

A photograph of a group of pink pigs in a pen. The pigs are standing on a bed of straw. In the background, there are metal bars and a green container. The pigs are looking in various directions, some towards the camera.

Pig Health and Welfare Council

Biennial Report 2013–2014

July 2015

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 which aims to promote a co-ordinated and integrated approach to improving pig health and welfare.

The members of the Pig Health and Welfare Council are:

Chairman: Professor Jim Scudamore
Agricultural Industries Confederation (AIC)
Animal Plant Health Agency (APHA)
Agriculture and Horticulture Development Board Pork (AHDB Pork)
British Meat Processors Association (BMPA)
British Pig Association (BPA)
Department for the Environment, Food and Rural Affairs (Defra)
Hybu Cig Cymru (HCC)
National Pig Association (NPA)
Northern Ireland Pork and Bacon Forum (NIPBF)
Pig Veterinary Society (PVS)
Quality Meat Scotland (QMS)
Red Tractor (RT)
Responsible Use of Medicines in Agriculture Alliance (RUMA)
Royal Society for the Prevention of Cruelty to Animals (RSPCA)

In addition to the formal organisations, there are producer members on the council and all of the subgroups, to represent the diverse production systems within the UK.

Observers invited to attend PHWC meetings:

Food Standards Agency (FSA)
Chief Veterinary Officer (CVO) UK, Nigel Gibbens
Chief Veterinary Officer (CVO) for Wales, Professor Christianne Glossop

The work of the Pig Health and Welfare Council would not be possible without the valued support from the Secretariats listed below:

The Secretariat for the Pig Health and Welfare Council is provided by AHDB Pork
The Secretariat for the Antimicrobial Usage subgroup is provided by the VMD
The Secretariat for the Pig Meat Safety subgroup is provided by AHDB Pork
The Secretariat for the Surveillance subgroup is provided by AHDB Pork
The Secretariat for the Welfare subgroup is provided by the RSPCA

Foreword

I am pleased to welcome the publication of the 2013–2014 biennial report from the Pig Health and Welfare Council. It provides an invaluable summary of the current state of the industry in terms of size and distribution, production systems and economics, and details changes that have occurred since the previous report. These changes can alter disease risks as well as profitability and it is good to see that work continues to improve the health and welfare of British pigs.

An implementation plan for delivery of the 20:20 Pig Health and Welfare strategy had been developed but in 2014 the council recognised that the breadth of the objectives and targets was too great to be addressed simultaneously. Consequently, work now focuses on four key strategic themes – surveillance, welfare, pig meat food safety and antimicrobial usage, each of which is led by a subgroup of the PHWC. This prioritisation enables the involvement of all the stakeholders, including the government, in taking these important strategic areas forward.

The report describes important achievements in a number of areas. Of particular value were the roundtables held on exotic and emerging diseases and antimicrobial usage. Both of these provided a series of recommendations which have been followed up by the respective subgroups. There is major concern about the potential impact of new and emerging diseases, such as Porcine Epidemic Diarrhoea, if they were to be introduced into the UK. The proactive approach by the pig industry and the willingness of Government to assist has resulted in the completion of a comprehensive contingency plan which could be extended to other high risk diseases if necessary.

The work on antimicrobial usage is crucial, given the scale of the threat to human and animal health and the focus on antibiotic use in food production. More data is needed from the pig sector to determine how antibiotics are currently used in UK pig production and how the amount and frequency of use can be optimised in future, taking account of practices in other species and other countries. The work of the subgroups on welfare and pig meat food safety is also crucial to maintaining consumer confidence and the long term future of UK pig production.

I welcome the partnership arrangements which continue to be developed between the government and the industry. The PHWC is represented on the sector council which in turn provides an input into the Animal Health and Welfare Board for England (AHWBE). This ensures that the views and advice from the pig industry on the development of policy and strategy are presented in a constructive way to the government. I am pleased that representatives from Scotland, Wales and Northern Ireland participate in the work of the PHWC. It is important to have a joint UK approach wherever possible as this will enable an exchange of ideas and initiatives to improve the health and welfare of the pig industry throughout the UK.

