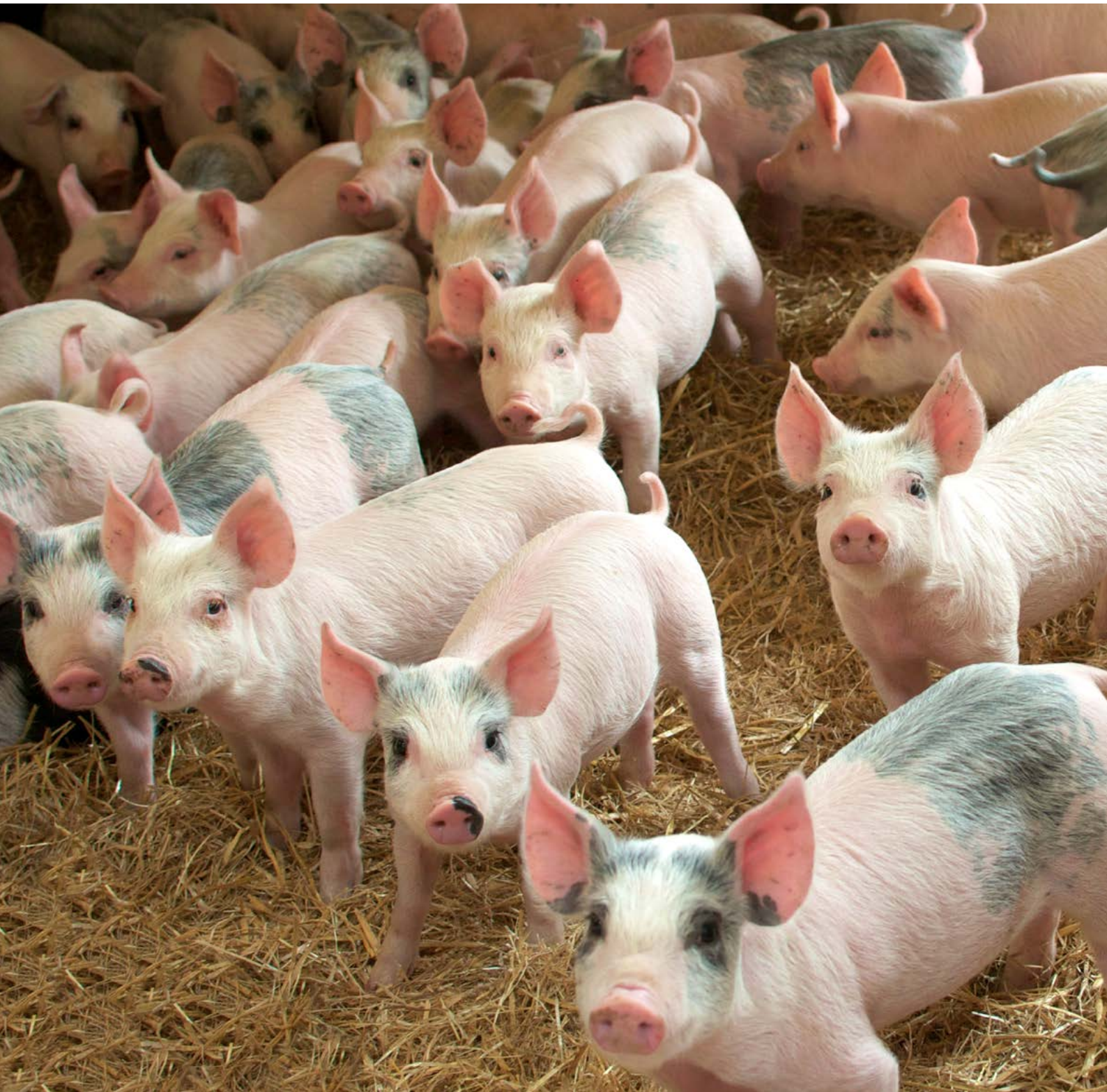
Pig Health and Welfare Council

Biennial Report 2019–2020



Foreword

The Chief Veterinary Officers (CVOs) of England, Wales and Scotland welcome the fifth biennial report of the Pig Health and Welfare Council (PHWC). We recognise and value the work of the PHWC in enabling partnership working across the sector and delivering invaluable technical expertise.

Firstly, we would like to acknowledge the important role of the council in raising awareness, encouraging good practice, promoting biosecurity and leading continual improvements in health and welfare.

Promoting good working practices enables producers to adapt and embrace changes that benefit the animals in their care. PHWC's welfare group played a key role in the development of the welfare code of practice for pigs, which has been published this year. It provides the opportunity to demonstrate high welfare standards and help promote the UK brand both nationally and internationally.

Delivering improved health and welfare can reduce the need for the use of antibiotics, helping to minimise the risk of AMR. The industry has set challenging targets to further reduce the use of antibiotics as part of the One Health approach. They are working together to promote change in working practices and provide support in actioning those changes. We see that PHWC continues to support the industry in their efforts by reaching out to all pig owners and providing evidence to encourage change in routine procedures and promote responsible use of veterinary medicines.

From a disease control perspective, although the overall challenges of early detection and control of disease remain constant, the specific details change. The CVOs welcome the council's new objectives for 2020–2030, which will build on previous achievements and embrace new technologies in a rapidly changing, data-driven world. The pandemic has only served to emphasise the importance of disease surveillance, preparedness for disease incursion, emergency response and control measures. African Swine Fever (ASF) remains a threat to UK pigs, and the industry must remain alert in promoting effective biosecurity measures, ensuring early detection and effective control.

On the One Health front, COVID-19 has been shown not to transfer through pigs, or pig meat and products. However, One Health continues to offer other challenges through other pathogens, including Salmonella, hepatitis E and LA-MRSA. Working together will reinforce the resilience of the sector and reduce possible impacts on human health from these zoonotic microorganisms.

In summary, we would like to congratulate the PHWC and members of the subgroups for their achievements and thank them for the expertise and advice they share to prepare the sector for the challenges of continually improving pig health and welfare.

Christine Middlemiss
Chief Veterinary Officer (UK)

Sheila Voas
Chief Veterinary Officer (Scotland)

Cristianne Glossop
Chief Veterinary Officer (Wales)

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Introduction

Welcome to the fifth report of the Pig Health and Welfare Council (PHWC), which recounts the activities of the council during 2019 and 2020. Since the last report, the 20:20 vision has been enhanced to reflect the integration of the industry in delivering pig health and welfare. The objective of the council for 2020–2030 is to support the pig industry in enhancing the health and welfare of the pig herd, and enabling assurance that pork products are safe to eat, and produced from pigs whose health and welfare needs have been met. The objectives are discussed further in this report, and aim to provide a targeted, streamlined and clear approach.

The Council greatly appreciates the work and collaboration of those across the pork chain throughout Great Britain. In addition, the expertise and commitment to pig health and welfare is integral to the success of the Council.

There have been significant achievements by the Council and respective subgroups since the last report. In respect to pig welfare, accomplishments include the collaboration involved in implementing the Welfare Code, the review of Red Tractor standards, and responses to the proposed changes to Welfare in Transport legislation. The Food Safety subgroup continues to work closely with Public Health England, the FSA and APHA in recognising the challenges facing food safety, and highlighting the importance of biosecurity. Achievements include the creation of a central information hub for biosecurity, health and safety, and public concerns of LA-MRSA. Surveillance of key diseases by the Disease Surveillance group, including ASF, prompted the launch of the **'#MuckFreeTruck'** lorry wash campaign in 2019, in addition to an updated contingency plan for PEDV. Finally, targets for RUMA's Targets Task Force, published in 2020, and proposals for the revision of Medicated Feed and Veterinary Medicines regulations, were achievements of the Antimicrobial Usage subgroup.

Dr Jane Downes BVSc MRCVS
Chair

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Pig industry structure

2.1 Key facts

- Since the peak of production in 1997–98, the total number of pigs on UK agricultural holdings has fallen from more than **8.0 million** to **5.0 million** in 2020, a fall of **38%**
- The number of female breeding pigs has fallen from **800,000** to **402,000 (50%)** over the same period
- In 2019, there were **10,500** commercial agricultural holdings with pigs in the UK: **5,500** had female breeding pigs (average number **76**) and **8,600** had fattening pigs (average number **530**). With the very small units of 4 or fewer breeding pigs or 9 or fewer finishing pigs taken out, the average number of breeding females in a herd rises to **192** and finishing pigs to **937**
- Of the **5.0 million** pigs in the UK, **80%** are in England, **13%** in N. Ireland, **7%** in Scotland and **fewer than 1%** in Wales. More than half of the pigs in England are in Yorkshire and the Humber, and Eastern England
- The number of abattoirs slaughtering pigs in England has halved over the last 20 years down to **103** in 2019. The 14 specialist abattoirs that only handle pigs account for **75%** of pigs killed
- Approximately **7,800** people work on England's specialist pig farms, with others working with pigs on non-specialist farms, although the number of these is uncertain

2.2 Size and distribution of the industry

Size of the UK pig herd

Latest figures from Defra show that in June 2020, the UK pig herd was just over 5.0 million head, down slightly on the previous year. This was due to a 2% fall in the number of breeding pigs, but there was stability in the number of feeding pigs.

Figure 3.1 Total pigs on agricultural holdings in the UK, 1992–2020

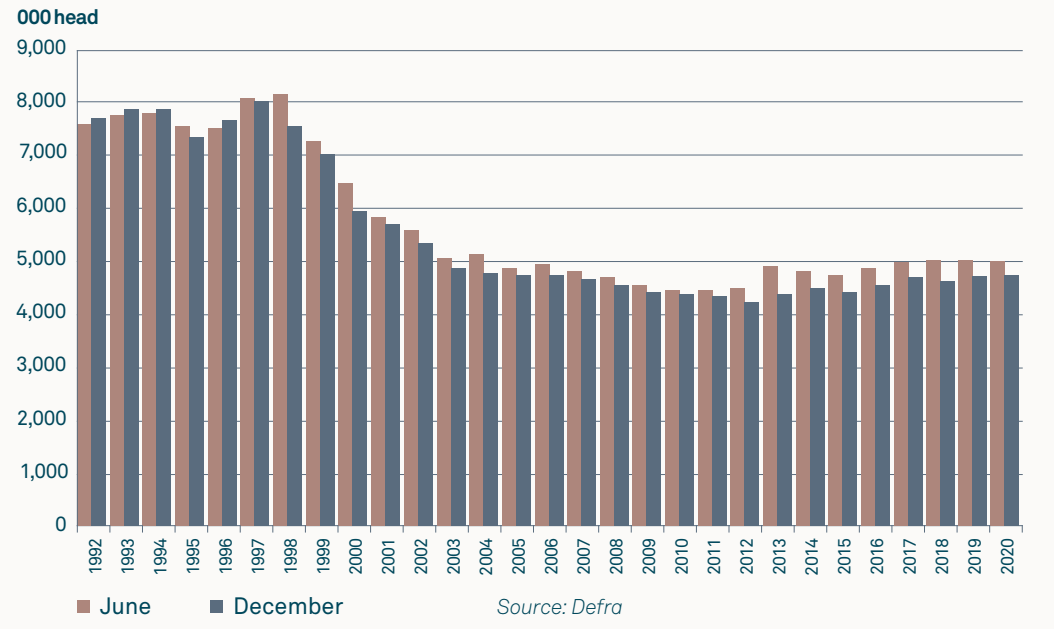


Figure 3.2 Female breeding pigs on agricultural holdings in the UK, 1992–2020

Breeding herd decline goes against anecdotal reports, especially considering the good financial position of producers up to the middle of 2020. Pig feed production statistics also show an increase in breeding feed production over the preceding 12 months. Although slaughter levels dropped in the final quarter of 2020, this is generally considered due to constraints on slaughter capacity at the time, influenced by COVID-19 outbreaks. A large number of pigs were reportedly backed up on farm at the start of 2021. We suggest some caution should be used when interpreting the annual changes in UK pig numbers reported in the census figures.

