,114,362	12,346,442
Impact at national level – beef	5,038,107	7,557,160	10,076,213
Total	**11,212,084**	**16,671,522**	**22,422,655**

Source: RVC, 2015

Industry Initiative: BVDFree England Scheme

It has been noted in previous CHAWG reports that since 2011, the Scottish Government has supported an ambitious industry-led scheme to eradicate BVD from Scotland. In December 2014, CHAWG encouraged a national, co-ordinated, strategy for the elimination of BVD virus from all cattle herds in England.

The BVDFree England scheme launched on 1 July 2016 with the aim of engaging the majority of the English national cattle herd within 1,000 days, and to work towards elimination of the BVD virus from cattle herds in GB by 2022. The BVDFree Scheme was developed by a broad industry based Implementation Group, supported with £60,000 per year of funding from AHDB. As a clear indication of the level of industry support for the BVDFree England[51] Scheme over 100 industry organisations have signed the BVD Statement of Intent fully backing the eradication of BVD from the national cattle herd. The list of organisations can be found on the BVDFree England website. The Chief Veterinary Officer of the UK, has also indicated his full support and has urged the continuation of the work, in communities and nationally, with farmers working with veterinary practices on BVD.

BVDFree England will build on a range of existing initiatives to control BVD. BVD control programmes have been offered for almost 20 years by cattle health schemes operating to standards set by Cattle Health Certification Standards (CHeCS). A number of other initiatives ranging from individual vet practices based through to regional and national programmes (eg, Myhealthyherd, XLVets CHECK TAG) have also helped raise awareness and support action to control BVD on farms. The 2007-13 Rural Development Programmes, part-financed by the EU, delivered support both at regional and national level for knowledge exchange with veterinary surgeons and with farmers to improve awareness and understanding of BVD virus and its control. In September 2014 a group of 11 regionally–clustered practices in Derbyshire and Staffordshire put together a regional BVD control scheme, ABC (Action for BVD Control), their goal being to map the prevalence of BVD across the region. Initial results found evidence of exposure to BVD in approximately 47% of herds as measured through youngstock seroconversion (118/250)[52]. Nationally, BVDFree England will work to protect and build on the core group of herds which are already free of BVD.

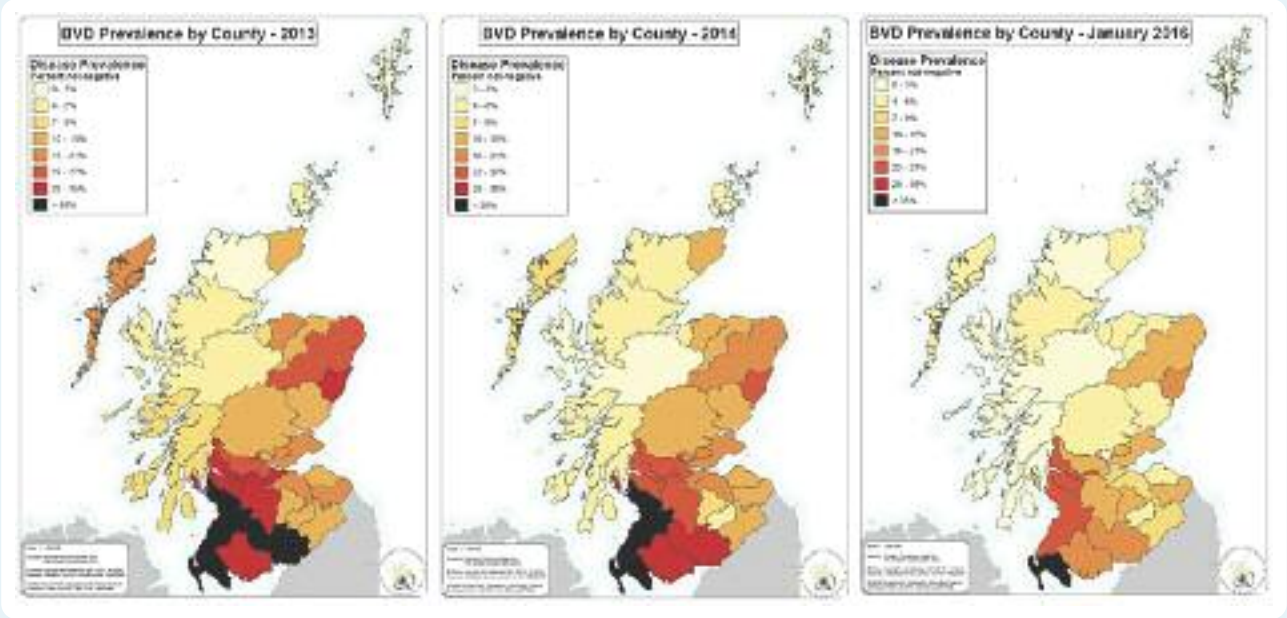
The BVDFree scheme is based on eliminating BVD through identification and removal of persistently infected animals (PIs). In parallel, good biosecurity is essential to protect herds currently free of BVD. Cattle keepers who join the scheme sign up to a four point **BVDFree Charter**:

1. To actively engage in BVD control in order to eliminate the disease from their herd.
2. To report all BVD testing results from their herd to the national database.
3. To allow herd status and/or individual animal status to be openly accessible through the BVDFree database (without any specific details of farm name or keeper being shown).
4. Not to move Persistently Infected (PI) animals other than directly to slaughter (or through a dedicated red slaughter market).

Industry Initiative: The Scottish BVD eradication scheme

Since the introduction of the BVD eradication scheme in Scotland[53], the level of exposure of the disease has reduced from 40% to around 15% of herds having a 'not negative' status, with exposure in the beef herd significantly lower than in the dairy herd.