I would like to congratulate the PHWC on the progress made so far in meeting the objectives of the 20:20 strategy. There are many challenges ahead and I would encourage the PHWC to continue with its work in partnership with the government, the pig industry and allied industries in order to improve the health and welfare of the pigs and ensuring a successful pig industry.

Nigel Gibbens
Chief Veterinary Officer (UK)
June 2015

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1 Introduction

I am pleased to present the second report of the Pig Health and Welfare Council (PHWC) which covers the activities of the council in 2013 and 2014. Improving the health and welfare of the pig industry remains of major importance in order to maximise productivity and ensure that the industry is competitive in the EU and other international markets.

The PHWC has continued to work towards delivering the 20:20 vision, although there have been changes to the way in which this is implemented. Initially, the strategy included eight objectives but these have been streamlined into four key themes. This has allowed the council to focus on those areas which are of significant importance to the industry. To achieve this, PHWC was restructured in 2014 with the establishment of four thematic subgroups for surveillance, welfare, antimicrobial usage and pig meat food safety respectively. The work of the subgroups is described in this report.

New and emerging diseases remain a major concern to the pig industry, with Porcine Epidemic Diarrhoea (PED), African Swine Fever (ASF) and Porcine Reproductive Respiratory Syndrome (PRRS) of high importance. Much of the work of the surveillance subgroup in 2014 has been devoted to PED. The development of the PED contingency plan for England, the standard operating procedures and diagnostic tests, has required close collaboration across the pig industry, with considerable assistance from the Animal and Plant Health Agency (APHA) and Government.

The Animal Health and Welfare Board for England (AHWBE), which was established in 2011, makes direct recommendations to Defra Ministers regarding strategic policies affecting health and welfare of animals. The sector council is one of the bodies established by the AHWBE and includes species-specific groups such as the PHWC. This provides an opportunity for the PHWC to liaise and contribute to the development of policy on common Government and industry objectives to improve health and welfare.

The broadly based PHWC includes members from a range of organisations including producers, allied industries, welfare, assurance groups and other interested stakeholders, as well as the wider farming industry. It is also recognised that the pig industry is UK wide and that close liaison and cooperation is essential between the four countries of the UK. Members of the PHWC and subgroups now include representatives from each country. This has many advantages in the mutual exchange of information and in being able to avoid duplication of effort.

There has been a considerable amount of work both for the main PHWC and also for the subgroups, especially with the regular meetings. I would like to thank the many participants for their contributions to all the work of the PHWC. I would also like to thank everyone who has contributed to the production of this report and to each of the different secretariats for their support both in the preparation of this report and to the PHWC and its subgroups.



Jim Scudamore
Chairman

2 About PHWC

The Pig Health and Welfare Council (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.

'20:20 Pig Health and Welfare, A Vision for 2020', was launched in August 2011 and a new PHWC was appointed by the cross-industry sponsoring organisations: Agricultural Industries Confederation (AIC); Animal and Plant Health Agency (APHA); British Meat Processors Association (BMPA); the Pork division of the Agriculture and Horticulture Development Board (AHDB Pork); British Pig Association (BPA); National Pig Association (NPA); Pig Veterinary Society (PVS); Red Tractor (Assured Food Standards); Responsible Use of Medicines in Agriculture Alliance (RUMA) and the Royal Society for the Prevention of Cruelty to Animals (RSPCA). Defra, Food Standards Agency (FSA) and Quality Meat Scotland (QMS) were invited to attend meetings as observers. Professor Jim Scudamore was appointed as PHWC chairman in March 2012.

Animal health and welfare has been a major part of Defra's role. Advice from the independent responsibility and cost sharing group, set up following the FMD outbreak in England, in 2007 was that animal keepers could play a greater role in tackling animal disease. The Animal Health and Welfare Board for England (AHWBE), established in 2011, brought together independent people with the relevant knowledge and skills, regarding both farm and companion animals, with government officials. AHWBE can make direct recommendations to Defra Ministers, regarding strategic policy affecting health and welfare of animals.

Species-specific groups represent the interests of each sector. PHWC plays an important role in liaising with AHWBE, Defra and the FSA on common Government and industry objectives to improve health and welfare.