Table 3.1 Pigs on agricultural holdings in the UK, June 2018–20

Thousand head	2018	2019	2020
Total pigs	**5,012,075**	**5,078,325**	**5,054,776**
Breeding pigs	503,551	509,396	501,621
Female breeding herd	409,423	413,489	402,197
Sows in pig	289,208	295,220	295,309
Gilts in pig	57,630	57,007	56,741
Other sows (suckling or dry)	62,585	61,262	50,147
Other breeding pigs	94,128	95,907	99,424
Boars for service	12,674	12,085	11,360
Maiden gilts	81,454	83,822	88,064
Fattening pigs (incl. barren sows)	**4,508,524**	**4,568,929**	**4,553,155**

Source: Defra June Survey of Agriculture

Number and size distribution of commercial holdings

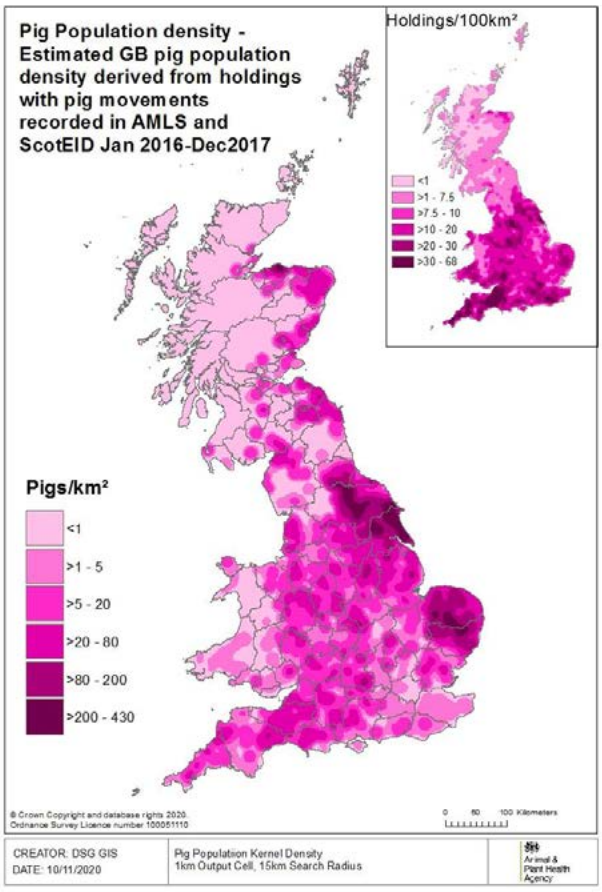
Defra figures from the 2019 June Agricultural Survey show a 4% decrease (to 10,500) in the number of UK commercial agricultural holdings with pigs between June 2018 and June 2019. This was driven by a decrease in the number of holdings with up to 299 pigs, which totalled 8,400, 5% down on a year before. Within this, the 1–9 pigs group particularly contracted (-7%). Holdings with 299 pigs or fewer contain only 4% of the total UK herd, with 87% of pigs being held on holdings that number at least 1,000. Within the total, there was also a decline in the number of farms with breeding pigs, which fell by 6% to 5,500. All holding sizes recorded a decline in numbers, though the majority of the herd remains concentrated on a few units. In the UK, 732 farms with 100 or more sows accounted for 91% of the national breeding herd. The number of holdings with feeding pigs was down 3% at 8,600, with about 3,500 of these also having breeding pigs. It should be noted that the June Agricultural Survey focuses on commercial holdings and, therefore, these statistics may not accurately reflect the number of smaller producers.

The numbers above include many holdings that keep pigs but are also engaged in other agricultural activities. Recent UK-wide figures are not available, but in England there were 1,921 specialist pig farms in 2019, a similar number to the previous year.

Location of pig producers

Pig producers are highly geographically concentrated. Of the 5.0 million pigs in the UK in 2019, about 80% were in England, 13% in Northern Ireland, 7% in Scotland and the number in Wales was less than 1%. In 2019, over 60% of England's pigs were concentrated in Yorkshire and the Humber, and Eastern England.

Figure 3.3 Estimated GB pig population density



Source: APHA

For more information, see **APHA Pig population report for GB 2019**

Abattoirs slaughtering pigs

The number of abattoirs slaughtering pigs has declined considerably over time as many small plants have stopped trading, to be replaced by fewer, larger abattoirs. During 2019, there were 103 English abattoirs killing pigs, approximately half the number in the late 1990s. Only 14 of these specialised in pigs, with the remainder also handling other species. The decline in abattoir numbers has led to a high degree of concentration. The 14 specialist pig abattoirs accounted for about 75% of all pigs slaughtered in England during 2019. In fact, the eight largest plants (including two non-specialist ones) killed over 80% of all pigs.

Workforce on pig farms

Detailed figures are available on the workforce in England's specialist pig farms for 2019. At that time, specialist pig farms employed a total of 7,800 workers, an average of four per holding. Over 50% of the workers on specialist pig farms were farmers, partners, directors and spouses, working either full-time or part-time. About 31% were regular full-time workers or managers (including part-time managers). The remainder was made up of part-time and casual workers. The number of people working on non-specialist pig farms is unknown.

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About the Pig Health and Welfare Council

The Pig Health and Welfare Council (PHWC) is a cross-industry alliance representing every stage of pig production along the chain. The PHWC aims to promote a coordinated and integrated approach to improving pig health and welfare by providing advice on areas of strategic policy and setting strategies.

The PHWC formed in 2004 to drive implementation of the Pig Health and Welfare Strategy, launched previously in December 2003. Following the review of progress, a new strategy for pig health and welfare in England was developed with the input and support of a broad range of industry organisations, coordinated by AHDB Pork (formerly BPEX) – the division with responsibility for the levy collected on pigs by the Agriculture and Horticulture Development Board (AHDB).

The PHWC recognises that its ongoing enterprises must be openly discussed with all interested parties in the pig sector and that results are communicated at all levels from the farmer to Government and Chief Veterinary Officer, when necessary. The main responsibility for the PHWC is to enhance the health and welfare of pigs in England.

Key areas of focus are surveillance and disease risk assessment, promotion of welfare and prudent antimicrobial usage through improved disease management. A longer-term priority of the PHWC is to review the methods for integration of existing and future data sources considered to be of surveillance value, to provide a comprehensive surveillance system for pig health and welfare.

The PHWC subgroups now cover the following areas:

- **Antimicrobial Usage subgroup** – reducing antimicrobial use in pig production
- **Disease Surveillance subgroup** – improving preparedness for exotic and emerging diseases
- **Pig Meat Food Safety subgroup** – enhancing pig meat food safety
- **Welfare subgroup** – enhancing pig welfare

3.1 PHWC membership organisations

Agricultural Industries Confederation (AIC) is the agrisupply industry's leading trade association. Formed in October 2003 by a merger of three trade associations, AIC has over 230 members in the agrisupply trade and represents £8 billion turnover at farmgate.

The Animal Health and Welfare Board for England (AHWBE) is responsible for strategic animal health and welfare policy, and oversight of implementation in relation to England, taking account of public health considerations.

Animal and Plant Health Agency (APHA) works to help safeguard animal and plant health, protect the economy and enhance food security through research, surveillance and inspection for the benefit of people, the environment and the economy. APHA is an executive agency, sponsored by the Department for Environment, Food & Rural Affairs, the Welsh Government and the Scottish Government.

Agriculture and Horticulture Development Board (AHDB) is a statutory levy board, funded by farmers, growers and others in the supply chain to help the industry succeed in a rapidly changing world. We want to create a world-class food and farming industry, inspired by and competing with the best.

British Meat Processors Association (BMPA) represents the majority of companies working in the British meat industry. Its members are responsible for supplying fresh meat and meat products to retailers, restaurants and food service companies throughout the UK.

British Pig Association (BPA) supports all pedigree pig breeders and can provide information on many aspects of pig keeping either directly within the office or through the different breed representatives who are pig keepers and are, therefore, in a good position to answer any questions. The BPA is a friendly organisation with a focus on conserving our native pig breeds.

Department for Environment, Food and Rural Affairs (Defra) is the UK government department responsible for safeguarding our natural environment, supporting our world-leading food and farming industry, and sustaining a thriving rural economy. Our broad remit means we play a major role in people's day-to-day life, from the food we eat, and the air we breathe, to the water we drink.

Hybu Cig Cymru (HCC) is the industry-led organisation responsible for the development, promotion and marketing of Welsh red meat.

National Pig Association (NPA) is the representative trade association for British commercial pig producers and is allied to the NFU and represents the pig interests of NFU members.

Northern Ireland Pork and Bacon Forum (NIPBF) was established to promote the local pig meat supply chain in Northern Ireland. The Forum, which comprises processors, producers, the grain trade, Government and scientists all supporting Northern Ireland interests, actively participates in market research, promotion and technical investment for the industry.

Pig Veterinary Society (PVS) was founded in 1963. It is a specialist division of the British Veterinary Association. The Pig Veterinary Society exists to assist its members to care for pigs, through dissemination of knowledge about health, disease, the pig's welfare and its management.

Quality Meat Scotland (QMS) is the public body responsible for helping the Scottish red meat sector improve its efficiency and profitability, and maximise its contribution to Scotland's economy.

Red Tractor (RT) is the flagship logo of British food, farming, and consumer safety, linking farming, food production, processing, and packing. About 50,000 British farmers work to their standards, which form the basis of buying and sourcing specifications for major supermarkets, household brands and restaurant chains, ultimately making life simpler for everyone. They are the UK's largest food and farm standards scheme and the only one to cover all areas of food production from animal welfare and food safety to traceability and environmental protection – simply put, from farm to pack. Only food that is grown and reared in the UK can bear the Red Tractor logo.

Responsible Use of Medicines in Agriculture Alliance (RUMA) was established in November 1997 to promote the highest standards of food safety, animal health and animal welfare in the British livestock industry. It is a unique, independent non-profit group involving organisations that represent all stages of the food chain from 'farm to fork'. This reflects the importance of traceability, transparency and accountability at all stages in the chain: from primary food production, through processing, manufacturing and retailing to the final consumer. Its membership includes organisations operating in agriculture, veterinary practice, animal medicines, farm assurance, training, retail and animal welfare.

Royal Society for the Prevention of Cruelty to Animals (RSPCA) is the world's oldest and largest animal welfare charity, with the primary focus of rescuing, rehabilitating and rehoming or releasing animals across England and Wales.

Trading Standards protect consumers and safeguard businesses through cross-boundary intelligence-led enforcement projects in England and Wales. It acts as a safety net for consumers by ensuring that products entering the UK and the food chain are safe. They fund national teams that are hosted within local authorities. These include the eCrime, Feed, Regional Investigations, Estate Agency, Intelligence and Scams Teams.

In addition to the formal organisations, there are producer members on all the subgroups of the council, to represent the diverse production systems within the UK. Observers invited to attend PHWC meetings include the Food Standards Agency (FSA), and the Chief Veterinary Officers (CVOs) for England, Christine Middlemiss; Wales, Christianne Glossop; and Scotland, Sheila Voas.

The council meets twice per annum, and is chaired by Dr Jane Downes BVSc MRCVS. The agenda is split between subgroup delivery updates and strategic policy debate.

The work of the Pig Health and Welfare Council would not be possible without the valued support from the secretariats. The secretariat for the Pig Health and Welfare Council, and Pig Meat Safety, Surveillance and Welfare subgroups is provided by AHDB Pork. The secretariat for the Antimicrobial Usage subgroup is provided by the VMD.

3.2 Welfare subgroup

The Welfare subgroup aims to develop strategies and initiatives to address welfare issues applicable to the diverse production methods within the UK pig industry. The subgroup aims to bring a consensus on the key pig welfare issues, through working closely with those in the pig industry, allied industries, veterinary surgeons and paraprofessionals, welfare scientists, consumer organisations and Government.

The subgroup meets twice per annum, chaired by Dr Annie Davis BVMS MRCVS. The agendas focus on knowledge exchange and coordination of activity and policy influence regarding pig welfare.

The members of the group are:

- Academia
- AHDB Pork and AHDB Pork Board
- Animal and Plant Health Agency (APHA)
- Assured Food Standards (AFS)/Red Tractor
- Buildings Forum
- HCCMPWE-Wales
- National Pig Association (NPA)
- NI Pork & Bacon Forum
- Pig Veterinary Society (PVS)
- Producer members
- Quality Management Scotland (QMS)
- RSPCA

3.3 Pig Meat Food Safety subgroup

The Pig Meat Food Safety subgroup aims to be the authoritative group for zoonotic hazards in pig meat production. This encompasses policy, surveillance, research, management and control, and, therefore, collaboration with Government, pig keepers, producers, veterinarians, processors, retailers and allied industries is critical.

The role of the Food Safety subgroup is to assist the industry in reducing the risk to the consumer from pork meat and products. The subgroup aims to develop a road map to achieve improvements in pig meat safety. This involves investigation and evaluation of current knowledge on reducing zoonotic-related food risks, and commitment from the whole industry to ensure 'whole chain' ownership of the road map.

The subgroup meets twice per annum with additional calls when required, chaired by Dr Jane Downes BVSc MRCVS. The agendas focus on knowledge exchange, coordination of activity and policy influence regarding food safety, and technical input to industry with regard to media coverage or food safety topics. The members of the group are:

- Academia
- Agricultural Industries Confederation (AIC)
- AHDB Pork and AHDB Pork Board
- Animal and Plant Health Agency (APHA)
- Assured Food Standards (AFS)/Red Tractor
- British Meat Processors Association (BMPA)
- British Pig Association (BPA)
- British Retail Consortium
- Food Standards Agency (FSA)
- HCCMPWE-Wales
- National Pig Association (NPA)
- NI Pork & Bacon Forum Pig Veterinary Society (PVS)
- Processor
- Public Health England
- Quality Management Scotland (QMS)

3.4 Disease Surveillance subgroup

The Disease Surveillance subgroup provides advice to PHWC on proposals for effective surveillance of pig health in England. In addition, the subgroup continues to focus on disease control and prevention procedures as well as surveillance. This involves continuing to identify and evaluate disease threats through various approaches to surveillance and monitoring. This information is used to formulate strategies of benefit to the UK pig industry, and to recommend appropriate courses of action for the prevention, reduction or eradication of significant diseases. To achieve this, it is important to have a close working relationship with the APHA pig expert group, which regularly reviews current and emerging disease threats.

The Surveillance subgroup works closely with the APHA Pig Expert Group, which meets regularly and produces **quarterly reports** on disease surveillance and emerging threats. The reports review disease trends and disease threats to the pig industry from either disease present or emerging in GB or those with potential to arrive in GB. Highlights include details of swine fever outbreaks around the world and information on PRRS, swine dysentery and threat from other diseases either occurring in GB or elsewhere, with the potential to enter GB.