Figure 18: Current BVD test results for Scotland



Source: Scottish Government

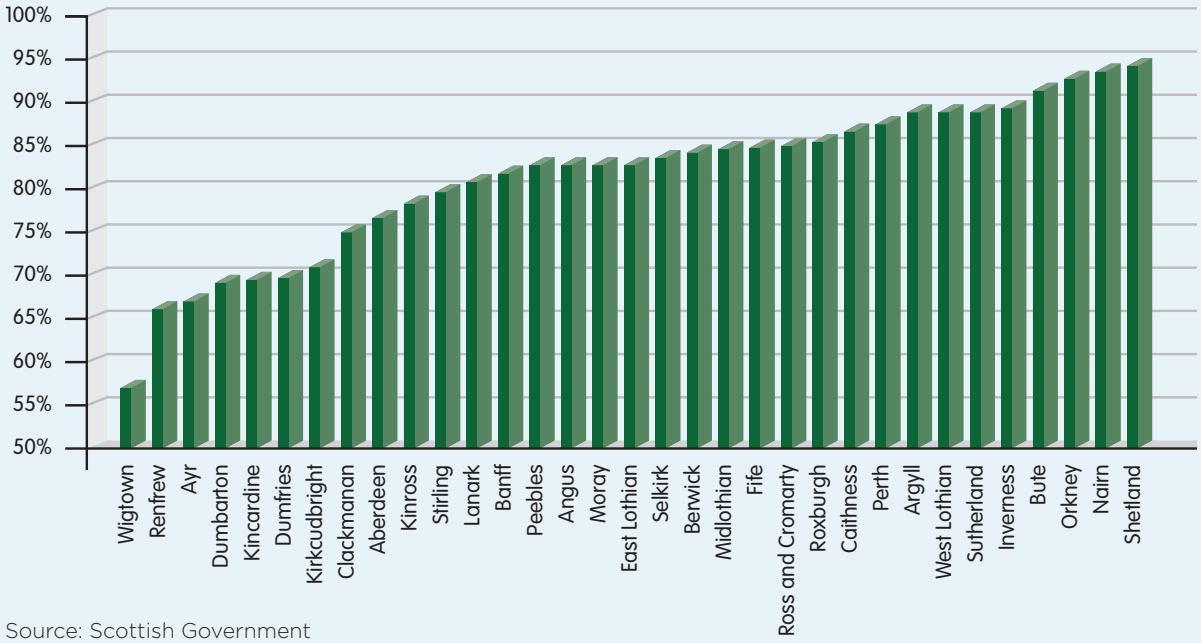
In June 2015 Scotland entered Phase 4 of the scheme. Along with a continuation of the mandatory annual screening and restrictions on the movement of BVD infected animals, Phase 4 introduced:

- restrictions on 'not negative' herds – animals from 'not negative' holdings may not move unless they have an individual 'negative' status.
- a reduction in the number of testing options available for annual screening.
- isolation and BVD testing requirements for animals entering herds from untested herds.
- assumed negative status for dams of calves which have tested negative.

Furthermore, from 1 February 2016, any cattle that move from a 'not-negative' holding need to be tested BVD negative or have an individually assumed negative status. Progress continues as the number of herds exposed to BVD declines. The graph shows that in the majority of areas, more than 80% of herds are negative.

A guidance booklet for farmers and a guide for vets containing information about Phase 4 control measures are now available. In recognition of the importance of the cattle trade across the UK and with the Republic of Ireland a group has been initiated and facilitated by CHAWG to coordinate elements of the schemes in each country.

Figure 19: % BVD negative herds



Source: Scottish Government

Industry Initiative: BVD eradication in Wales

A new national BVD eradication plan for Wales is being developed. For the first time all cattle farmers will be encouraged to voluntarily test their herds for BVD during the annual bTB test. This co-ordinated programme aims to capitalise on the presence of the vet being on farm.

Pivotal to the success of this plan will be a team approach between the farmer, the farm vet and the Wales BVD sub group. There will be a three year period of voluntary testing to identify infected animals. This will reduce the prevalence of BVD infected cattle in Wales. Controls to finally eliminate remaining pockets of infection will then be introduced.

The most important part of the strategy will be the testing of youngstock during the annual bTB tests to determine the BVD status of herds in Wales. This approach will enhance the overall value of the annual bTB tests.

The blood sampling of five youngstock between the ages of nine and 18 months (that have been in contact with other stock on the farm – 'a management group') will provide a strong indication whether the disease is present in the herd. Herds with more than one 'management group' will be advised to sample each group.

Herds with clear test results will be encouraged to protect their 'Free' status, through appropriate biosecurity measures. Those herds without clear tests will be advised to test further to find the persistently infected (PI) cattle that are harbouring and constantly spreading and perpetuating the disease. Removing these PI cattle is key to eradicating BVD. The programme intends to be able to support this activity on farms.

A significant proportion of cattle herds in Wales are accredited as BVD free by the Cattle Health Certification Scheme (CHeCS). Those farmers who are CHeCS-accredited will be able to test as normal. The working group is currently applying for funding to support the voluntary phase of this programme. This phase is proposed to start in the Spring of 2017. More information about this will be posted on the Welsh Government website[54] when confirmed.

Industry Initiative: Action Johne's

The Action Johne's[55] initiative was launched in April 2015, and represents the implementation of the National Johne's Management Plan (NJMP) developed by the Action Johne's Group.

Phase One of the initiative required milk purchaser members of the plan to commit their supplying dairy farmers to determining their risk and disease status, and implementing one of the six control strategies set out in the NJMP by September 2016. The objective was to engage 80% of dairy farmers in GB in credible and robust Johne's management activity.

Currently, milk purchasers accounting for 78% of GB milk production have become members of the NJMP. Actual engagement by farmers with the requirements of the plan has yet to be assessed but:

- National Milk Laboratories has undertaken Johne's testing for 3,500 dairy farms over the past 12 months ranging from ad hoc 30-cow screens (testing the 30 cows from the herd which are most likely to be infected with Johne's disease) through to full whole herd quarterly screening. A further 1,500 to 2,000 farms will have tested for Johne's through other laboratories, and thus it appears around half of GB dairy herds are engaged in some form of surveillance.
- Of the milk purchasers assessing the level of engagement by their supplying farmers, 59% of supplying farmers on average have assessed their risk and status.

A full assessment of the level of engagement will be undertaken before the end of 2016.

Action Johne's is now consulting on the requirements of Phase Two of the initiative. It is proposed that this would require farmers to obtain, over three years beginning 1 January 2017, an annual signed declaration from a BCVA Johne's Certified Veterinary Adviser that they know their risk and disease status, and will be implementing one of the six strategies specified by the National Johne's Management Plan[56].

h. Losses at slaughter

Recent work has been carried out by Warwick University[57] to highlight incidence and increase awareness of bruising in abattoirs. Researchers worked with all those involved in managing animals through abattoirs, eg, government regulators, animal welfare bodies, producers, owners of abattoirs and those who currently assess animals in slaughterhouses, to develop and test welfare indicators. The aim was to collect data for each indicator and establish its usefulness for each stakeholder, as this is a loss to the industry that can potentially be prevented.

Table 24: Summary of four health issues recorded in beef carcases in GB during 2012 & 2015

	2015	2012	2015	2012
	No. carcases	No. carcases	% Throughput	% Throughput
Liver Fluke	244,792	259,500	16.5%	16.5%
Bruising/trauma	22,074	18,000	1.5%	1.1%
Abscess	95,998	94,500	6.5%	6.0%
Pneumonia/Pleurisy	105,230	91,500	7.1%	5.8%
Total Throughput	1,486,818	1,572,040		

Source: Food Standards Agency

Industry Initiative: Improvement in collection and communication of inspection results (CCIR)

Feeding back accurate abattoir data to producers has a lot of potential benefits in terms of alerting them to health issues within their herd – such as liver fluke. AHDB is currently working with the Food Standards Agency (FSA) to deliver a project which aims to improve this information flow in term of accuracy and consistency for the cattle and sheep sector. As part of the project, FSA also rolled out a revised post mortem conditions list for sheep and cattle across England and Wales.