2014 saw changes to the structure of the established PHWC from the 20:20 strategy, with eight objectives reduced to a more streamlined set of key strategic priorities. The reduction has allowed the council to focus in four key areas which are of significant importance to the industry, while remaining nimble and agile enough to adapt to any unforeseen changes that may appear on the horizon.

The PHWC subgroups cover the following areas:

- **Disease surveillance subgroup – Improving preparedness for exotic and emerging diseases**
- **Welfare subgroup – Enhancing pig welfare**
- **Pig meat food safety subgroup – Enhancing pig meat food safety**
- **Antimicrobials subgroup – Reducing antimicrobial use in pig production.**

The proposed reorientation of the PHWC strategy into these four themes did not infer that other strategic themes, such as minimising the impact on the environment, were no longer of key importance to the industry and wider stakeholders. It is acknowledged that the PHWC may not be the most appropriate forum to affect change in these areas and that a more precisely defined set of strategic themes could culminate in a more tangible delivery and success.

The terms of reference for the new format of PHWC and its subgroups can be found below (for the full terms please refer to Appendix 1).

The PHWC aims to be a resource for the pig industry, by providing advice on areas of strategic policy. Key areas of focus are surveillance and disease risk assessment, promotion of welfare as well as prudent antimicrobial usage through improved disease management. This can only be achieved with a close working relationship between pig keepers, the veterinary profession, government and allied industries. The PHWC recognises that its ongoing activities 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.

The disease surveillance subgroup has the main aim of providing advice to the PHWC on proposals for effective surveillance of pig health and welfare in England. This is achieved through integrative work across the industry in the same manner as the main PHWC. This group's main focus is to provide horizon scanning on new pathogens and emerging diseases of importance to the pig industry and on changes in levels of endemic disease within the UK. The subgroup then uses this information to formulate strategies of benefit to the UK pig industry and to recommend a course of action in the prevention, reduction or eradication of significant diseases. The provision of a robust, reliable and integrated disease surveillance system forms one of the ongoing long term strategic aims for this group.

The welfare subgroup is focusing on all aspects of pig welfare applicable to the UK pig industry. Pig welfare within the British Isles needs to reflect the diverse production methods within the industry, which often presents unique challenges when compared to our European counterparts. The subgroup aims to bring a consensus on the key pig welfare issues to be investigated and the ultimate aims for each issue. This work requires considerable amounts of facilitation between the pig industry (including pig keepers, slaughterhouses and processors), allied industries, paraprofessionals (eg veterinary surgeons), welfare scientists, consumer organisations and Government, the aim of which is to develop workable strategies and initiatives to address the key issues identified. The subgroup may engage research in areas to which it determines there is a gap in knowledge and utilise this to inform the PHWC of any resulting recommendations.

The pig meat food safety subgroup aims to be the authoritative group for advice on strategic policy, surveillance, research and management and control of zoonotic hazards in pig meat production. This will be manifested by the development of a road map to achieve improvements in pig meat safety. This work requires extensive investigation and evaluation of current knowledge on reducing zoonotic related food risks and collaboration with Government, pig keepers, processors, veterinarians, processors, retailers and allied industries. The inclusion of all these groups is required to ensure that there is whole chain ownership of the road map and that there is shared commitment to its outcomes.

The antimicrobials subgroup has been charged with reviewing and eliciting change in the pig industry with regard to responsible use and stewardship of antimicrobials. The group will actively seek out information on all aspects of antibiotic usage by the pig industry and identify crucial gaps in knowledge. The group recognises the need to safeguard antimicrobials for future generations and to reduce the risk of resistance developing. This can only be achieved through an informed approach to antimicrobial usage, based upon evidence in optimising efficacy in antimicrobial administration, as well as investigating alternatives to antibiotics wherever possible. In addition, it is vital that the whole of the pig industry supports and adopts these measures in good practice. The antimicrobials subgroup aims to ensure open and informed communications on its findings to the public and stakeholders.

3 The pig industry structure

3.1 Size and distribution of the industry

3.1.1 Size of the UK pig herd

Latest figures from Defra show that in December 2014 the UK pig herd was above 4.5 million head for the first time since 2008, up 3% over the last year. This shows that productivity continues to improve, given that the number of sows was down by 2%. The overall increase is, therefore, due to a 4% rise in the number of feeding pigs.