The remit of the Surveillance subgroup covers England, with observers invited from Scotland, Wales and Northern Ireland in recognition that the UK is one unit. Members of the group have participated in a number of other committees and working groups, and make regular reports at

the meetings. The group has successfully delivered on its 2019/20 milestones, as shown in the Milestones section of this report. The subgroup meets twice per annum with additional calls when required, chaired by Professor Jim Scudamore. The agendas focus on knowledge exchange, and coordination of activity and policy influence regarding pig disease control and surveillance.
The members of the group are:

- Academia
- Agricultural Industries Confederation (AIC)
- AHDB Pork and AHDB Pork Board
- Animal and Plant Health Agency (APHA)
- Animal Health and Welfare Board for England (AHWB)
- Assured Food Standards (AFS)/Red Tractor
- British Pig Association (BPA)
- Department for Environment, Food and Rural Affairs (Defra)
- Food Standards Agency (FSA)
- HCCMPWE-Wales
- National Fallen Stock
- National Pig Association (NPA)
- NI Pork & Bacon Forum
- Pig Veterinary Society (PVS)
- Producer members
- Quality Management Scotland (QMS)
- RSPCA
- Rural Payments Agency (RPA)

3.5 Antimicrobial Usage subgroup

The Antimicrobial Usage subgroup aims to elicit change in the pig industry with regard to responsible use and stewardship of antimicrobials. This subgroup considers information on all aspects of antimicrobial usage by the pig industry and identifies crucial gaps in knowledge, such as optimising efficacy in antimicrobial administration, and investigating alternatives to antimicrobials.

The subgroup meets four times per annum, chaired by Mrs Grace Webster BVMS MRCVS.
The agendas focus on development and coordination of the delivery of the pig industry road map, to reduce usage of antimicrobials in pigs, knowledge exchange, and coordination of activity and policy influence regarding antimicrobial use in pigs. The members of the group are:

- Academia
- Agricultural Industries Confederation (AIC)
- AHDB Pork and AHDB Pork Board
- Allied Industry Group (AIG)
- Animal and Plant Health Agency (APHA)
- Assured Food Standards (AFS)/Red Tractor
- British Pig Association (BPA)
- Controlling Antimicrobial Resistance in Scotland (CARS)
- Forfarmers UK
- HCCMPWE-Wales
- National Farmers Union (NFU)
- National Office of Animal Health (NOAH)
- National Pig Association (NPA)
- NI Pork & Bacon Forum
- Pig Veterinary Society (PVS)
- Producer members
- Quality Management Scotland (QMS)
- RSPCA
- RUMA
- VMD

4

Review of the 20:20 vision for Pig Health and Welfare

The vision in '20:20 Pig Health and Welfare for 2020' was established in 2012, to be 'An English pig herd where health and welfare are continually improving, which results in better pig performance, the production of a safe and quality product, reduced environmental impact and increased sustainability of an industry that contributes fully to national food security.'

This vision has continued under the new structure of the Pig Health and Welfare Council (PHWC), but with a more streamlined and targeted approach to try to achieve the same objectives but with a clearer direction on key topics that have been identified as potential issues for industry.

Following the restructure of the PHWC in 2014, the approach taken to continue the delivery of the 20:20 vision, was to restructure the PHWC around strategic themes. It was decided that the thematic subgroup approach already established for welfare and surveillance would be adopted for the two remaining themes regarding food safety and antimicrobial drugs.

4.1 20:20 Pig Health and Welfare for 2020 objectives

1. Support pig producers in delivering their objectives for continual improvements in pig health and pig welfare.
2. Eliminate or control significant enzootic pig diseases locally, regionally and nationally.
3. Eliminate or control significant infections of food safety and public health concern (e.g. Salmonella).
4. Develop and promote new knowledge on the assessment of welfare outcomes.
5. Promote the open exchange of information on the disease status for herds and regions.
6. Promote and encourage responsible and appropriate use of antimicrobials.
7. Maintain freedom from notifiable exotic and emerging diseases of pigs.
8. Deliver an integrated approach to improving pig health and welfare with all stakeholders, allied support industries, retailers, foodservice and Government.

4.2 Pig Health and Welfare for 2030 objectives

Eight years after the launch of the 20:20 Pig Health and Welfare for 2020, the industry has made significant progress, and the eight themes included in the objectives remain relevant for the pig industry today. The PHWC has built on those objectives and has agreed a new overall objective with six main areas of focus to take the industry forward from 2021:

The overall objective is to support the pig industry in achieving an integrated approach to: enhance the health and welfare of the pig herd, and enable assurance that pork products are safe to eat, and produced from pigs whose health and welfare needs have been met.

Objective 1 – Partnership working

1. Lead an alliance of all stakeholders in the pork chain, producers, processors, allied support industries, retailers, foodservice and Government, to provide quality animals and products.
2. Design health and welfare strategies with consideration for the impact on the environment and in line with evidence-based best practice to meet consumer demands.
3. Draw up a roadmap to success, enabling target projects to be supported and funded.
4. Work with those responsible for delivering skills strategies to ensure that industry needs are met.
5. Support producers and veterinary surgeons in their delivery of integrated farm and/or area-specific programmes to improve pig herd health.
6. Support the industry in becoming self-regulating and take appropriate action to ensure standards are always maintained.

Objective 2 – Maintain and extend our disease surveillance system

1. Assist with the further development of a syndromic surveillance system.
2. Encourage all to invest in data systems that are fully coordinated, to enable better use of all information being collected.
3. Support the maintenance and further development of an accurate pig register, linked to a detailed mapping system and the electronic medicines book, to assist disease control programmes and to monitor antibiotic usage.
4. Encourage membership of the Disease Charter to include 92% of pigs for purposes of information sharing, disease alerts and disease controls. Increase the range of diseases included in the charter.
5. Encourage the introduction of routine surveillance of wild animal populations of importance to the pig industry, particularly feral pigs, to mitigate disease risk.

Objective 3 – Reduce, control, or eliminate endemic and zoonotic diseases including those with food safety implications

1. Keep an updated register of pig diseases and their impact on health and profitability.
2. Promote programmes to reduce each key disease.
3. Encourage identified behavioural change that impacts disease prevalence.
4. Identify barriers and gaps in knowledge that prevent the successful implementation of disease reduction programmes. Make proposals for the removal of those barriers, including research requirements.
5. Promote the use of improved biosecurity systems at each critical point in the animal/food chain.
6. Promote the further development of individual farm health plans to include food safety challenges.
7. Evidence the need for responsible use of veterinary medicines to maintain the health and welfare of pigs and food safety.

Objective 4 – Provide robust evidence that all production systems provide physical and mental wellbeing

1. Assist with the collection of data to demonstrate high welfare standards are being achieved across the whole industry.
2. Provide pig owners with advice and guidance to help achieve compliance with changing welfare expectations and welfare codes.
3. Identify and communicate welfare issues that may arise from changes in production methods.
4. Encourage and support the rearing of pigs with intact tails.
5. Identify and promote environments that protect piglet and sow physical and mental wellbeing.

Objective 5 – Encourage use of data and new technologies

1. Support the development of affordable farm early warning technologies such as measures for feed consumption, water consumption and stressors.
2. Encourage the development of tests for rapid and accurate diagnosis, enabling correct use of veterinary medicines, reducing antimicrobial usage.
3. Disseminate information and technologies that contribute to early warning of health and welfare issues.
4. Identify and assess new technologies, such as gene editing for compliance with PHWC aims.
5. Proactively support the introduction of novel technologies such as precision livestock farming, which contribute to food security, reduce environmental impacts, improve productivity, and consequently reduce disease and the subsequent use of veterinary medicines.

Objective 6 – Promote professional skills

1. Demonstrate and promote pork production as a professional career pathway and aid the development of approved training and onward professional development.
2. Encourage the industry to require competencies to be achieved before taking responsibility for the care of pigs.
3. Support the continuation of our national expertise in pig health and welfare, nutrition, genetics, housing, and other allied disciplines.
4. Support the development of automation and data-driven machine learning (AI), to improve the living environment for pigs and the work environment for stockpeople.

5

Activity 2019–2020

5.1 Welfare

Housing

Close involvement with other areas of the industry has long been acknowledged as essential to achieve a holistic view of welfare issues. To this end, the Welfare subgroup has welcomed the participation and input of the Buildings Forum. Significant investment is required in replacing or upgrading pig housing to ameliorate current challenges and continue improving welfare. Such investment requires confidence on the part of the producer and the building companies concerned, to ensure compliance with existing requirements and to anticipate future ones. Recent work on ammonia emissions will prove informative in line with the welfare code requirements to monitor the pig environment.

Welfare code

Implementation of the welfare code, enacted in early 2020, has been a major task of the group. Collaboration between Defra policy, APHA, the Pig Veterinary Society and the NPA was a significant part of the year, ensuring transparency in what was required and clarity on how it would be audited.

Red Tractor standards review

The Red Tractor Standards are undergoing review and updating. The group has been involved in the review process, supporting or challenging changes to the standards, to ensure they are defensible and also necessary to protect the welfare of pigs and producers. This process has identified areas where further work needs to be done to ensure that positive benefit to the pigs and the industry justifies (in some instances) considerable impact and cost.

Tools for on-farm management

The group continues to evaluate experience and research from producers, scientists, nutritionists, vets, and others in the area of vice and aggression on farm. Various tools are becoming available for producers to assess their units, such as the AHDB WebHat tool and the examples gained from the AHDB Strategic Farms. Evidence and experience from producers are invaluable; continuing to support data collection and the transfer of knowledge gained from trials is also critical.

Stockpeople training

Ongoing is the development of online welfare training material for stockpeople on farms. The skill of stockpeople has long been recognised as paramount in the welfare of pigs under their care; the construction of formal, accredited training has been undertaken, with an initial set of modules around pig handling due to be available later this year. Plans for further modules to cover other aspects of management are in place.

Welfare in Transport

Group members responded extensively on proposed changes to the Welfare in Transport legislation. The increasing distances both finished pigs and cull animals are having to travel, and the impact breakdowns, COVID-19, and unforeseen interruptions on the supply chain have become more concerning, as all these situations have arisen in the last 18 months.

Welfare at farrowing

Welfare at the time of farrowing remains a focus, the NPA are collecting data from units operating different farrowing systems to achieve a robust base from which to support or challenge any proposed legislative changes. Reviewing studies from Europe is ongoing to ensure we can be informed of best practice for sows and piglets around the time of farrowing and lactation.

Piglet euthanasia

The euthanasia of neonatal piglets is a contentious and ongoing issue. The group supports and will encourage and facilitate industry engagement and collaboration with Defra and APHA to find a robust, practical and acceptable solution that does not adversely affect welfare.

Real Welfare update report

The Real Welfare update report (2018–2020) provides a summary of the progress and influence the AHDB Real Welfare scheme has had on the pig industry over the previous seven years. The Real Welfare Scheme provides a positive impact, particularly in providing support to decrease lameness, severe body marks and improve hospital pen management. The report details that the prevalence of the main welfare outcomes shows a decreasing trend over time, aside from severe tail lesions, and that the majority of farms are either addressing welfare issues or already have them under control.

5.2 Food safety

The Food Safety subgroup receives regular reports from Public Health England in respect of zoonotic diseases from pigs. Over the 2-year period 2019–20, there have been no major outbreaks of food poisoning incidents linked to pork products. During 2020, there has been a reduction in the reports of all Salmonella human infections, and this may be linked to the impact of the COVID-19 pandemic controls and changes to eating patterns. Cases of human hepatitis E have risen slightly, but without raising any cause for concern. The Food Safety subgroup also works closely with the Food Standards Agency, with the aim of providing actions on farm that will reduce the risk to the consumer from any pork product. Data published by the FSA is monitored by the subgroup for trends, for example, **Pig Condition data**.

Salmonella

Salmonella remains the highest causal risk of food poisoning for consumers of pork meat.
The Food Safety subgroup worked with APHA to find a method of measuring Salmonella prevalence at minimum cost. APHA obtained permission to use samples taken for statutory surveillance for LA-MRSA for Salmonella testing. The results showed that the prevalence of Salmonella remains similar to that of the 2014 industry survey, being some 34% of the pig herd. Industry testing of carcases shows less than 1% of carcases post-processing test positive for the presence of Salmonella, which indicates that the hygiene controls practiced at the abattoir are effective at preventing contamination of the carcase during dressing, and the risk is being well controlled at this point in the food chain. Work was undertaken to corroborate the industry results, but laboratory controls on the introduction of faecal pathogens prevent the work from continuing.

It remains a key aim to reduce Salmonella prevalence on farm and on its transfer between farms but this can be an issue where pig and poultry farms are located close together, especially if either is outdoors, as Salmonella can spread between pigs, poultry and wild birds. As poultry is subject to a National Control Plan, which includes the culling of some positive flocks, infection can have serious implications and financial impact on the poultry industry. A core group including members of the poultry industry are working together to identify ways of reducing the risk of disease transfer between species. The pig industry is being aided by the now available Salmonella vaccine. APHA is carrying out research into the efficacy of the vaccine and the effects on Salmonella prevalence within a pyramid when the vaccine is used at primary and multiplier herds. The results reported to the Food Safety subgroup indicate that the vaccine is a useful addition to the controls available to the producer but will not achieve its maximum effectiveness unless good biosecurity is also practised.

Hepatitis E

A roundtable event was held in 2019 to identify the known and unknown facts relating to hepatitis E virus. The event has been followed up by a core group, which includes the British Retail Consortium and major retailers. Working together has enabled members to recognise the challenges this virus presents to each sector within the pork chain, and the research required to provide evidence for sound and cost-effective recommendations for risk reduction. The greatest risk is presented by pigs with a high viraemia level entering the food chain. A reduction route is through identifying and holding these animals, or by eliminating the virus in the processing or cooking phases. The FSA's research programme is addressing some of the critical questions including routes of transmission, the optimising of extraction and detection of the virus and routes of transmission. AHDB funded further research with the Royal Veterinary College (RVC) to provide a mathematical model for risk management. The results of this work will be taken into consideration as soon as possible. The group has created an intelligence hub to hold a single point of information for key questions and answers. The hub will be updated as information becomes available from the research projects providing a source for evidenced-based decision-making.