7. Responsible use of medicines

a. Minimising disease

The Responsible Use of Medicines in Agriculture Alliance (RUMA), with the support of the BCVA, updated its guidelines for cattle in August 2015[58]. The guiding principles are summarised as follows:

Table 25: Disease Control: Four Guiding Principles

Rule	Principle	Comment
1	Review biosecurity of new cattle introduced into a herd	Disease spreads around and between farms by contact with other cattle. Screening and monitoring will help to limit the spread of disease. REMEMBER contact can also be INDIRECT by a needle, surgical instrument, manure or people.
2	"Stress" is a killer	Stressed animals are far more likely to become diseased. This includes not only obvious physical stress factors such as overcrowding or management procedures; but also exposure to micro-organisms which cause major stress to the immune system eg, BVD. THINK - If a procedure causes the cattle to become stressed, ask "can this be done in a less stressful manner?" eg, castration, introduction of heifers to the dairy herd.
3	Good Management and Hygiene	There is no substitute for good management, hygiene and biosecurity measures. Cleaning buildings and equipment coupled with good hygiene will all make a difference. Don't spread disease by poor management and hygiene.
4	Good Nutrition	Good intakes of colostrum provide essential antibodies to protect calves as their immune system is developing. Balanced diets with adequate levels of trace elements, vitamins and anti-oxidants are essential if the immune system of cattle is to work properly in tackling diseases.

Source: RUMA

b. Antimicrobial use in the cattle sectors

Bacterial resistance to antimicrobials is an issue of growing international concern. The O'Neill Review on Antimicrobial Resistance[59] (AMR) published in May 2016 examined the global challenges across human and animal populations, and called on agriculture to play its part in working towards reduced use of antimicrobials, especially those critical to human medicine.

While resistance to antimicrobials remains largely attributed to human medical use[60] (a recent study confirms farm animal use could be responsible for as few as one in every 370 clinical cases[61] of AMR), resistance is accepted by the farming industry as a threat to animals. For this reason there is increasing activity focused on reducing, refining and replacing use of antimicrobials in all livestock sectors, such as the setting up of a 'targets task force'[62] by RUMA, which aims to identify meaningful objectives for each sector by 2017.

In 2014, the Veterinary Medicines Directorate (VMD) commissioned CHAWG to undertake a scoping study to ascertain what antimicrobial usage data are currently being collected from farm medicine records and what should be done to develop data collection systems in the GB cattle sectors, both dairy and beef.

CHAWG carried out 30 interviews within the beef and dairy supply chains about the issue, and the BCVA undertook an on-line survey with 60 of its members. One of the main conclusions was the central collection of 'medicines use' records is virtually non-existent. Most records are paper-based, and even the majority of vet practices still operate a paper-based system for prescribing and dispensing on-farm, with the results then incorporated into the vet practice software at the surgery.

All those contacted recognised the importance of AMR. There was considerable willingness to develop a robust and effective system to meet the reporting and monitoring requirements. Also, importantly, it needed to enable the cattle sector to use actual usage data research and development and make informed decisions.

Following the publication of the resulting report[63], CHAWG held a cross-industry meeting to seek consensus on how the cattle sector acts positively on this important topic. As a direct result of this meeting, a high level GB-wide steering group has been established, with CHAWG chairing and the VMD providing the role of secretariat.

This group includes the sheep sector as this will encourage the development of a standardised system for the ruminant sector, recognising that the vast majority of farms in GB are mixed.

An initial scoping meeting has agreed a work plan against an 18-month time line. Phase 1 will focus on the following:

- The extraction of prescription/dispensing data from veterinary practices.
- Identifying the most appropriate model for electronic collection and storage by the industry.
- Better understanding of future reporting and records of value to the sector.

The second phase of the work plan (if necessary) will focus on:

- The development of a collection system for farm medicine book entries, which are predominantly paper based.
- Ensuring that whatever system is established adds value and does not create unnecessary burden on-farm or to farm service levels.

The Royal Association of British Dairy Farmers (RABDF) recently carried out a survey in association with the University of Bristol to gauge antibiotic use on farms, with a focus on cattle and, more specifically, dairy units:

- 97% of farmers regard the current AMR crisis as something they need to play a part in tackling.
- Over 80% of respondents agreed they need to reduce antimicrobial use before they are forced to do so.
- Antibiotic usage could be reduced in the next five years by 20% in clinical mastitis and around one third in dry cow therapy.
- Antibiotic usage in calves could be cut by a median of 15%.
- Almost 60% of dairy farmers surveyed were aware of treatments they use which include critically important antibiotics (CIAs).

c. Dry cow therapy

Dry cow therapy is a practice that has been advocated as a preventative treatment for mastitis in dairy cows for the past 50 years. Although a very small percentage – 0.6% – of all antibiotic use in the EU is intramammary, a positive association had been proven between their use and the development of antibiotic resistance in field conditions; this is why intramammary products are the focus of a number of different initiatives to reduce and use products selectively.

A 2015 survey conducted by Zoetis and Farmers Weekly of 200 dairy farmers found:

- 68% of farmers had heard about selective dry cow therapy
- 32% were concerned about it
- 78% were using an internal teat sealant
- 73% were testing for bacteria causing mastitis on farm
- 33% claimed that maintaining cleanliness at drying off was the hardest problem to manage

Industry initiative: Selective dry cow therapy guidelines

In 2015, RUMA published its first ever Guidelines on the Responsible Use of Antimicrobials in Dry Cow Management[64] to help vets and farmers determine how best to treat cows in the drying off period to prevent and treat the development of bacterial disease such as mastitis. The advice is to take the following course of action to minimise infection while minimising use of antibiotics:

- do nothing and monitor closely for the potential development of mastitis (a health and welfare risk for the cow)
- use an internal teat sealant
- use a dry cow antibiotic
- use both an internal teat sealant and antibiotic

Industry Initiative: Research into selective dry cow therapy

Recent research looks more closely at selective approaches to dry cow therapy to reduce this risk[65]. The premise of the research is that the changing profile of mastitis infection in the UK supports a change in approach. With evidence that killing gram positive – primarily *Staphylococcus* and *Streptococcus* – bacteria through dry cow therapy can actually select for gram negative bacteria, mainly coliforms, the advice is that the standard 'herd' approach should be reassessed as too many cows could be receiving the wrong treatment. The best approach is now the 'cow approach' looking at individual cow somatic cell counts, with bacteriology carried out on late lactation animals with high counts.