Figure 3.1: Total pigs on agricultural holdings in the UK, 1990–2014.

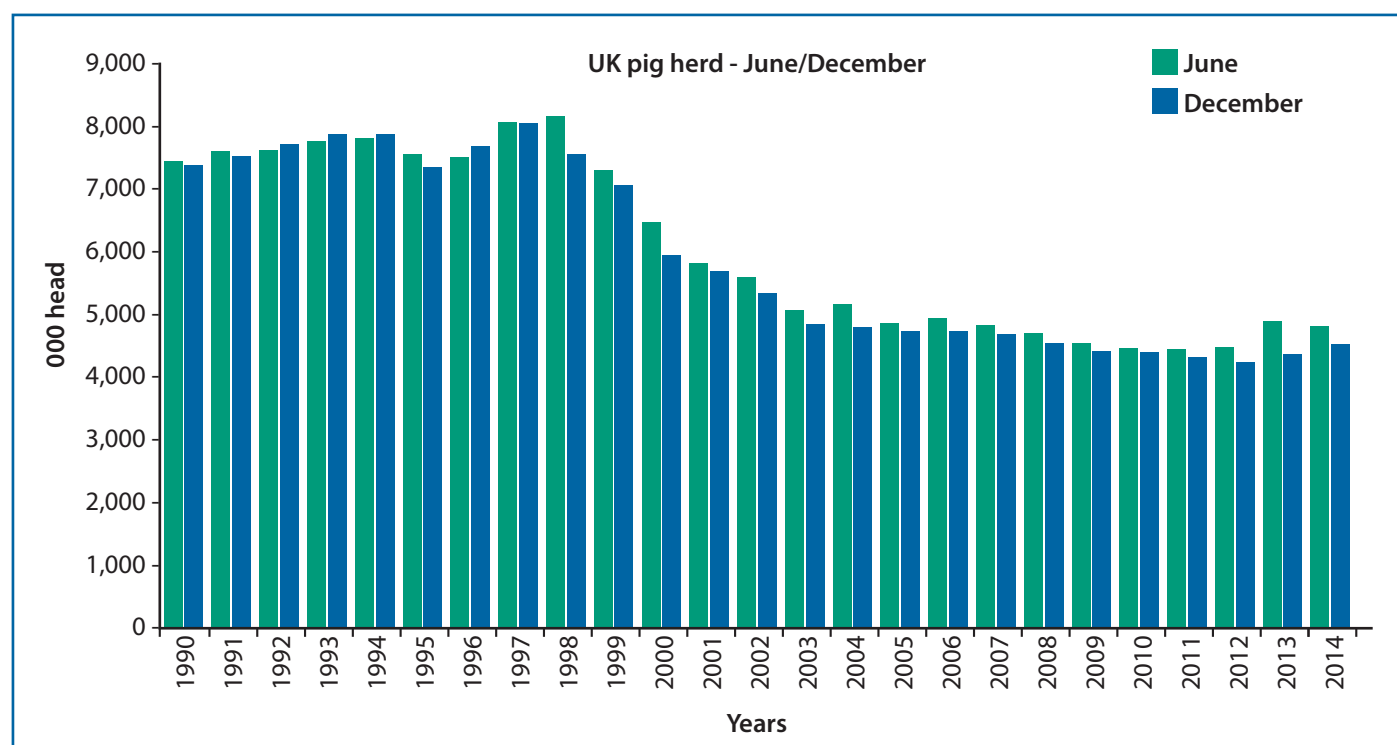


Figure 3.2: Female breeding pigs on agricultural holdings in the UK, 1990–2014.