LA-MRSA

Livestock Associate Methicillin Resistant Staphylococcus aureus (LA-MRSA) is known to have developed resistance to certain antibiotics. It has been identified in livestock in various countries throughout the world and has recently been reported in a small number of animals in the UK. Measures to protect public health have been considered but currently the risk to the general public of colonisation or infection with LA-MRSA is low in the UK. The FSA has confirmed the risk from eating and handling meat is very low. Measures are needed, however, to protect the health of those working in regular close contact with live pigs, their families and the vets that work in the industry. Research has shown that stockmen and vets in regular contact with pigs frequently become carriers of the bacteria and test positive for LA-MRSA, becoming negative after 24 hours of ceasing contact with pigs.

The group is creating an information hub including questions and answers that address any public concerns and provide a single source of information for farmers and vets, which includes health and safety considerations and biosecurity measures to be used on farm. It addresses the need to raise awareness among pig producers of LA-MRSA and how to protect themselves, their families and close contacts who may be immunocompromised, and others, such as hauliers and vets who come into contact with their pigs. It also makes recommendations for pig producers to advise their doctor that they work with pigs, particularly when requiring a hospital stay.

The EU is requiring members to undertake sampling and testing for LA-MRSA for surveillance purposes and to set a baseline per country. In order to maintain the English export market, it is likely that surveillance will be in line with EU requirements. These results will provide data for future control strategies.

Trichinella

Trichinella is a parasite that can be found in pigs and wildlife such as fox and feral boar. Significant numbers of pigs are tested post-slaughter and no positive case has been identified in England since 1976. Testing levels are set to increase in 2021 to meet the requirements for export to the EU although there is ongoing work to agree a definition for controlled housing conditions, which would enable the exemption of some pigs from the testing regime.

5.3 Disease surveillance

Disease control

Contingency plan for PEDv

A new version of the contingency plan with a revised layout was prepared in 2019. Desk instructions have been prepared for AHDB, which would coordinate the action against PED in the event of an outbreak. The proposed PED exercise to test the revised plan was due in the autumn of 2020 but is on hold due to the need to avoid clashing with the proposed ASF Exercise Holly by Defra, which had been postponed. A PED exercise is now planned for autumn 2021, led by the Pig Health and Welfare Council. The contingency plan has been developed in such a way that it could be used for other endemic, new and emerging disease, if required.

Epidemiology training

A PED and epidemiology training course was held by APHA and AHDB in July 2019 for six practising vets who have been trained as field epidemiologists to carry out the epidemiological investigations in the event of a PED outbreak. Contracts were agreed to retain the field epidemiologists on a standby basis. Ongoing training on a regular basis will continue. While this programme has been developed in the context of PED, the epidemiological expertise would be available for investigating new and emerging diseases if that became necessary. Face-to-face training sessions for the epidemiologically trained vets were not possible in 2020 but an online resilience training session is being considered.

Significant Diseases Charter

The Significant Diseases Charter is an important component of the contingency plans for swine dysentery and PED by overcoming confidentiality issues and enabling mapping of diseases in commercial herds. One of the constraints to sharing information quickly in the event of a disease outbreak is the need to obtain permission from a producer of a suspected or positive holding to inform other producers. By signing up to the Charter, producers agree to report the suspect PED or confirmed swine dysentery case to AHDB, which can then send an email notification to other Charter members. This details the outcode of the affected unit to enable producers to take precautions to minimise the spread of infection. If a producer is not a member of the Charter, notification cannot be sent to other Charter members without obtaining permission, which can take time and may not be given, resulting in a possible delay in disease containment. Allied industry organisations such as feed manufacturers, processors and hauliers can also sign up to receive the region of the outbreak. Details are not notified to non-Charter members.

AHDB has been promoting the Charter since June 2018. By November 2019, approximately 69% of pigs moved were covered by the Charter. At this stage, unless more producers signed up to the Charter there would be a limitation on the ability to pass on information more widely. AHDB has continued to promote the Charter and there has been a steady increase in producers signing up.

During 2019/2020, the success of the Charter relied totally on the voluntary commitment from producers and their vets to raise the alarm, should they experience a disease breakdown. If endemic diseases are to be controlled, it is essential that details of outbreaks can be made available to enable appropriate controls to be implemented by farmers and others. By September 2020, the Pig Health and Welfare Pathway (Pathway) recognised that increasing Charter membership was an important priority for recording, communicating and controlling specific diseases. This could be achieved by increasing Charter membership through inclusion in Red Tractor Standards, which would mean that 95% of pigs moved to slaughter would be covered by the Charter. A consultation was launched by Red Tractor in November 2020 to update the standards, which included a proposal 'that all units must be a member of the AHDB Significant Diseases Charter and report in line with the terms and conditions'. This recognised the importance of timely sharing of information about disease outbreaks. If this proposal is accepted, the revised Red Tractor Standards will come into force in November 2021.

Following consultation with industry, the scope of the Charter could be extended to include a number of other endemic diseases such as PRRS agreed as priorities following industry consultation. The Surveillance subgroup has a role to play in this by reviewing the priority diseases and making recommendations.

Emerging disease template

The emerging disease template is a generic document for use within the pig and other livestock sectors. It outlines the assessments needed to identify whether a new and emerging disease is a threat and the appropriate actions needed to mitigate the threat. The Surveillance subgroup reviewed the template document and suggested a number of changes. The final version remains a mechanism for considering future incidents, which may or may not lead to a disease being made notifiable. It also details areas requiring assessment, and the required procedures for deciding if a disease should be made notifiable.

Pig transport vehicles

With the spread of African Swine Fever (ASF) on the continent and swine dysentery (SD) in England during 2019, the Surveillance subgroup recognised the importance of vehicle hygiene and highlighted the risks posed by contaminated livestock lorries. Previous modelling using real-time eAML2 pig movement data and accounting for local spread, showed how quickly ASF could spread rapidly across the country if it entered major pig-producing areas. Putting in the additional time at the wash bay could make the difference between spreading the disease and not.

The **'#MuckFreeTruck'** lorry wash campaign was launched by the National Pig Association and AHDB Pork, and endorsed by the four Chief Veterinary Officers in 2019. This promoted the need for pig producers, processors and hauliers to ensure livestock lorries were properly cleaned. A survey of hauliers was carried out in 2019 by AHDB to identify potential problems.

The results indicated that British Quality Assured Pork assured that abattoirs generally had the facilities required and that drivers felt they were fit for purpose. Many of the challenges reported were from smaller non-assured sites and mixed species abattoirs. There was also some feedback from hauliers that they were not always given any specific training on vehicle washing. As a result, AHDB worked with the BMPA, Road Haulage Association, Red Tractor and AIMs to build a specific vehicle washing module to fit into new driver training programmes and for refresher training. A vehicle washing checklist has also been produced and a short training video is being designed as part of the programme.

Exclusion testing for notifiable disease

Exclusion testing involves samples being sent for testing where a disease such as ASF is a possibility but not suspected so avoiding the premises going under formal disease restrictions. The Surveillance subgroup considered that, in principle, exclusion testing was a good idea as it could act as an enhanced surveillance option and could demonstrate freedom from disease.

Schemes are already in operation in the Netherlands and Germany. In the Netherlands, about 90 submissions are tested each year. The farmer pays for sampling and the Government pays for testing. They also carry out tests on tonsils going through labs for post-mortems. The German scheme has been running for some time and requires testing when certain criteria are reached, although how it is funded is uncertain. In the USA, testing is carried out for swine fever in cases of PRRS because mild ASF can resemble PRRS.

The **UK exclusion testing scheme** for notifiable avian diseases started in 2014. There have been about 41 tests for avian flu since the scheme started. This averages approximately 5–6 tests per year. The scheme has helped detect low path Avian Influenza. Exclusion testing is also available for West Nile fever in horses.

The concept of testing for exclusion, in particular for swine fevers was supported by the Surveillance subgroup, which provided comment and input to discussions and plans with Defra and others to develop an effective scheme. The CVOs commissioned a review of the avian exclusion testing scheme and intend to complete and analyse this before considering establishing a scheme for the swine fevers in pigs.

Compartments

The Surveillance subgroup continued to discuss the need to develop compartments for the pig industry. One outbreak of ASF in a previously ASF-free country, whether in domestic pig, feral pigs or wild boar can result in a ban on all exports of live pigs and their products. In 2020, Germany lost its export market to China and many other countries following the declaration that ASF had been found in the wild boar population.

The primary purpose of considering compartments for pigs in the UK is to develop a proactive approach to mitigate the risk of trade suspension in the event of a serious disease outbreak, e.g. ASF or CSF. Compartments are defined by the World Organisation for Animal Health (OIE) as 'one or more establishments under a common biosecurity management system containing an animal subpopulation with a distinct health status'. In practice, a compartment is defined primarily by management and husbandry practices relating to biosecurity. Full details of the requirements are provided in Chapter 4.4 of the **OIE Terrestrial code**.

Compartments for fish and poultry already exist in the UK. In 2019, the Surveillance subgroup received a number of presentations including one from the poultry industry on the way in which their compartments operated. Contingency planning to ensure exports could continue in the event of a serious disease outbreak remains a priority.

Industry responsibilities for control of animal diseases

A paper entitled 'Response to the Risk of Entry to Great Britain of Exotic Diseases of pigs which are not controlled by Government' was prepared by AHDB and discussed by the Surveillance subgroup in June 2020. The purpose of the paper was to provide a mechanism by which industry could deal with a new exotic disease such as PED or PRRS-2 incursion into the UK. It reflected increasing industry concerns that there is currently no mechanism to deal with exotic imported pathogens or their variants that are not controlled by Government.

When an actual risk presents itself, there is a short window of opportunity for the industry to act to eliminate the risk, before the disease can take hold and spread within the pig population. To take advantage of that short window, there needs to be a mechanism in place that is ready to go, requiring only a swift and case-specific approval. The paper describes such a mechanism in detail and the principle that it should be self-funding. Legislation is required to enable industry to raise funds in order to implement control procedures in the event of a disease outbreak and to develop procedures by which producers could receive money for culling pigs. A similar mechanism would be needed in the event of an ASF outbreak where culling for welfare reasons might be required. The Surveillance subgroup gave its support to the proposal, which will be discussed by the Animal Health and Welfare Board for England.

Disease surveillance

Syndromic surveillance

The Pig Syndromic Surveillance roundtable discussion held in 2016 made a number of recommendations. One of these was to develop an app to be used by vets to report disease incidents on pig farms. Following this, APHA carried out user research with the main pig veterinary practices in the summer of 2017. The development of the app was in abeyance for a period in 2019 and early 2020 for various reasons. Later in 2020, APHA undertook an external supplier search for the app development and received a number of cost estimates which informed a bid for funding in the year 2021/2022.

However, during 2020, there were several new situations/initiatives which affected the pig industry. These include the impact of Brexit, the development of the Livestock Information Programme, and proposed Pig Health and Welfare Pathway for England. As a result, it was considered timely by APHA to revisit where a pig syndromic app should sit within the other data collection systems used by pig farmers and vets, and whether there were new ideas about how it could be implemented to the benefit of the pig industry and pig disease surveillance. It was considered that there were new opportunities that were not available when the concept of the app was first conceived.

The proposal for a Pig Health and Welfare Pathway in November 2020 recognised the importance of surveillance and that syndromic surveillance is one of the proposed areas for development. The Pig Hub held by AHDB currently links into several databases into which producers or their vets input information. Pig Hub has been developed by AHDB as a single pig industry database for all producers. It provides individual producers with access to their details as well as enabling them to have control over who can see their information.

In view of these initiatives, the approach to the development of pig syndromic surveillance needed to be adjusted so that it would integrate with AHDB PigHub and become another linked database, rather than a stand-alone system. This also avoids duplication of effort, is likely to assist in clear data management and ownership, and makes it more likely that there will be data entry. This work will continue in 2021/2022 along with the developments of the Pathway and the **Livestock Information Service (LIS)**.

GB pig disease surveillance dashboard

GB pig disease surveillance dashboard was launched in October 2017, and is updated monthly. It is an online resource developed to share the surveillance information from 2012 onwards derived from submissions to the GB veterinary diagnostic network. Since then, an interactive PRRS dashboard for GB has been developed using data on the PRRS diagnoses extracted from the Veterinary Investigation Diagnosis Analysis Database from 2012 to 2019. The interactive service enables veterinarians and others to obtain a wide range of information on PRRS including details of yearly diagnoses, age group, symptoms, clinical signs, seasonality and geographical distribution of cases for any time period. The **interactive map which shows PRRS diagnoses** and which can be searched using a number of filters is of particular value, although it must be recognised that the level of disease in specific regions cannot be inferred or compared as the disease status of non-submitting herds is not known.

AHDB Pig Health Scheme

Since it's relaunch in 2019, membership of the **Pig Health Scheme** has seen huge increases and currently covers 81% of all slaughter pigs. Due to COVID-19, the scheme was suspended in March 2020 and work is currently underway to begin assessments again when it is safe to do so. English pigs at slaughter are monitored for prevalence and severity of 12 conditions by specially trained assessors. The information can be used by the producer to identify the current health status of the herd, monitor the effects of management changes and inform decisions around disease control. At a national level, the scheme will provide valuable information about the 12 conditions and make an important contribution to the overall surveillance system for pigs.