In herds where the aim is reduction of bulk milk SCC with a priority removal of gram positive organisms, more widespread use of dry cow therapy may prove beneficial. But in herds with low bulk milk SCC, priorities are likely to be different. Clinical mastitis may be the major issue and gram negative bacteria are of increased concern. In this situation, more conservative use of antibiotic dry cow therapy may be beneficial. For cows with low SCC tests in late lactation, risk of mastitis during the dry period or at calving may be better managed with teat sealants, which have been shown to reduce new infection by 75% making them twice as effective as dry cow therapies.

8. Surveillance

a. Changes to Scanning Surveillance in England and Wales

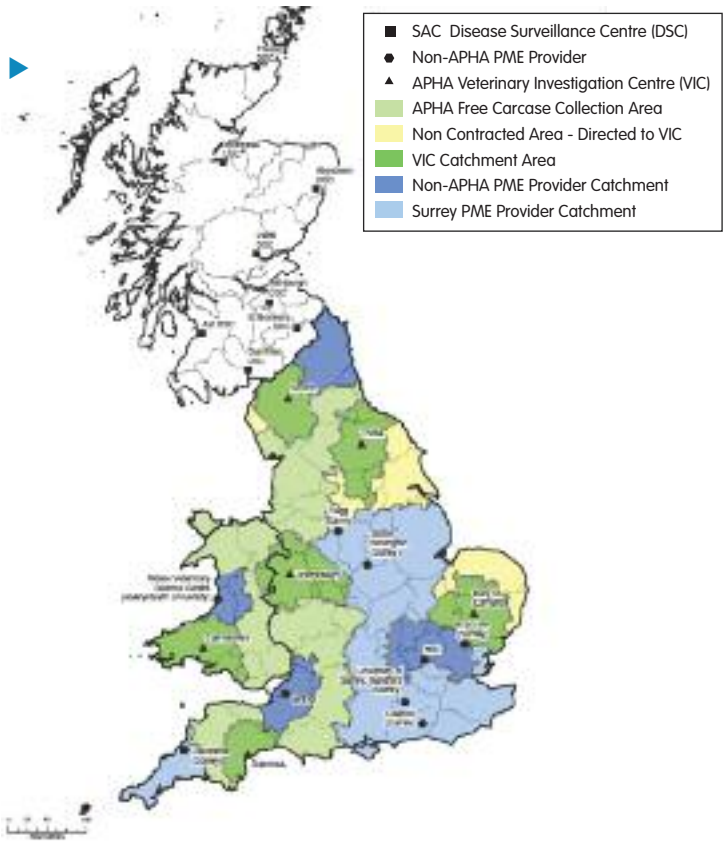
Proposed changes to scanning surveillance in England and Wales were reported in the 2014 CHAWG report. Subsequent to this, the Animal and Plant Health Agency (APHA) was launched on 1 October 2014. It merges the former Animal Health and Veterinary Laboratories Agency (AHVLA) with parts of the Food and Environment Research Agency (FERA) responsible for plant and bee health to create a single agency responsible for animal, plant and bee health.

During 2014-15 the changes in surveillance proposed in the Surveillance chapter of the 2012 CHAWG report[66] and reported in detail in the 2014 report were implemented. The proposals were, amongst other things, intended to improve the access of farms to diagnostic post mortem examinations (PME) by:

- provision of post mortem facilities by five partner PME providers: SAC CVS, University of Bristol, Royal Veterinary College, University of Surrey, and Iechyd Da at the Wales Veterinary Science Centre. These became operational from September 2014 to autumn 2015.
- continued provision of post mortem facilities at the six remaining APHA Veterinary Investigation Centres (VIC).
- provision of a free carcase collection service in those areas not within the catchment areas of the facilities described above (light green in the map below).

Figure 20: Service provision for PME and carcase collection in England and Wales, also showing SAC CVS Disease Surveillance Centres

The changes have resulted in an increase in the proportion of livestock holdings within an hour of a post mortem facility to increase from 50% to approximately 75%.



Source: APHA

b. Scanning Surveillance in Scotland

In Scotland, farm animal disease surveillance is provided by Scottish Rural College, SAC Consulting Veterinary Services (SAC CVS) with financial support from the Scottish Government. There are eight disease surveillance centres strategically positioned around the country in relation to the livestock population density. There has been no change in the number of centres since 1982 (see Figure 20).

c. Diagnostic cattle submissions

During 2015 there was an overall reduction in the number of diagnostic cattle submissions of all types in Great Britain compared with previous years. This fall in submission numbers was most marked in England, notably carcases submitted for post-mortem examination (PME).

The APHA Surveillance Intelligence Unit and its constituent Species Expert Groups, including the Cattle Expert Group (CEG), are actively exploring additional means of surveillance, for example collection and analysis of other laboratories' data, and development of 'syndromic' surveillance methods. Syndromic surveillance might involve collection of data from new sources with a lower degree of diagnostic certainty, and could provide additional early warning of new and re-emerging disease and changes in endemic disease. Suitable sources of data might include farm or fallen stock PMEs, abattoir lesion recording, or antimicrobial use.

The major APHA Species Expert Groups produce monthly and quarterly Disease Surveillance Reports[67] where further details may be found.

Table 26: Number and proportion of cattle diagnostic submissions to APHA, SAC and non-APHA PME providers during 2015 and compared with the average of the prior two and five years

	Carcase			Foetus/Stillborn			Other			Total		
Annual	2015 Subs	2015 v Prior two years	2015 v Prior five years	2015 Subs	2015 v Prior two years	2015 v Prior five years	2015 Subs	2015 v Prior two years	2015 v Prior five years	2015 Subs	2015 v Prior two years	2015 v Prior five years
England	636	69%	47%	466	81%	63%	12,357	67%	58%	13,459	67%	58%
Wales	139	89%	61%	95	93%	68%	3,145	81%	74%	3,379	81%	73%
Scotland	771	91%	77%	382	78%	69%	4,668	78%	72%	5,821	80%	72%
Unknown	91	224%	179%	4	89%	77%	384	104%	100%	407	106%	102%
	1,565	80%	60%	947	81%	66%	20,554	71%	64%	23,066	72%	63%

Source: APHA

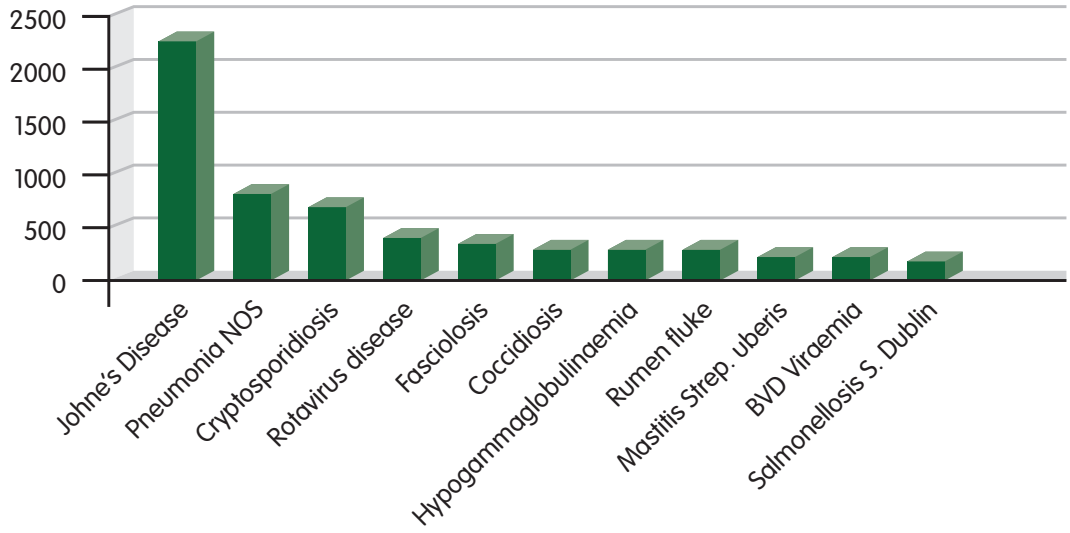
d. Commonly-diagnosed diseases

Diagnoses are defined by the Veterinary Investigation Diagnosis Analysis (VIDA) system, which provides criteria by which a diagnosis may be ascribed to a submission whether it is a carcase or a clinical specimen. This ensures that diagnoses are equivalent, regardless of the contributing laboratory. Contributing laboratories are APHA's six Veterinary Investigation Centres, APHA Weybridge central laboratory, SAC CVS's eight Disease Surveillance Centres, APHA's Partner Postmortem Providers, the University of Bristol Veterinary School, Royal Veterinary College, University of Surrey and the Wales Veterinary Science Centre.

Note: It should be noted that VIDA diagnoses are a subset of submitted materials from which a diagnosis could have been reached, and in turn these are a subset of diagnosable submissions to all laboratories in GB. These submissions could have been submitted to various laboratories for a variety of reasons, and so the VIDA diagnoses presented are in no way representative of GB laboratory submissions or of disease occurrence, and are thus subject to considerable bias.

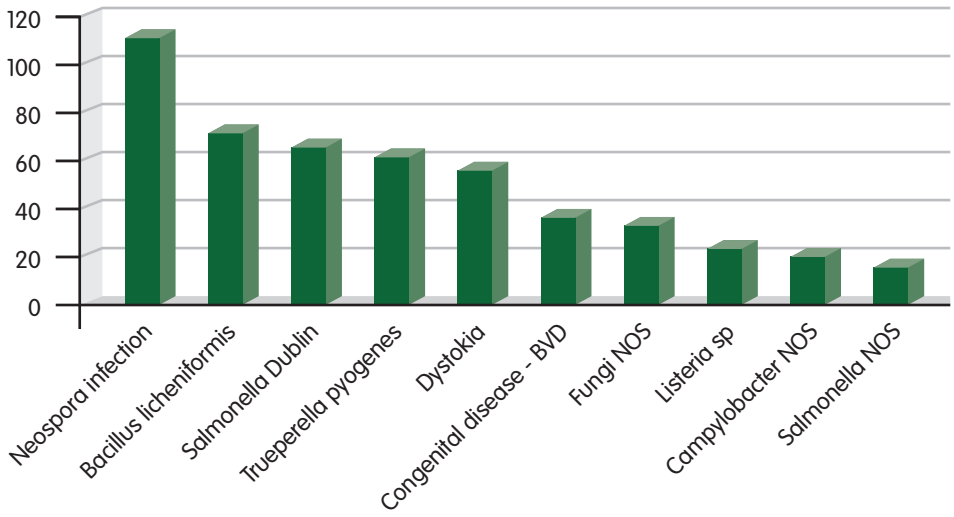
In 2015, there were 11,738 submissions to participating laboratories in which a VIDA diagnosis was reached, with the 'top 11' diagnoses listed below.

Figure 21: Count of most commonly diagnosed diseases in cattle in GB 2015



NOS= No Organism Specified
Source: VIDA, 2015

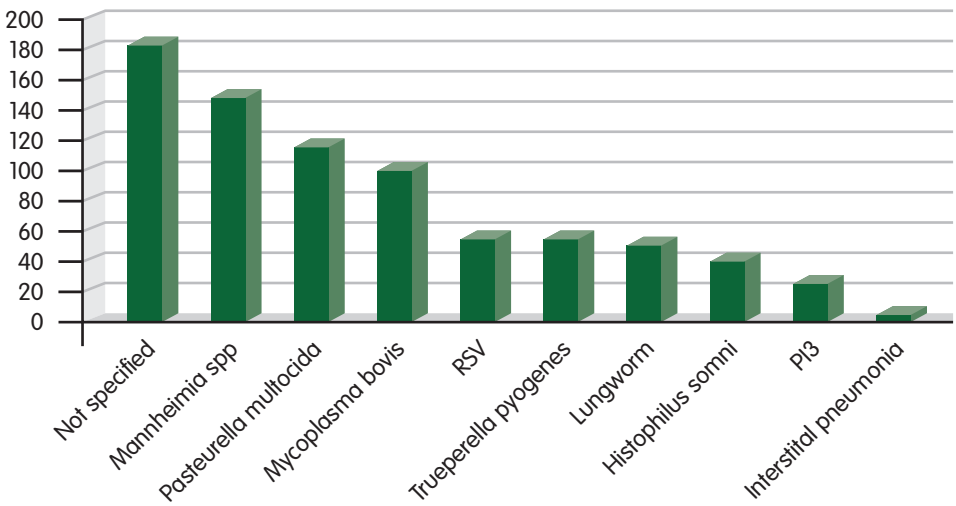
Figure 22: Top 10 causes of abortion 2015



NOS= No Organism Specified
Source: VIDA, 2015

The most common diagnosed causes of abortion was Neospora (21.5% of VIDA diagnosed abortion submissions in 2015) and *Bacillus licheniformis* (13.5%), which is an environmentally-associated infection arising from bacteria commonly found in poorly-made silage or dirty cattle housing facilities.

Figure 23: Top 10 VIDA pneumonia diagnoses 2015



RSV= Respiratory Syncytial Virus
PI3= Parainfluenzavirus-3
Source: VIDA, 2015

'Not specified' means that although pneumonia was described, it was not possible to make a definitive diagnosis. This could be due to prior antibiotic treatment, or the samples were taken later in the disease process by which time the pathogens had been cleared by the animal's immune system but the damage remained.

e. Bluetongue Virus

In September 2015 bluetongue disease caused by Bluetongue virus serotype 8 (BTV-8) recurred in Central France after a period of apparent freedom from disease of about six years. Bluetongue disease is caused by a virus transmitted by biting midges, which are most active between May and October; by early 2016 over 280 outbreaks had been officially reported in France, and there is risk of further outbreaks as the year progresses. Outbreaks of Bluetongue affect farm incomes through reduced milk yield, sickness, reduced reproductive performance (failed pregnancies, abortion, central nervous system deformities in the calf or lamb) or, in severe cases, the death of adult animals. Bluetongue is a notifiable disease which means that suspicion of disease must be reported.