Archive of serum and tonsil samples

Between March and July 2019, 700 blood and tonsil samples were collected from slaughter pigs to create an archive. Sampling was stratified across the main 11 abattoirs that slaughter larger numbers of pigs. Sampling dates were randomly allocated and pigs were randomly selected from within a batch. The archive can be tested as required to provide national prevalence data for endemic or emerging disease threats. APHA will store for future testing over a five-year period. Testing the archive to provide national PRRSv-1 and PCV3 prevalence for the slaughter pig population has been undertaken to provide a baseline for possible future control through the Animal Health and Welfare Pathway.

Top 10 questions

The Surveillance subgroup created the 'Top 10 Questions' document in 2015, with modifications in 2016. The document was developed as the Surveillance subgroup recognised there are several basic features of pig units which, if recorded systematically for all units via an annual census, would be of benefit to the pig industry, and Government and its Agencies. Benefits would include:

- Up-to-date knowledge of which units are active, i.e. keep pigs
- Assist disease outbreak investigations – notifiable and other to identify risks, prioritise tracings and guide surveillance
- Provide better information for pig population demographics and monitoring changes over time
- Improve intelligence for small pig units
- Allow targeted messaging to certain unit types/sizes
- Reduce time spent by pig producers responding to researcher questionnaires (this is the original reason for this action being suggested)

More detailed discussion about how this might be applied, data confidentiality, data usage and funding was needed. The document was reviewed by the Surveillance subgroup in June 2020 taking into account members' comments. The details were passed to the LIS team, although if they are unable to include the 10 questions into their database other options would need to be explored.

Priority diseases

The pig industry has long recognised the relevance of endemic disease, both to the bottom line and for the welfare of the animals in their care. In the past, the Surveillance subgroup has proposed a priority list of endemic disease that have economic and welfare implications. It would be possible to reduce the prevalence or eliminate them entirely. The list includes PRRS, Swine Flu, *Streptococcus suis* 2, swine dysentery and Salmonella.

Disease situation

Information on disease and the threats they pose to the GB pig industry are obtained from a number of sources. The **APHA International Disease Monitoring** team monitors and carries out risk assessments on the progress of exotic diseases around the world to evaluate the potential risks of those diseases entering the UK. Mitigating actions and issues are considered to reduce the risk of introduction. This activity is also informed via representation on the APHA pig expert group, and personal contacts between Surveillance subgroup members and their international contacts, which is also useful for information on non-statutory exotic threats, such as Senecavirus A.

African swine fever

Defra continues to publish qualitative risk assessments concerning the risks to the UK from ASF on the European continent, China and the Far East. The Defra reports conclude that 'the overall annual risk level is considered to be medium because of the combination of the pathways for introduction'. **Risk assessments** published in 2019 covering Eastern Europe, China and Wild Boar in Belgium, while in 2020 they included Eastern Europe, Germany, South East Asia and Oceania.

Outbreaks of African swine fever in domestic pigs have been continually reported throughout 2020, in Eastern Europe. Poland, Romania, Russia and Ukraine are the main countries affected, with a large number of outbreaks in domestic pigs reported in Romania mainly in small holdings. ASF continues to be reported in wild boar across much of Eastern Europe, and parts of Germany close to the border with Poland. Strict measures were imposed in Germany including increased biosecurity; no free-range holdings or use of paddocks; no use of hay, straw or green feed; investigation of all pigs, dead or with fever; restrictions on movements.

ASF has been confirmed in many countries across Asia and Oceania. Such widespread infection in the different countries indicates the potential for further spread of ASF into and within the domestic pig and wild suid populations in South East Asia. A variant of ASF virus was identified in several herds in China during 2020 and appears to be a naturally attenuated virus that has evolved from the original strain. The clinical signs due to the variant are milder and present as PRRS-like reproductive syndrome in sows, with stillbirths, abortions, mummifications, embryonic deaths, infertility and poor viability neonates, and chronic disease with poor performance in growing pigs.

On 22 October, Russia reported that traces of ASF had been found in pork products in several regions. The DNA of ASF was detected in sausages produced by a meatpacking plant from the Voronezh region (bordering with Ukraine), and then stored in a warehouse in Veliky, Novgorod. These products were supplied to several central regions of the country creating a significant risk of spreading the virus across other regions of the country.

The importation of meat products across borders continues to pose a real risk of transmitting ASF. In 2019, USDA released information that USDA-trained detector dogs were instrumental in the discovery and seizure of one million pounds of prohibited Chinese pork coming into the US through the port at Newark, New Jersey. In Australia, declared and seized pork jerky, sausages and pork products in late 2018 and early 2019 were shown to have fragments of ASF DNA in a number of the samples. Similar findings have been seen in a number of other countries where pork or pork products have been seized and tested.

The Surveillance subgroup was concerned about lorry drivers arriving in the UK, overnighting in laybys near to outdoor pig units where there was the potential for discarded food to be eaten by pigs. The subgroup recommended that some form of publicity about the risks was necessary and that signage should be placed in laybys, wherever possible. The NPA urged producers with outdoor pigs in particular to put up signage in paddocks next to public footpaths and with public rights of way, telling people not to feed the pigs due to risk of spreading disease.

There are also concerns about the illegal importation of infected pork into the UK from Asia.

Free signs and posters, some in a number of languages, are available from AHDB Pork. Publicity campaigns are in place to inform the public and discourage individuals from bringing pork products into the UK, including targeted messages to key stakeholders such as road hauliers, hunters, pig keepers and veterinarians.

Feral wild boar

The Feral Wild Boar Working Group continues to meet quarterly and has produced an action plan to develop communications, collate existing research and identify areas for future work. The group provides a platform for local landowners, industry bodies and Government to collaborate. The group has been considering a research project to locate boar across the country. One method involves painting a beech resin attractive to boars on trees. The boar would rub against the tree leaving behind hair stuck in the resin. An initial test would be conducted in the Forest of Dean to ascertain how wide apart to paint the trees. This could then be taken wider to other forests in the country and other areas to look for indications of boar from testing hairs stuck in the resin. The results could then be mapped. There was no current funding for this project but an estimate of the costs would be £80,000 over three years.

The Forestry England annual population survey suggests that the wild boar population has decreased from 1635 in 2019 to 1172 in 2020, despite a short suspension in targeted culling due the COVID-19 restrictions. In June, they restarted their cull in the Forest of Dean. By September, Forestry Commission England had met their cull targets in the Forest of Dean. Culling continues and staffing is now back up to full strength. Staff have been trained to take samples from dead animals for testing. Feral boar were identified in Somerset in 2020 where it is believed they were released into the wild. A cull was successful in controlling this population.

Current status of PEDv

The last diagnosis of PED recorded in the GB diagnostic database (VIDA) was in 2002 on a farm in England. PED due to any strain remains notifiable in England and Scotland and suspicion of disease, or confirmation of infection, must be reported. There has only been one suspect case of PED since the disease was made notifiable in 2015. No suspect cases of PED were notified in 2019/20. Routine weekly batch PEDV PCR testing of non-suspect cases of diarrhoea in pigs continued at APHA. None tested positive for PEDV in over 1160 diagnostic submissions tested under AHDB Pork funding between June 2013 and December 2020. A small number were from Wales, with the remainder from England. Samples taken in Scotland are sent to SRUC for testing.

A paper describing a German PED outbreak in 2019 confirmed that active PED infection continues in Europe, although not involving the virulent strains detected in Asia, North America, the Ukraine and elsewhere. The PED virus involved in this outbreak was similar to those detected in Germany in 2014 and to the S-INDEL strains in the US, which are generally considered less virulent. However, viral evolution continues to occur and the genetic drift gives rise to a new cluster that comprises recent strains from Germany, Hungary, and France.

The continuation of active PED elsewhere continues to support the testing requirements of the National Pig Association import protocol when live pig imports are planned.

Porcine Reproductive Respiratory Syndrome (PRRS)

The 2019 data have been uploaded into the **PRRS dashboard**. The diagnostic rate for PRRS in GB submissions increased, with an upward trend in 2020. The tendency for a seasonal rise in PRRS diagnoses during the cooler winter months observed from 2008 to 2015 has not been such a clear feature in these data since 2016. There are no diagnoses involving PRRS genotype 2 in GB pigs and none of the PRRSv-1 sequenced at APHA in 2019/20 have detected exotic PRRS strains. However, the ORF-5 gene sequencing of PRRSv strains detected in diagnostic submissions indicates that the virus continues to become more diverse. It remains a prominent diagnosis, with some clinical issues being found in some vaccinated herds.

A recombinant vaccine virus was discovered in Denmark, which was unusual as it appeared to be a combination of two vaccine viruses producing a virulent virus. Using live vaccines together can increase the chance of recombinants occurring.

A joint Defra-industry working group developed a project to improve productivity in the English pig sector by reducing the impact of PRRS. Subject to successful procurement, the project would be delivered under the Rural Development Programme for England (RDPE) and would offer specific biosecurity advice to pig farmers based on their current PRRS status. RDPE funding could cover training, advice, mapping and diagnostic testing to support advice but could not cover capital costs and would be restricted to England. PRRS testing would be offered if the farm status was unknown or unclear.

Defra issued an invitation to tender (ITT) on 11 March 2020, with an anticipated contract start date of 20 May 2020 but with the impact of COVID-19, the invitation was reissued on 10 October 2020. The ITT indicated that the contract start date would be 4 January 2021 with duration of 2 years and 3 months. Unfortunately, no bid was accepted and the funds for the project are no longer available.

The development of the Pig Health and Welfare Pathway reached a key stage at the end of 2020. The final version of the Pathway proposed an industry-led partnership with Defra to develop a national control plan to reduce the impact of a priority list of endemic diseases, with the control of PRRSv being the primary focus. It is likely that the Surveillance subgroup will act as an advisory body on PRRS control including testing, vaccination and biosecurity. This would involve either proactively or reactively investigating PRRS issues and providing advice and comment as necessary.

Swine dysentery

In 2020, there were 13 diagnoses of swine dysentery (SD) in GB compared with 29 in 2019 through **VIDA**. During 2020, diagnoses were recorded in submissions from Wales, Scotland, and several counties in England. This all indicates the potential for spread of *B. hyodysenteriae* in different regions and the need to maintain biosecurity measures. Some cases have involved relatively mild diarrhoea, and typical signs of swine dysentery (muco-haemorrhagic diarrhoea) are not always seen. It should be noted that VIDA records capture diagnoses of SD, not detections of *B. hyodysenteriae* made from submissions monitoring herd status without associated clinical signs.

There is diversity in the strains that are being detected. When *B. hyodysenteriae* isolates are provided from either diagnostic or monitoring submissions, antimicrobial sensitivity testing and whole genome sequencing are carried out. Whole genome sequencing identified ten multi-locus sequence types (MLST) in the 2020 isolates, five of which had not been identified in isolates that have been sequenced previously within APHA.

5.4 Antimicrobial usage

Additional functionality added to the eMB Pork

The timeliness and accuracy of submissions to the eMB (electronic medicines book) has continued to improve and with four years of data now collected, patterns of use are becoming apparent. The data for the last quarter of 2020 has still to be finalised, but the reduction in use from the starting point in 2015 of 278 mg/PCU has now reduced by about 63%. This reduction has been achieved despite widespread outbreaks of swine dysentery in the UK in 2019, which resulted in increased use of antibiotic for treatment and disease elimination programmes, and caused the national use figure to stall in its reduction. It is likely as we reduce our use of antibiotics that similar episodes will have more of an impact on the national aggregated figure. Benchmarking within the eMB system has been refined and now offers a group report for businesses with multiple sites and also for veterinary practices.

Persistently high users project

This Defra-funded surveillance project used eMB data analysis to select candidates, and offered free post-mortem and diagnostic investigations to enable improvements to health, management or infrastructure. In 2017, producers using over 300 mg/kg of antibiotic were offered free post-mortems and diagnostic investigations as part of a Defra-funded surveillance project, to help inform these producers and vets. Of the farms that participated, there has been an overall reducing trend in use subsequently, although some sites have experienced fluctuations. In comparison with the UK aggregated figures, which demonstrate a 13% reduction in antibiotic use, there has been an overall reduction of 42% in the participating group. While it is likely that the individuals that responded to the offer were motivated to improve the health of their herds and reduce their antibiotic usage, this also reflects the benefits of investing in diagnostics to help inform interventions that lead to these reductions.

RUMA's Targets Task Force 2 (TTF2)

Targets have been developed for RUMA's Targets Task Force 2 (TTF2), which were published in November 2020. The new targets for the pig sector comprise numerical and non-numerical targets and have been supported by the Pig Veterinary Society and National Pig Association. The targets have the same cross-cutting objectives as the milestones for the subgroup and include a 30% reduction in antibiotic usage across the sector by the end of 2024, while maintaining the already exceptionally low level of HP-CIAs.

The first of the non-numerical targets addresses Persistently High Users (PHUs), requiring them to develop and implement an Antibiotic Reduction Plan (ARP). For the purposes of these targets, PHUs are defined as being the top 5% of users in each holding category in the eMB and are calculated over a rolling four quarters using eMB data. Red Tractor has included this in their proposal for revised pig standards that are expected to be implemented from October 2021. The definition of a PHU will be reviewed periodically to ensure it remains appropriate, with the first of these being in 2022.