Defra produces regular updates on the Bluetongue disease situation.[68] Vaccines were available for the GB market from mid-July 2016 onwards, but the decision to vaccinate continues to lie with the farmer in consultation with their private veterinary surgeon. The Defra International Disease Monitoring team has produced a Qualitative Risk Assessment for the incursion of BTV-8 into GB,[69] which considers the extent of resurgence after remission in France, which is in turn dependent on the effectiveness of the French vaccine campaign, the weather, particularly the temperature; and the level of vaccination and climate in GB.

Industry initiative: Bluetongue JAB campaign

The NFU has co-ordinated another 'JAB' campaign following its successful effort during the 2007/8 outbreak.[70] Its advice is to:

- Monitor stock carefully and report any clinical signs of disease. The local vet can provide help in the diagnosis.
- Source animals responsibly and check the health status of animals likely to be bought in.
- Consider vaccination as a method of reducing the spread of infection. Vaccination is the only effective tool to protect animals from bluetongue. Consult the vet about the benefits of doing so and the availability of vaccine if this is something being considered. Meat and milk from vaccinated animals is safe for consumption.
- Maintain good biosecurity such as washing equipment after use.

f. Lumpy Skin Disease

Lumpy Skin Disease (LSD) is a notifiable disease of cattle and buffalo caused by a pox virus. It initially leads to a fever, production loss and the following clinical signs:

- nodules: small bumps beneath the skin in the nose, mouth and on the body
- yellowish-grey lesions (damage to the skin) on the tongue
- swollen and tender udder or testicles
- discharge from the eye and nose
- salivation
- bulls becoming sterile and cows having abortions
- swollen lymph nodes, for example beneath the neck.

The disease is thought to be spread by a range of biting flies, ticks and mosquitos. Its range was principally Africa, with spread into the Middle East in the 1990s. However, over recent years, it has spread rapidly through Asiatic Turkey into European Turkey and is now well established in Greece, the Balkans and southern Russia, by both slow local spread via insect spread and via large distances too, possibly as a consequence of animal movements. Control is by slaughter of infected animals, movement controls, and vaccination. The risk to GB is considered by Defra's International Disease Monitoring Team to be very low as there is very restricted trade in live animals with the infected areas. However, this is an emerging disease in Europe, and its progress is being closely monitored. Any suspicion of disease should be reported immediately to APHA.

9. Conclusions

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The importance of this document as a 'one stop reference' for important information relating to the health and welfare of cattle in GB should not be underestimated, as sub-optimal animal health and welfare has been reported to cost the cattle industry millions of pounds every year. In our view good welfare is good business, as well as having its own intrinsic value.

It is clear that many positive initiatives are being pursued within the industry at present, which are good examples of industry stakeholders working successfully together for the greater good. Notable amongst these are those associated with dairy cow genetics, eliminating BVD, the national dairy cow welfare strategy and the development of a data hub for the collation of information relating to antimicrobial use. Indeed, some of these are starting to realise improvements in key areas, for example, dairy cow longevity is beginning to increase, and cow fertility figures and somatic cell counts appear to be moving in the right direction.

However, there are still ongoing concerns relating to some important health and welfare issues. For example, despite the evidence suggesting the annual prevalence levels of cattle lameness are beginning to fall, there still appears to be no centralised database for recording it. If lameness data is fragmented and being held by various agencies, it makes it more challenging to comprehensively and accurately articulate the national position. Perhaps CHAWG could focus on developing a mechanism whereby anonymised key health and welfare data are recorded and held on a national database. Farm assurance schemes may have an important role to play in this process.

Optimal animal health and welfare must be an integral part of any discussion relating to the actual and potential future challenges that the industry faces. These challenges cover a wide range of issues and variables, including climate change, sustainable livestock systems, price and market volatility, the use of antimicrobials, 'sustainable intensification' and Brexit to name but a few.

Consumers have come to expect that farm animal health and welfare is included as an essential part of livestock production. Future CHAWG reports will continue to have an important role to play in identifying the extent to which these aspects have been included in national overarching food production policy.

Glossary and abbreviations

AHDA	Animal Health Distributors' Association
AHDB	Agriculture and Horticulture Development Board – the levy boards
AHWBE	Animal Health and Welfare Board for England
AIMS	Association of Independent Meat Suppliers
Antibiotic	A type of antimicrobial drug used in the treatment and prevention of bacterial infections
Antimicrobial	Destroys or inhibits the growth of (pathogenic) micro-organisms; includes antibiotics, antifungals, antiprotozoals and antivirals.
APHA	Animal and Plant Health Agency, formerly AHVLA
AssureWel	The initiative undertaken by University of Bristol, RSPCA and the Soil Association to establish farm animal welfare outcomes measures
BBSRC	Biotechnology and Biological Sciences Research Council, the lead funding agency for academic research and training in the biosciences at universities and institutes throughout the UK
BCMS	British Cattle Movement Service
BCVA	British Cattle Veterinary Association
BMPA	British Meat Processors Association
BMSCC	Bulk Milk Somatic Cell Count
BNP	Bovine Neonatal Pancytopenia (Bleeding calf syndrome)
Breedplan	An Australian genetic evaluation system for beef cattle breeders that supplies services to some breed societies in GB
BVA	British Veterinary Association
BVD	Bovine Viral Diarrhoea
CDI	The Centre for Dairy Information, wholly owned by Holstein UK
CHAWG	Cattle Health and Welfare Group of Great Britain
CIA	Critically Important Antibiotic (for human medicine)
CHeCS	The Cattle Health Certification Standards, a non-trading organisation established by the cattle industry in UK and Ireland for the control and eradication of non-statutory diseases
CIS	The Cattle Information Service
COWS	Control of Worms Sustainably, an industry stakeholder group which aims to promote best practice in the control of cattle parasites
CP	Clostridium perfringens
CTS	Cattle Tracing System
CVO	Chief Veterinary Officer
DA	Referring to land that is classified a Disadvantaged Area for subsidy and management purposes, and also applied to the herds kept on it
Dairy UK	The trade association for the British dairy supply chain
Defra	Department for Environment, Food and Rural Affairs
DSC	Disease Surveillance Centres
EBV	Estimated Breeding Value
FSA	Food Standards Agency
FUW	Farmers Union of Wales
HCC	Hybu Cig Cymru, responsible for the development, promotion and marketing of Welsh red meat
IAAS	Institute of Auctioneers and Appraisers for Scotland
IBR	Infectious Bovine Rhinotracheitis
LAA	Livestock Auctioneers Association
LDA	Left Displaced Abomasum
LFA and non-LFA	Referring to land that is classified as Less Favoured Area and non-Less Favoured Area according to its inherent challenges to productivity and the subsidy support for which it may be eligible. Also refers to herds kept on one area or the other.