Monitoring the effect of reduced antibiotic use on pig health through use of reliable data sources such as the Pig Health Scheme, is targeted to serve as an alert for disease control and ensure that any negative consequences from antibiotic reduction on animal health and welfare are identified quickly. The aspiration to reduce antibiotic use must not be at the expense of animal health and welfare.

The next target is to establish coordinated support to review weaner management on pig farms, including through Pig Focus Farms as exemplar sites for knowledge exchange, to prepare the industry for the anticipated ban on the use of zinc oxide at therapeutic levels from the end of June 2022. This will require the collective efforts of producers, vets, nutritionists and AHDB, across the UK as it is recognised that the solution for control of post-weaning diarrhoea will vary from farm to farm. It is essential, however, that the removal of zinc does not become a driver for increased antibiotic use. The availability of future Defra grant funding opportunities, such as the Animal Health & Welfare Pathway may be able to support producers to better manage weaning when they become available.

Encouraging use of targeted water medication, where appropriate and advised by the unit veterinary surgeon, in preference to feed medication through use of small grants available through the Animal Health & Welfare Pathway, to install the necessary infrastructure for delivery. Use of water-soluble medication can reduce the treatment duration and, therefore, the amount of antibiotic used. This route of delivery may not be appropriate in all situations such as where wet-feeding systems are used, and producers should be guided by their veterinary surgeons.

Our drive to reduce antibiotic usage comes from concerns about Antimicrobial Resistance (AMR) and the next target is, therefore, to continue to monitor AMR via Veterinary Antimicrobial Resistance and Sales Surveillance (VARSS), and other reliable data sources. This will ensure that appropriate action is taken if it becomes necessary to do so.

The last target is to encourage training in responsible antibiotic use and understanding of AMR across the pig sector. Some training is already available in the pig sector, but it is clear that a range of training materials will be required to address differing requirements from different stakeholders, which may relate to their level of responsibility and engagement with veterinary medicines. The antibiotic usage subgroup acknowledges that a review of the current available training provision will support the call for any further materials required.

Red Tractor Standards review includes a proposal for a new standard that requires at least one person, responsible for overseeing use of medicines on the unit, to undertake training in the responsible use of medicines. If approved, this will be implemented from October 2021.

Concerns regarding the revised Medicated Feed and Veterinary Medicines Regulations

Following informal discussions with the VMD regarding the revised Veterinary Medicines and Medicated Feed Regulations (VMR and MFR), which are expected to be implemented in 2022, the subgroup prepared a position paper, outlining the concerns of the pig sector and proposing alternative wording that retains the principle and ambition of the original EU legislation, that the regulations are drawn from but that would be practical and achievable in the UK without compromising animal health and welfare.

Among the practical concerns were the ban on prophylaxis and on group medication via feed, and limited duration of a medicated feeding stuffs prescription to five days. These have implications that will lead to delayed treatments and will curtail disease elimination programmes that are commonly used to improve health and remove the need for ongoing antibiotic use to treat endemic bacterial disease within herds.

Proposals from the subgroup include:

- Requiring the unit vet to make a diagnosis and determine the group for metaphylaxis based on the pathogenesis and epidemiology of the disease and the group at risk on the unit
- Expressing the duration of treatment as 'a course of treatment' rather than picking an arbitrary number of days
- Formal consultation on the proposed regulations was expected to have taken place in 2020 but has been postponed to Autumn 2021 due to COVID-19.

Investigating new technologies

Exploratory discussions were held with a diverse range of researchers, and others working in areas of health improvement, field diagnostics and control of AMR. Some examples are below.

Looking at genetic selection or gene editing for resistance or tolerance of porcine pig pathogens to facilitate reductions in antibiotic use. The European Court of Justice has ruled that genome editing is a genetic modification and effectively banned this practice in Europe. However, the removal of specific genes that determine susceptibility to a disease is a process that can happen naturally and the group were supportive of the principle, which could lead to control of major pathogens like PRRSv.

Looking to other European countries has been helpful in understanding alternative approaches to antibiotic usage reductions. Belgium has used a low-level tax imposed on pharmaceutical companies for each kg of antibiotic sold to fund the group charged with achieving the reduction in antibiotic use (AMCRA). Much of the reduction has been achieved by targeting a reduction in medicated feed through a switch to water soluble medication. This correlates well with one of our non-numerical TTF2 targets.

'Pen-side diagnostics' have been identified as a gap in our toolbox for responsible use of antibiotics. Roboscientific has developed technology that detects volatile organic compounds (VOC) that are given off by a host when infected by a pathogen. These VOCs are specific to each pathogen, and sampling of the environment can highlight the presence of a disease before it is apparent clinically. This technology would be particularly helpful in an environment where prophylactic medication is banned, to allow rapid medication of animals when endemic disease flares up.

6

Milestones

As well as general milestones for the PHWC, each of the subgroups sets out milestones for the upcoming year. These milestones illustrate strategic goals and specific objectives, which are in line with the horizon scanning performed by each group. The approach of the overarching Pig Health and Welfare Council is to ensure that these milestones are on target to achieve their objectives, and that progress is continuing to be made.

In addition to the milestones outlined below, the longer-term priority of the PHWC is set out in the objectives listed in the Review of the 20:20 vision for Pig Health and Welfare section.

6.1 PHWC milestones for 2021–2022

- Represent the industry in the design and delivery of the Animal Health and Welfare Pathway
- Identify challenges to the health and welfare of the pig herd and offer advice and solutions
- Provide evidence-based solutions to improving health and welfare that will assist the industry in achieving the antibiotic reduction target

6.2 Milestones for the Welfare subgroup 2021–2022

Interruptions in the supply chain and methods to ameliorate their impact on the welfare of pigs on farm is likely to be an increasing problem. Ensuring prompt action, and how this is facilitated by all areas of the industry will be a challenge.

Constantly reviewing areas of concern, including those detailed in the Milestones will continue, as will support of schemes aimed at maintaining and improving welfare standards.

Health and welfare are inextricably linked, and so implications for improved welfare associated with addressing endemic disease as well as identifying new threats will be in full association with the Surveillance subgroup and the Pathway.

Collaboration with Farm Assurance, APHA and Defra will be maintained and strengthened where possible so that on-farm welfare remains in the forefront of ongoing discussions, especially in the areas around compliance and implementation of the Code, farrowing systems, euthanasia and tail damage.

- Working across the industry to **reduce tail damage on farm**, collaborating with APHA to produce a tail action plan for each unit
- Review the research around welfare as pigs are finished at heavier weights, including a focus on welfare proximate to, before and during slaughter
- Review current practice with respect to pig medicine teaching and euthanasia training at UK vet schools, for newly graduated vets and mixed-practice vets with little pig experience. Ensure the latest information on best practice is provided to producers including non-assured farms and smallholders
- The welfare of sows and piglets at the time of farrowing and during lactation, supporting the collection of evidence relevant to the various systems available and evaluating the welfare of the sow and piglet, and the safety of those working in the farrowing area

6.3 Milestones for the Food Safety subgroup 2021–2022

- Assess the impact of disease-control measures put in place to reduce the risk of Salmonella infection from pork. To include monitoring, testing, and to identify emerging methods of reducing Salmonella carriage in pigs. Review and update producer options for controlling and reducing the prevalence of Salmonella following the outcome of current research. Work with the poultry industry to limit the risk of transfer of Salmonella Typhimurium between species

- Action the outcomes of the hepatitis E workshop. To include communication on the work of the industry to reduce the risk of hepatitis E in slaughter pigs, ranking proposed projects and working in partnership to generate a science-based reduction programme. Review and maintain the intelligence hub for hepatitis E virus, and revisit the AHDB model for managing the risks of hepatitis E in the light of current research programmes
- Deliver the agreed actions from the LA-MRSA workshop of April 2018, enabling the industry to meet any recommendations from the EFSA report on LA-MRSA. To include biosecurity standards and health and safety considerations

6.4 Milestones for the Disease Surveillance subgroup 2021–2022

- Develop, update and maintain disease-control measures to ensure that the pig industry is in a position to take appropriate action against new, emerging, exotic notifiable and endemic diseases. To include contingency plans, disease-control exercises, epidemiological investigation, biosecurity and compartments for trade
- Develop a comprehensive surveillance system for the pig industry that is fit for purpose and that maintains and uses existing and new data sources. Capable of detecting current and emerging threats to pig health and welfare as well as providing baseline information against which progress could be monitored
- Identify the priority steps and monitor the outcomes being achieved by the PRRS control project and use this to plan the next steps
- Encourage measures to enable the early detection of pig notifiable disease

6.5 Milestones for the Antimicrobial Usage subgroup 2021–2022

The proposed ban on the use of zinc oxide at therapeutic levels from June 2022 will have significant consequences for animal health and welfare, use of antibiotics, and will negatively impact the sustainability of pig units as they aim to become net zero carbon. Preparing units for this change by focusing on all aspects of weaner management including nutrition, hygiene, building design and health is a priority to mitigate these risks and is included in the targets for the pig sector under TTF2. The group will continue to discuss the proposed ban with the VMD and develop support for producers and vets. This is essential for sustainably high standards of health and welfare in our pigs and to ensure that the pig sector continues to build on the progress made in reducing antibiotic usage.

Increased use of targeted water medication is also one of the sector's non-numerical targets but currently the infrastructure to deliver this effectively is missing on many farms. It is anticipated that small grants may be available through the Animal Health & Welfare Pathway to facilitate investment in the required equipment, and the subgroup will encourage uptake of this opportunity, which can lead to further significant reductions in antibiotic used.

- Support initiatives and guide knowledge transfer for vets and producers aiming for continued responsible use and reduction in antimicrobial use in pigs. This will include engaging with producers that are consistently using the highest levels of antibiotics through diagnostics and advice
- Support RUMA in increasing awareness of the importance of ensuring responsible use of antimicrobials in pigs. This will also include advising the new RUMA Targets Task Force as they develop targets for the period from 2020 to 2025
- Assess the impact of the rapid reduction in antibiotic use on the health and welfare of the UK pig herd
- To explore systems that encourage a response to surveillance of antimicrobial resistance in the UK pig herd
- Ensure the industry is prepared for the loss of zinc oxide in 2022, seeking effective antimicrobial alternatives and methods of ensuring that when antimicrobial use is necessary, it is targeted and optimal

7

Horizon scanning

7.1 Summary of disease-related threats and potential threats to GB pigs identified in 2019–2020

Pig disease-related threats identified and investigated in 2019–2020 are summarised below. More details on each threat, or potential threat, are included in the relevant Quarterly Pig GB Disease Surveillance and Emerging Threats report(s) cited for each threat. The quarterly reports are produced by the APHA Pig Expert Group and include actions taken to address identified threats.

Useful links:

- **2019 APHA monthly and quarterly reports about new and emerging diseases in pigs**
- **2020 APHA quarterly reports about new and emerging diseases in pigs**
- **APHA animal disease surveillance reports**
- **More information about the Pig Expert Group**

Veterinary Investigation Diagnosis Analysis (VIDA) diagnoses and analyses referred to in the table below, are recorded on the APHA FarmFile database and SAC Consultancy: Veterinary Services LIMS database, and comply with agreed diagnostic criteria against which regular validations and audits are undertaken.

Notifiable diseases

Description	Brief summary	Confirmed in GB	Q Report
Spread of African swine fever (ASF) in South East Asia	Since ASF was detected in China in August 2018, the virus has spread into Vietnam, Cambodia and Mongolia	No	2019 Q1
ASF spread in South East Asia and detection in seized pig product in NI	Hong Kong, North Korea, Laos and Myanmar all reported first detections of ASF May–August 2019. ASF virus DNA fragments detected in sausage illegally imported by passenger from Asia and seized by port authorities	No	2019 Q2
ASF spread westwards in Poland	Poland reported ASF in a wild boar just 85 km from the German border about 300 km from the nearest known ASFV-infected area east near Warsaw. Large geographic jumps to new areas like this are usually human-mediated. The neighbouring region of the province has a large proportion of the commercial pig industry, with 30% of the Polish pig population	No	2019 Q3

Description	Brief summary	Confirmed in GB	Q Report
Expansion of ASF in South East Asia and Europe	Spread in South East Asia where ASF present in China, Mongolia, Vietnam, Cambodia, Hong Kong, North Korea, South Korea, Laos, Myanmar, Philippines, East Timor and Indonesia. The first Indonesian ASF outbreaks in North Sumatra province followed unofficial reports of disease and mortality since September 2019. Further outbreaks of ASF in commercial pigs in Bulgaria and Romania. Greece reported its first case of ASF in a small domestic pig herd in early 2020. ASFV was circulating for several months in wild boar and domestic pigs in Bulgaria close to borders with Greece and North Macedonia	No	2019 Q4
ASF in Europe and Asia	Outbreaks of ASF in domestic pigs increased in Eastern Europe, particularly in Poland, Romania, the Baltic States and Russia. Some in western Poland on both commercial and backyard premises where wild boar cases are still being found, some close to the border with Germany. In September, Germany reported its first case of ASF in a wild boar found dead in Brandenburg near the border with Poland. In Asia, Myanmar reported an outbreak in domestic pigs in Kayah State, which borders Thailand; previous outbreaks in 2020 were in the north-east, closer to China. The first ASF cases in India were reported in pigs in the north-east.	No	2020 Q2
Spread of ASF into wild boar in Germany	Further ASF cases detected in dead or sick wild boar resulting in establishment of four core infected zones in Eastern Germany. No ASF has been detected in domestic pigs in Germany to date. Fenced buffer zones of 5 km around the core of infected zones are to be subject to intensive shooting to create corridors free of wild boar. More permanent fences are planned at the Polish border to replace temporary fencing and prevent entry of wild boar	No	2020 Q3

Description	Brief summary	Confirmed in GB	Q Report
ASF virus variant with lower virulence in domestic pigs in China	ASF virus variants with deletions in the MGF360 locus and the CD2v locus in several herds in China have been identified causing milder disease. Chinese researchers have published information describing this as a natural attenuated virus evolving from the original. Spread of variants of this nature increase the risk of pigs with ASF going undetected and more infected meat reaching the food chain, and may delay disease outbreaks being reported	No	2020 Q4
Swine fevers ruled out in suspect report cases	Two suspect swine fever cases ruled out by official investigation: haemorrhagic diathesis in single Kune-Kune pig and case of skin and renal haemorrhages in single pig at abattoir	No	2019 Q4
Negated swine fever report cases in 2020	Three suspect notifiable disease report cases were prompted by clinical signs or pathological findings in 2020, all of which were negated. Follow-up investigation of two of these diagnosed bacterial diseases	No	2020 Q4
Classical swine fever (CSF) in Japan	Further farms affected in central Japan since September 2018 when CSF was reported in domestic pigs for the first time since 1992. Oral bait vaccine delivered to wild boar in Gifu and Aichi Provinces where CSF-positive wild boar found	No	2019 Q1
Classical swine fever in Japan	CSF has persisted and spread in Japan since September 2018, with further prefectures affected and spread to island of Okinawa. Since October 2019, vaccination of domestic pigs permitted in certain areas. Vaccination of wild boar with an oral (bait) vaccine is ongoing. Japan is not approved for export of fresh or frozen pig meat to the EU	No	2019 Q4
Human infections Aujeszky's disease virus in China	Humans historically thought to be refractory to ADV infection. Reports from China, where Aujeszky's disease is endemic, described detection of AD virus fragments by Next Generation Sequencing (NGS) in ocular or cerebrospinal fluids of cases of human endophthalmitis and encephalitis; ADV was not isolated from the cases that had contact with pigs or pig meat. UK was declared free of ADV in 1991	No	2019 Q3

African Swine Fever (ASF) outbreak and risk assessments from **APHA's International Disease Monitoring** *team.*

New disease or pathogen

Description	Brief summary	Confirmed in GB	Q Report
Porcine circovirus 3-associated disease	Investigation into disease in 2018 on one farm in England found stillborn piglets (some with limb deformities) and pre-weaned piglets with nervous disease had multi-systemic inflammation associated with high PCV-3 viral loads. Collaboration with CReSA-IRTA in Barcelona demonstrated PCV-3 in association with the histological lesions providing evidence for PCV-3 involvement in this incident	Yes	2019 Q3
Myocarditis associated with PCV3 labelling by in situ hybridisation	One pre-weaned pig found to have a non-suppurative myocarditis with PCV3 labelling by in situ hybridisation (ISH) associated with the inflammation suggesting involvement of PCV3 with the cardiac pathology. This case appeared incidental to the main disease (Kpp septicaemia) occurring on farm	Yes	2020 Q3
PCV3 associated with myocarditis in stillborn pigs and neonatal pigs	A third incident of disease associated with PCV3 was investigated in breeding pigs in England – the two previous detections were in 2018 and 2014 (latter identified retrospectively). Disease manifested as an increase in stillborn piglets and neonatal piglets described as abnormal by farm staff, litters from any parity of sow were reported to be affected	Yes	2020 Q4
Novel circovirus species (PCV4) identified in pigs in China	Report of a new circovirus (tentatively designated as PCV4) identified in pigs on two farms with severe clinical disease in Hunan Province, China. Disease included respiratory and enteric signs and (in a few) porcine dermatitis and nephropathy syndrome-like skin lesions. PCV4 was detected with PRRSV and PCV2 so disease could not be attributed specifically to PCV4. The clinical significance of PCV4 is uncertain at this stage and will be kept under review	No	2019 Q4

Description	Brief summary	Confirmed in GB	Q Report
Pigs not susceptible to novel human coronavirus (SARS CoV-2)	Study published from China showed ferrets and cats to be highly susceptible to SARS CoV-2 infection, dogs had low susceptibility, and pigs, chickens, and ducks were not susceptible to infection. Results from another experimental study in Germany showed ferrets and fruit bats to be susceptible to SARS CoV-2 infection, while pigs and chickens were not. These studies are based on inoculation of small numbers of animals and align with field observations of infections reported in various felids, mink and dogs, arising from reverse zoonosis events	No	2020 Q1
Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2) in livestock	The OIE published a technical factsheet on SARS-CoV-2 and infection in animals. Several animal species have been found to be susceptible to infection with SARS-CoV-2 either naturally and/or by experimental infection, but evidence from risk assessments, epidemiological investigations, and experimental studies indicate that animals do not play a significant role in the spread of SARS-CoV-2, and the current pandemic is the result of human-to-human transmission	No	2020 Q4
Ability of Swine enteric alphaCoV (SeACoV) to infect human cells	To date, SeACoV has been reported in pigs in two provinces of China. A paper described the ability of SeACoV to infect human cells; in *vitro* findings do not necessarily correlate with in *vivo* susceptibility, or to transmissibility. There is currently renewed interest in coronaviruses including SeACoV	No	2020 Q3
Porcine Astrovirus type 3 (PoAstV3) detected in polioencephalomyelitis cases in US	A retrospective study in the US on cases of undiagnosed nervous disease with lesions consistent with a viral encephalomyelitis detected PoAstV3 in the central nervous system of a quarter of such cases. PoAstV3 was detected from 2010, the earliest year from which material was tested. Clinical signs included lateral recumbency, paresis, and ataxia	No	2019 Q4

Description	Brief summary	Confirmed in GB	Q Report
Highly divergent porcine sapovirus (SaVs) characterised in the US	Porcine SaVs are widely distributed in pigs in pig-producing countries with eight genogroups identified, GIII being predominant. In this study, porcine SaVs were detected in US pigs of varying ages with diarrhoea using next-generation sequencing. Porcine SaV GIII was detected in most and SaV GVI in one	No	2020 Q1
Haemorrhagic tracheitis syndrome investigations in North America	Outbreaks of distinctive 'honking' coughing associated with tracheal lesions reported in pigs in Canada for a period of years and more recently in the US. The case definition is of acute onset of a characteristic honking cough, usually in a low percentage of pigs aged 14 to 30 weeks old leading to dyspnoea and, in some, to death or euthanasia. A consistent finding is marked oedema and haemorrhage in the tracheal submucosa causing luminal obstruction.	No	2020 Q1
Streptococcus equi subsp *zooepidemicus* in North America	US Swine Health Information Centre (SHIC) reported unusual mortality in adult sows and finishers due to *Streptococcus equi* subsp. *zooepidemicus*; sows also aborted. Similar cases described in Canada. The isolates involved are sequence type ST-194 with close genetic sequence similarity to isolates from high mortality outbreaks in China in the 1970s	No	2019 Q3
Staphylococcus sciuri in septicaemic finishers	*Staphylococcus sciuri* septicaemia diagnosed in outdoor finisher pigs with concurrent swine influenza. *S. sciuri* is usually considered non-pathogenic in pigs, but in this incident, there was good evidence that it was clinically relevant	Yes	2020 Q2
Trueperella abortisuis abortion in a pig herd in Scotland	This is believed to be the first case of *T. abortisuis* abortion in the UK. Four abortions in a commercial herd in Scotland. *T. abortisuis* isolated from fetal stomach contents and an exudative placentitis confirmed. *T. abortisuis* reported from similar cases in Japan and Germany	Yes	2019 Q3

Description	Brief summary	Confirmed in GB	Q Report
Novel *Mycoplasma* '*Mycoplasma haemosuis*' in Germany	Disease outbreak in finisher pigs on one farm in Germany with skin lesions, inappetance, anaemia and high fever. PCR testing detected a novel porcine *Haemoplasma* ('Candidatus *M. haemosuis*'. Affected pigs responded to treatment with oxytetracycline and non-steroidal anti-inflammatory drugs. This is the first report of Ca. *M. haemosuis* in pigs outside Asia and first report of its association with disease	No	2020 Q3
Brachyspira hampsonii detected in pig faeces	First detection at APHA of *B. hampsonii* in pigs showing uneven growth and loose faeces on a single indoor finisher unit, only one faeces of several tested positive and other causes of diarrhoea found. *B. hampsonii* described as a new potentially pathogenic species in pigs in North America in 2012 and a potential cause of diarrhoea	Yes	2019 Q2

New pathogen variant

Description	Brief summary	Confirmed in GB	Q Report
Porcine circovirus 2 genotyping shows shift to PCV2d	Analysis of PCV2 ORF2 gene sequences from PCV2 associated disease cases from 2016 to 2019 shows the virus in four cases clusters within genotype PCV2b. The remaining sequences cluster with reference PCV2d strains. This indicates that for cases diagnosed at APHA, PCV2d has become predominant as reported elsewhere in the global pig population. The significance of this is uncertain; PCV2a-based vaccines have been shown to be effective against PCV2d challenge under experimental conditions	Yes	2019 Q4
Detection of rotavirus group H in pigs in Spain	This is the first report of rotavirus group H in pigs in Europe; rotavirus group H was found on 9 of 103 Spanish pig herds investigated	No	2020 Q4

Changes in endemic disease

Description	Brief summary	Confirmed in GB	Q Report
PRRS diagnosed in negated notifiable disease investigation	PRRS virus-1 confirmed as cause of disease in breeding pigs, which prompted official investigation for notifiable disease – swine fevers were ruled out by testing. Widespread lethargy and inappetence in the breeding herd, with mortality in recently farrowed sows and their piglets. Suspicion of swine fevers prompted by unusual finding of splenic infarcts and enlarged lymph nodes with haemorrhages in a dead sow	Yes	2019 Q2
Porcine reproductive and respiratory syndrome-1 virus analyses	Diagnoses due to PRRSV-1 remain prominent. The historic pattern of a higher percentage of diagnoses in autumn and winter months was not seen in data for 2018–19. Concurrent disease was common	Yes	2019 Q3
Porcine reproductive and respiratory (PRRS) syndrome diagnoses	The diagnostic rate for PRRS in GB submissions increased in Q1–2020 and the upward trend continued into Q2–2020 with PRRS remaining a prominent diagnosis. The tendency for a seasonal rise in PRRS diagnoses during the cooler winter months observed in 2008 to 2015 has not been such a clear feature in this data since 2016. All incidents of PRRS diagnosed in the first six months of 2020 were due to PRRSV-1 infection. ORF-5 sequencing did not identify new clusters or novel PRRSV strains	Yes	2020 Q2
Pandemic H1N1 2009 and H1N2 influenza virus strains circulate in 2019	Pandemic H1N1 2009 (pH1N109) and H1N2 (including reassortant H1N2) were found in approximately equal numbers where swine influenza strains were identified. Some pandemic H1N109 were only detected using an adjusted PCR test; it is likely that pH1N109 has evolved differently in humans and pigs since its original introduction and it retains the ability to transmit between pigs and humans	Yes	2019 Q4

Description	Brief summary	Confirmed in GB	Q Report
Rise in the diagnostic rate of swine influenza	The diagnostic rate rose over the last two quarters, pandemic H1N1 2009 (pH1N109) and reassortant H1N2 (H1N2) were detected. These strains have been predominant for several years, with avian-like H1N1 occasionally identified. All outbreaks in Q1–2020 were in post-weaned growing pigs, mainly affecting pigs aged four to eight weeks	Yes	2020 Q1
Varied presentations of porcine circovirus 2-associated disease	A rise in the quarterly diagnostic rate of porcine circovirus 2-associated disease (PCVD) was seen. Diagnoses were in pigs aged from six to 20 weeks old with a wide range of clinical signs (respiratory, wasting, diarrhoea, sudden death) and pathological presentations including respiratory, hepatic, enteric disease and individual pigs with splenic infarcts prompting consideration of swine fevers	Yes	2019 Q3
Porcine circovirus 2 (PCV2) genotyping from disease-associated incidents	PCV2d has become predominant; PCV2 genotyping of six cases of PCV2 disease in 2020 identified all as PCV2d. The significance of this shift is uncertain; PCV2a-based vaccines have been shown to be effective against PCV2d challenge under experimental conditions	Yes	2020 Q4
Swine dysentery involving several *Brachyspira hyodysenteriae* strains	Whole genome sequencing to assist epidemiological investigations show that up to seven swine dysentery strains, or clusters of strains, were involved in the increased diagnoses in 2017–18	Yes	2019 Q1
Several MLST sequence types in *B. hyodysenteriae* 2020 isolates	Fewer diagnoses of swine dysentery were made in 2020 compared with 2019. Whole genome sequencing of 12 2020 isolates identified 10 multi-locus sequence types, 5 of which had not been identified in isolates that have been sequenced previously within APHA	Yes	2020 Q4
Salmonellosis due to *Salmonella* with multiple antimicrobial resistance	Downward trend in diagnostic rate for salmonellosis in recent years, but some outbreaks involve *S. Typhimurium* or Typhimurium-like monophasic variants with wider multiple drug resistance leaving fewer choices for treatment. Advisory Zoonoses Order visits to affected farms offered and advice provided on control and disinfectant choices	Yes	2019 Q1