MCF	Malignant Catarrhal Fever
MHI	Meat Hygiene Inspector
NBA	National Beef Association
NFU	National Farmers Union
NFU Cymru	The National Farmers Union's Welsh arm
NFUS	National Farmers Union of Scotland
NMR	National Milk Records
NPA	National Pig Association
NSA	National Sheep Association
PGI	Protected Geographical Indication - an EU designation
PI	Persistently Infected
PI3	Bovine Parainfluenza Virus-3
QMS	Quality Meat Scotland, the levy board representing the red meat industry in Scotland
RABDF	Royal Association of British Dairy Farmers
RADAR	Rapid Analysis and Detection of Animal-Related Risks – captures and processes data from a range of sources including the BCMS Cattle Tracing System (CTS)
RDA	Right Displaced Abomasum
RFM	Retained Foetal Membranes
RDPE	Rural Development Programme for England
Red Tractor	A food assurance scheme which covers production standards on safety, hygiene, animal welfare and the environment
RSV	Respiratory Syncytial Virus
RUMA	Responsible Use of Medicines in Agriculture Alliance
RVC	Royal Veterinary College, London
SAC Consulting	Part of SRUC
SARS	Suspected Adverse Reaction Surveillance Scheme
SBV	Schmallenberg Virus
SCC	Somatic Cell Count
SDA	Referring to land that is classified Severely Disadvantaged Area for subsidy and management purposes, and also applied to the herds kept on it
SHAWG	Sheep Health and Welfare Group
Signet	Signet Breeding Services provides genetic evaluations to sheep and cattle breeders, and is funded by AHDB Beef and lamb, HCC in Wales and QMS in Scotland
SRUC	Scotland's Rural University
SSPCA	Scottish Society for the Prevention of Cruelty to Animals
TMR	Total Mixed Ration, a method of feeding cattle that combines all forages, grains, protein feeds, minerals, vitamins and feed additives into a feed
VEERU	Veterinary Epidemiology and Economics Research Unit, University of Reading
VIO	Veterinary Investigation Officer
VMD	Veterinary Medicines Directorate

References and Links

1 Cattle Health and Welfare Group of GB report 2012 http://beefandlamb.ahdb.org.uk/wp/wp-content/uploads/2013/06/Cattle-Health-and-Welfare-Report.pdf
2 GB Dairy Cow Welfare Strategy http://www.dairyco.org.uk/technical-information/animal-health-welfare/dairy-cow-welfare-strategy/#.U4id-dSjcB9M
3 Beyond Calf Exports Forum http://calfforum.rspca.org.uk/home
4 Velasova, M., Drewe, J.A., Gibbons, J., Green, M., Guitian, J. 2015. Evaluation of the usefulness at national level of the dairy cattle health and production recording systems in Great Britain. Veterinary Record, 177, Issue 12, p304
5 http://www.ahdb.org.uk/projects/DataHubProject.aspx
6 http://assurance.redtractor.org.uk/contentfiles/Farmers-5614.pdf
7 http://www.arlafoods.co.uk/overview/our-responsibility/arlagarden-in-the-uk/
8 http://www.qmscotland.co.uk/
9 www.nmr.co.uk/uploads/files/files/HolsteinFriesian-500NMRherds-2015.pdf
10 www.kiteconsulting.com
11 www.kingshay.com
12 http://beefandlamb.ahdb.org.uk/returns/stocktake/
13 http://beefandlamb.ahdb.org.uk/wp/wp-content/uploads/2015/10/BRP-bulletin-Autumn-2015.pdf
14 http://qmms.co.uk/
15 http://www.total-vet.co.uk/
16 http://www.thecis.co.uk/
17 http://dairy.ahdb.org.uk/technical-services/mastitis-control-plan/
18 Down et al 2016
19 http://dairy.ahdb.org.uk/resources-library/market-information/supply-production/gb-hygienic-quality/#.V-zJbk32b4g
20 http://dairy.ahdb.org.uk/research-development/health-welfare/current-projects/decision-making-for-mastitis-control/#.V-vjDU32bIU
21 http://dairy.ahdb.org.uk/research-development/health-welfare/current-projects/predict-and-prevent-streptococcus-uberis-mastitis/#.V-vjS032bIU
22 http://hccmpw.org.uk/
23 http://dairy.ahdb.org.uk/
24 Collins, S. 2016. PhD Thesis. Royal Veterinary College, University of London
25 Clarkson et al., 1996. The Veterinary Record, 138, 563-567; Whay et al., 2003. Veterinary Record, 153, 197 -202; Huxley et al., 2004. Veterinary Record, 155, 237-239; Rutherford et al., 2009. The Veterinary Journal 180, 95-105; Haskell et al., 2006. Journal of Dairy Science 89, 4259 – 4266; Barker et al., 2010. The Journal of Dairy Science 93, 932-941; Shepherd, F.., 2016. ResM Thesis. Duchy College working with University of Plymouth; Heath et al., 2014. Welfare Quality 23, 95-107, RDPE Report, 2013. http://www.reaseheath.ac.uk/wp-content/uploads/2014/02/Cattle-Mobility-Final-report-December-2013.pdf; Collins, S. 2016. PhD Thesis. Royal Veterinary College, University of London
26 http://www.cattlelamenessacademy.co.uk/
27 http://synergyfarmhealth.com/
28 Murray et al., 1996. Veterinary Record 138, 586-591; Barker, Z.E. 2007. Epidemiology of lameness in dairy cows. PhD Thesis. University of Warwick; Burnell & Reader, 2009. Proceedings of 1st Cattle Lameness Conference; Burnell & Reader, 2013. Proceedings of international lameness conference, Bristol; Reader & Burnell, 2016. Proceedings of the British Cattle Veterinary Association Congress.
29 http://www.nacft.co.uk/wp/
30 http://dairy.ahdb.org.uk/about-ahdb-dairy/industry-groups/dairy-cattle-mobility-steering-group/#.V6M1OKJjY1s
31 http://dairy.ahdb.org.uk/resources-library/technical-information/ahdb-dairy-feet-programme/icar-claw-health-atlas/#.V-LKhTVjY1s
32 Thomas HJ, GG Miguel-Pacheco, NJ Bollard, SC Archer, NJ Bell, C Mason, OJR Maxwell, JG Remnant, P Sleeman, HR Whay and JN Huxley (2015). "Evaluation of treatments for claw horn lesions in dairy cows in a randomized controlled trial". Journal of Dairy Science, 98 (7): 4477-4486. DOI: 10.3168/jds.2014-8982
33 Thomas HJ, JG Remnant, NJ Bollard, A Burrows, HR Whay, NJ Bell, C Mason and JN Huxley (2016). "Recovery of chronically lame dairy cows following treatment for claw horn lesions: A randomised controlled trial". Veterinary Record, DOI: 10.1136/vr.103394. Maxwell OJR, CD Hudson and JN Huxley (2015). "Effect of early lactation foot trimming in lame and non-lame dairy heifers: a randomized controlled trial". Veterinary Record, 177(4): 100. DOI: 10.1136/vr.103155.
34 Archer SC, R Newsome, H Dibble, MG Chagunda, CS Mason and JN Huxley (2015). "Claw length recommendations for dairy cow foot trimming". Veterinary Records, DOI: 10.1136/vr.103197
35 http://dairy.ahdb.org.uk/research-development/health-welfare/current-projects/lameness-control-in-dairy-cows/#.V-vjXk32bIU
36 Green LE, JN Huxley, C Banks and MJ Green (2014). "Temporal associations between low body condition score, lameness and milk yield in a UK dairy herd". Preventive Veterinary Medicine, 113: 63-71; DOI: 10.1016/j.prevetmed.2013.10.009. Lim PY, JN Huxley, JA Willshire, MJ Green, AR Othman and J Kaler (2015). Unravelling the temporal association between lameness and body condition score in dairy cattle using a multistate modelling approach. Preventative Veterinary Medicine, 118 (4): 370-377. OI:10.1016/j.prevetmed.2014.12.015 Randall LV, MJ Green, MGG Chagunda, C Mason, LE Green, SC Archer and JN Huxley (2015). "Low body condition predisposed cattle to lameness: An 8 year study of one dairy herd". Journal of Dairy Science, 98 (6): 3766-3777. DOI: 10.3168/jds.2014-8863
37 Newsome R, MJ Green, NJ Bell, MGG Chagunda, CS Mason, CJ Sturrock, HR Whay and JN Huxley (2016). "Linking bone development on the caudal aspect of the distal phalanx with lameness during life". Journal of Dairy Science, 99: 1-14. DOI: http://dx.doi.org/10.3168/jds.2015-10202
38 http://dairy.ahdb.org.uk/research-development/health-welfare/current-projects/digital-dermatitis-transmitted-between-dairy-cows/#.V-vjc032bIU
39 Sullivan LE, Carter SD, Blowey R et al. Vet Rec 2013; 173: 582. Sullivan LE, Evans NJ, Blowey RW et al. Vet Microbiol 2015; 178: 77-87. Sullivan LE, Clegg SR, Angell JW et al. J Clin Microbiol 2015; 53: 1628-38. Sullivan LE, Carter SD, Duncan JS et al. Appl Environ Microbiol 2015; 81: 7460-9. Sullivan LE, Blowey RW, Carter SD et al. Vet Rec 2014; 175: 201.
40 www.feedforgrowth.com
41 www.healthyyoungstock.co.uk
42 http://dairy.ahdb.org.uk/c2c
43 http://glw-lifetime.co.uk/
44 http://www.bi-vetmedica.com/species/cattle/keep_calves_healthy.html
45 http://www.signetfbc.co.uk/recording-birth-weight-ease-birth-enhance-calf-lamb-survival/
46 http://beefandlamb.ahdb.org.uk/wp/wp-content/uploads/2014/09/74404-Review-of-the-genetic-improvement-of-beef-cattle-and-sheep-in-the-UK-Final-report-140515.pdf
47 http://beefandlamb.ahdb.org.uk/event/better-returns-from-reducing-calving-difficulties-improving-calf-survival-oxon/
48 http://dairy.ahdb.org.uk/news/atd-articles/summer-2016/check-for-inbreeding-before-serving-dairy-cows/#.V-LzgDVjY1s