Description	Brief summary	Confirmed in GB	Q Report
Early spring outbreak of *Klebsiella pneumoniae* (Kpp) septicaemia	A diagnosis was made unusually early in March 2019 in piglets on an East Anglian outdoor breeding unit which had previous Kpp outbreaks. Kpp septicaemia was confirmed in multiple pigs found dead in one gilt litter and, while this fulfilled the case definition, follow-up revealed this was the only litter affected	Yes	2019 Q1
Extended season of *Klebsiella pneumoniae* (Kpp) septicaemia outbreaks	One outbreak diagnosed in March and another in October showing an extension of the season beyond the previous May to September pattern. There was no acquired antimicrobial resistance in the Kpp isolates in 2019 cases; penicillin resistance is innate in *Klebsiella* species	Yes	2019 Q3
Early spring outbreak of *Klebsiella pneumoniae* (Kpp) septicaemia in piglets	A Kpp septicaemia diagnosis was made in February for the first time. The outbreak was typical and affected piglets on an East Anglian outdoor breeding unit that had not previously experienced outbreaks. The weather was unusually mild for the time of year when the outbreak occurred	Yes	2020 Q1
Diagnoses of disease due to *Streptococcus suis* serotype 1	Relative increase in diagnoses of disease associated with *S. suis* serotype 1, possibly reflecting more diagnostic investigations in younger pigs as part of efforts to reduce antimicrobial use; alternatively, could be an effect of reduced antimicrobial use. Diagnostic submissions are also made to obtain *S. suis* isolates for autogenous vaccine production	Yes	2019 Q1
Upward trend in diagnostic rate for *Actinobacillus pleuropneumoniae*	Upward trend noted in the second and third quarters of 2020. The clinical sign reported most frequently when APP was diagnosed in 2020 was pigs being found dead, with respiratory signs the next most common. APP was the primary pathogen in the majority of cases	Yes	2020 Q3
Increased diagnostic rate for *Actinobacillus pleuropneumoniae*	This quarter's diagnostic rate was the highest seen for several years. The rise was not explained by antimicrobial resistance. The age range affected is slightly wider for 2020 diagnoses, some APP incidents also involved PRRS or streptococcal disease but the majority did not have concurrent disease. APP isolates from 2020 are being typed to investigate	Yes	2020 Q4

Description	Brief summary	Confirmed in GB	Q Report
Disease due to *Actinobacillus suis* in preweaned piglets	Seven *A. suis* diagnoses were recorded in 2019–20 compared with three in 2017–18. Three were made in Q4-2020, all in preweaned pigs. This recent cluster of cases involved clinical presentations of polyarthritis, septicaemia and meningitis	Yes	2020 Q4
Lactational osteoporosis in young sows	Three incidents of lactational osteoporosis diagnosed in 2020 with histories of acute recumbency due to fractures at or soon after weaning in first litter sows on indoor units. These prompted review of the gilt diets during growth, gestation and lactation	Yes	2020 Q2

New or rare emerging resistance

Description	Brief summary	Confirmed in GB	Q Report
Pneumonia due to ampicillin-resistant *Actinobacillus pleuropneumoniae* (APP)	Pleuropneumonia in finisher pigs found dead yielded APP isolates resistant to ampicillin. Ampicillin (beta-lactam) resistance in APP is occasionally detected by APHA in isolates from clinical cases; however, none was detected in 2019, and this was the first of two identified in 2020. Antimicrobial resistance in APP is kept under review and no increase in the diagnostic rate of APP in GB was seen in Q1–2020	Yes	2020 Q1
Scanning surveillance detections of livestock-associated meticillin-resistant *Staphylococcus aureus* (LA-MRSA) in joint disease	LA-MRSA clonal complex (CC) 398 was identified in piglets with suppurative joint infections from two farms in England. In both, the LA-MRSA was incidental to the main cause of disease and was isolated from a single pig. LA-MRSA CC398 is a group of related LA-MRSA strains frequently detected in livestock in Europe in recent years	Yes	2020 Q1
Tiamulin-resistant *Brachyspira hyodysenteriae*	One *B. hyodysenteriae* isolate of those tested in 2020 showed resistance to tiamulin. This is the first isolate tested at APHA in several years to have a tiamulin MIC above the clinical breakpoint. No other tiamulin-resistant isolates were found in 2020 and some were fully sensitive to all six antimicrobials tested	Yes	2020 Q3

Public health-related

Description	Brief summary	Confirmed in GB	Q Report
Bracken poisoning in a small fattening herd	Confirmed as cause of sudden deaths in finisher pigs accessing a woodland area. Reported to the Food Standards Agency as a potential food safety incident and advice given to prevent exposure to bracken by pigs for at least two weeks before slaughter to protect the food chain	Yes	2019 Q1
Coal tar toxicity incident	Sudden deaths of outdoor growers with severe liver necrosis confirmed as coal tar poisoning from fragments of old clay pigeons within affected pig paddocks exposed when pigs rooted. Shooting had taken place historically. Incident reported to the Food Standards Agency as a potential food safety incident; pigs at risk were moved and restricted from entering the food chain for 28 days	Yes	2020 Q1

Unusual diagnoses or presentations

Description	Brief summary	Confirmed in GB	Q Report
Greasy pig disease and tail necrosis in neonatal piglets	Tail necrosis in outdoor piglets diagnosed due to *Staphylococcus hyicus* infection affecting up to 30% of certain crossbreed litters. Tail necrosis within hours of birth is a recognised condition of piglets; aetiology likely multifactorial with suggested factors including trauma, staphylococcal infections, frostbite and mycotoxins	Yes	2019 Q1
Clostridial myositis and cellulitis in finisher pigs	Outbreak in finishers, no obvious risk factor identified. Skin lesions, lethargy and death. Emphysema and oedema in subcutis and oedematous, emphysematous, dry dark red-black musculature. Clostridium septicum detected by direct fluorescent antibody testing of lesioned tissues and histopathology. Throat swelling prompted testing to rule out pharyngeal form of anthrax	Yes	2019 Q2

Description	Brief summary	Confirmed in GB	Q Report
Fibrocartilaginous embolism in boar with nervous signs	Adult boar with a history of acute onset recumbency and paddling found to have fibrocartilaginous embolism affecting the brain, likely to have resulted from disruption of spinal intervertebral disc material due to trauma or infection, with embolic spread	Yes	2019 Q3
Porcine sapelovirus-associated neurological disease in growers	Diagnosed in weaners with unusual nervous signs including weakness and recumbency, ataxia, fore and hindlimb paresis, knuckling and, in some pigs, generalised mild tremor and hyperaesthesia. Multifocal, necrotising, non-suppurative encephalomyelitis highly suggestive of neurotropic viral infection. Porcine sapelovirus detected by PCR. Prevalence unknown but in past decades, this virus was considered to be widespread in GB pigs, with disease arising if endemic stability is disrupted	Yes	2019 Q3
Possible vitamin E/selenium-associated iron toxicity	Seven-day-old piglets with acute onset recumbency, dyspnoea, convulsions and rapid death in which the history, clinical signs and gross pathology raised the possibility of vitamin E-related iron toxicity. This can occur associated with vitamin E/selenium deficiency in sows, when normal iron doses become toxic to anti-oxidant deficient piglets	Yes	2019 Q3
Mycoplasma hyorhinis conjunctivitis in US	US authors described conjunctivitis outbreaks in growing pigs where *Mycoplasma hyorhinis* was demonstrated in the eyes of pigs with a marked lymphoplasmacytic inflammatory infiltrate, lymphofollicular hyperplasia and perivascular cuffing	No	2019 Q3
Unusual pluck lesions associated with fungal disease in nursery pig	Respiratory disease in a weaner found to be due to severe subacute ulcerative fungal tracheitis and an acute multifocal necro-haemorrhagic alveolitis. Fungal infection is usually opportunistic and secondary to factors such as mucosal damage, immunosuppression, or prolonged antimicrobials	Yes	2019 Q4

Description	Brief summary	Confirmed in GB	Q Report
Neurological disease associated with otitis media in gilts	Sudden onset of clinical signs suggestive of middle ear disease (head tilt), progressing to unusual behaviour such as attempting to climb the wall, ear twitching and recumbency, were investigated in a herd. Chronic bacterial infections of the middle and inner ear with localised associated meningitis were diagnosed	Yes	2020 Q1
Lymphoma in a grower pig with musculoskeletal disease	Multicentric lymphoma, one of the most common neoplasms of pigs, was diagnosed in a three-month-old pig with sudden loss of hindlimb function. Liver, spleen and lymph nodes were affected and lesions were found within the tibia and femur explaining the clinical signs	Yes	2020 Q1
Electrocution event	Sudden deaths and acute onset recumbency in lactating adult sows determined to be due to electrocution. Histopathology revealed supportive evidence with rhabdomyolysis and consequent renal tubular injury as complication of sublethal electrical injury	Yes	2020 Q2
Clostridial myositis and cellulitis in finishers	An unusual diagnosis of clostridial myositis and cellulitis (similar to blackleg in cattle). Resolved following interventions including thorough cleaning of the wet feeding system and a period of vaccination	Yes	2020 Q2
Disease incident involving skin lesions and transient mortality	Investigation into an unusual clinical presentation of skin scald lesions and mortality in indoor grower pigs; no cause identified, many ruled out. Similarities to a few other incidents over the last 10 years, most in late summer to autumn	Yes	2020 Q3
Septicaemic pasteurellosis (*Pasteurella multocida*) in finishing pigs	*P. multocida* septicaemia diagnosed in finishers dying suddenly. No underlying viral infections detected. This is an uncommon disease presentation of *P. multocida*; APHA recorded 17 cases since 2013. Disease has occurred in both outdoor and indoor-reared pigs and in pigs aged three days to six months	Yes	2020 Q4

Description	Brief summary	Confirmed in GB	Q Report
Haemorrhages in single Kunekune pig	Haemorrhagic disease in a single young adult Kunekune pig investigated; there was a good clinical history and no suspicion of notifiable disease. Rodenticide toxicity and other differentials were ruled out. The cause of disease, which had the appearance of a clotting disorder, was not determined	Yes	2020 Q4
Actinobacillus rossii abortion	*A. rossii* was diagnosed as the cause of abortion of a gilt litter. *A. rossii* is as an inhabitant of the porcine vagina and RTX toxin genes have been identified in strains of *A. rossii*. Possession of these virulence factors may contribute to the organism's ability to act as a sporadic cause of porcine abortion	Yes	2020 Q4

Other type of threat

Description	Brief summary	Confirmed in GB	Q Report
Straw bedding shortage concerns	Straw in short supply in some regions, prices likely to rise. Potential issues if less straw used for bedding increasing risk of disease, and other concerns relating to some alternative bedding materials	Yes	2020 Q3

8 Conclusions

The 20:30 vision of the PHWC provides clear direction into the future of the pig industry. The vision is to support the pig industry in achieving an integrated approach to: enhance the health and welfare of the pig herd, and enable assurance that pork products are safe to eat, and produced from pigs whose health and welfare needs have been met. The new six objectives to achieve this vision will use the expertise, experience, and strength of partnership working, to continue supporting and providing strategies for the pig industry to thrive from 2021. Challenges of previous years, including the threat of disease, welfare issues, zoonotic diseases and antibiotic resistance will continue to challenge from 2021 onwards, and the Council will continue to reflect on its foundations of partnership, and close alliance with industry, to promote a sustainable and profitable pig industry.

9

Glossary of Abbreviations

9.1 Abbreviations of Organisations or Institutions

AIC	Agricultural Industries Confederation
AFS	Assured Food Standards *(See also Red Tractor)*
AHWBE	Animal Health and Welfare Board for England
APHA	Animal and Plant Health Agency *(Formerly AHVLA)*
AHDB	Agriculture and Horticulture Development Board
BMPA	British Meat Processors Association
BPA	British Pig Association
BPEX	British Pig Executive *(See also AHDB)*
CARS	Control of Antimicrobial Resistance Scotland
Defra	Department for the Environment, Food and Rural Affairs
EFSA	European Food Safety Authority
FAWC	Farm Animal Welfare Committee
FSA	Food Standards Agency
HCC	Hybu Cig Cymru (Meat Promotion Wales)
NIPBF	Northern Ireland Pork and Bacon Forum
NPA	National Pig Association
PEG	Pig Expert Group
PHWC	Pig Health and Welfare Council
PVS	Pig Veterinary Society
RDPE	Rural Development Programme for England
RT	Red Tractor *(see also Assured Food Standards)*
RSPCA	Royal Society for the Prevention of Cruelty to Animals
RUMA	Responsible Use of Medicines in Agriculture Alliance
RVC	Royal Veterinary College
SRUC	Scottish Rural University College
QMS	Quality Meat Scotland
VMD	Veterinary Medicines Directorate

9.2 Abbreviations of Terms

AMBP	Animal Medicines Best Practice Programme
AMR	Antimicrobial Resistance
ASF	African Swine Fever
BPHS	BPEX Pig Health Scheme
CCIR	Collection and Communication of Inspection Results
CVO	Chief Veterinary Officer
FMD	Foot and Mouth Disease
HEV	Hepatitis E virus
KT	Knowledge Transfer
LA-MRSA	Livestock Associated-Methicillin Resistant *Staphylococcus aureus*
PCR	Polymerase Chain Reaction
PCU	Population Corrected Unit
PED	Porcine Epidemic Diarrhoea
PEDv	Porcine Epidemic Diarrhoea virus
PRRS	Porcine Reproductive and Respiratory Syndrome
RFID	Radio-frequency identification
SD	Swine dysentery
SOP	Standard Operating Procedure
SSDP	Defra Scanning Surveillance Delivery Programme
VARSS	Veterinary Antibiotic Resistance and Sales Surveillance

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