[49] http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=17791
[50] http://dairy.ahdb.org.uk/resources-library/research-development/health-welfare/ahdb-dairy-research-into-practice-booklet/#.V5sm2k32bIU
[51] www.bvdfree.org.uk
[52] J S Russell, C Murray, F Broadfoot (2015) Action for BVD Control – an example of how collaborative practice working can achieve results in on farm improvements and positive veterinary interventions. Cattle Practice (23) 328.
[53] http://www.gov.scot/Topics/farmingrural/Agriculture/animal-welfare/Diseases/disease/bvd/eradication
[54] http://gov.wales/topics/environmentcountryside/ahw/disease/bovine-viral-diarrhoea/?lang=en
[55] http://www.actionjohnesuk.org/
[56] http://www.actionjohnesuk.org/control-strategies/
[57] http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=18282&FromSearch=Y&Publisher=1&SearchText=university%20of%20warwick%20&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description
[58] http://www.ruma.org.uk/cattle/responsible-use-antimicrobials-dairy-beef-cattle-production/
[59] http://amr-review.org/Publications
[60] The European Medicines Agency Committee for Medicinal Products for Veterinary Use (CVMP) says in its draft strategy on antimicrobials that: "it is recognised that the biggest driver of AMR in people is the use of antimicrobials in humans or human health." Other publications, such as the UK Department of Health 5 Year Strategy on Antimicrobial Resistance, published in 2013, contain similar statements. It stated that whilst antibiotic use in animals is an important factor that: "Increasing scientific evidence suggests that the clinical issues with antimicrobial resistance that we face in human medicine are primarily the result of antibiotic use in people, rather than the use of antibiotics in animals."
[61] Burch, D. 2015 – Use of antibiotics in animals and people. November 28, 2015, Veterinary Record, 549-550 doi:10.1136/vr.h6380
[62] http://www.ruma.org.uk/ruma-welcomes-oneill-findings-announcement-targets-task-force/
[63] http://beefandlamb.ahdb.org.uk/wp/wp-content/uploads/2015/11/AMR-Mapping-report-June-2015.pdf
[64] http://www.ruma.org.uk/ruma-publishes-guidelines-on-the-responsible-use-of-antimicrobials-in-dry-cow-management/
[65] https://www.youtube.com/watch?v=VBgvkldP03A&index=2&list=PLbxhW7-AcgGVWNBQcHfgQlOPC32XlnGkV
[66] http://ahvla.defra.gov.uk/vet-gateway/news/20140901.htm
[67] https://www.gov.uk/government/collections/animal-disease-surveillance-reports
[68] https://www.gov.uk/government/collections/animal-diseases-international-monitoring
[69] https://www.gov.uk/government/publications/qualitative-risk-assessment-bluetongue-virus-btv-8-entry-into-the-uk
[70] http://www.nfuonline.com/news/latest-news/bluetongue-what-you-need-to-know/

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