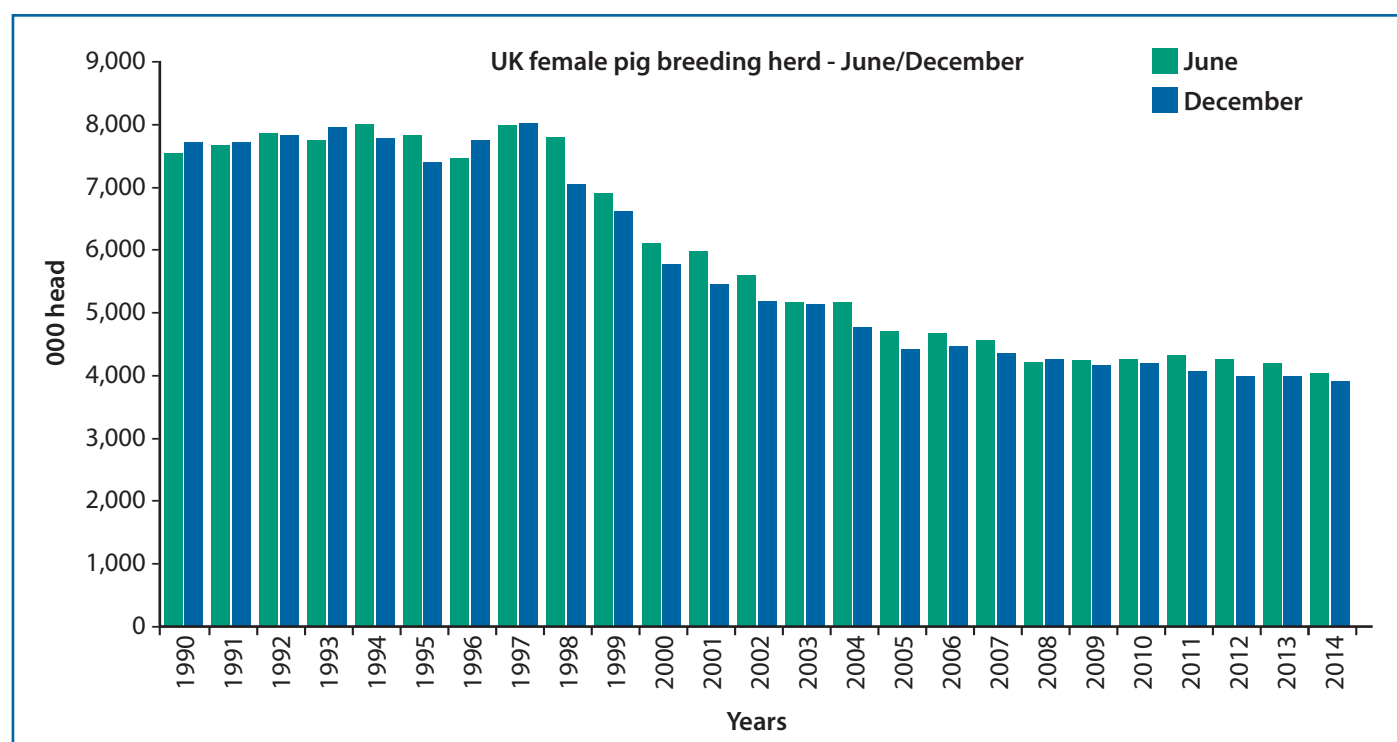


Table 3.1: Pigs on agricultural holdings in the UK, December, 2012–2014.

Thousand head	2012	2013	2014
Total pigs	4,216	4,383	4,510
Breeding pigs	509	497	486
Female breeding herd	400	398	390
Sows in pig	269	273	260
Gilts in pig	68	60	56
Other sows (suckling or dry)	63	64	74
Other breeding pigs	109	99	96
Boars for service	15	15	13
Maiden gilts	93	84	83
Fattening pigs (incl. barren sows)	3,707	3,886	4,024

Source: Defra June Survey of Agriculture

The smaller breeding herd recorded in the December survey and particularly the lower number of in-pig sows and gilts may indicate some pessimism among producers. However, there is some uncertainty about these figures, given that a similar fall in the June survey figures didn't lead to any tightening of finished pig supplies. This suggests that, unless there has been an unprecedented surge in productivity, the June figures didn't accurately reflect the true situation. It is, therefore, probably best to assume that the breeding herd remains broadly stable.

With the breeding herd apparently broadly stable, the overall herd increase is due to a 4% rise in the number of feeding pigs, taking numbers over 4 million head for the first time in six years. The biggest increase was in the top weight band, those over 110kg liveweight, consistent with the heavier carcass weights recorded over the last year. However, there were significant increases in all weight bands.

3.1.2 Number and size distribution of commercial holdings

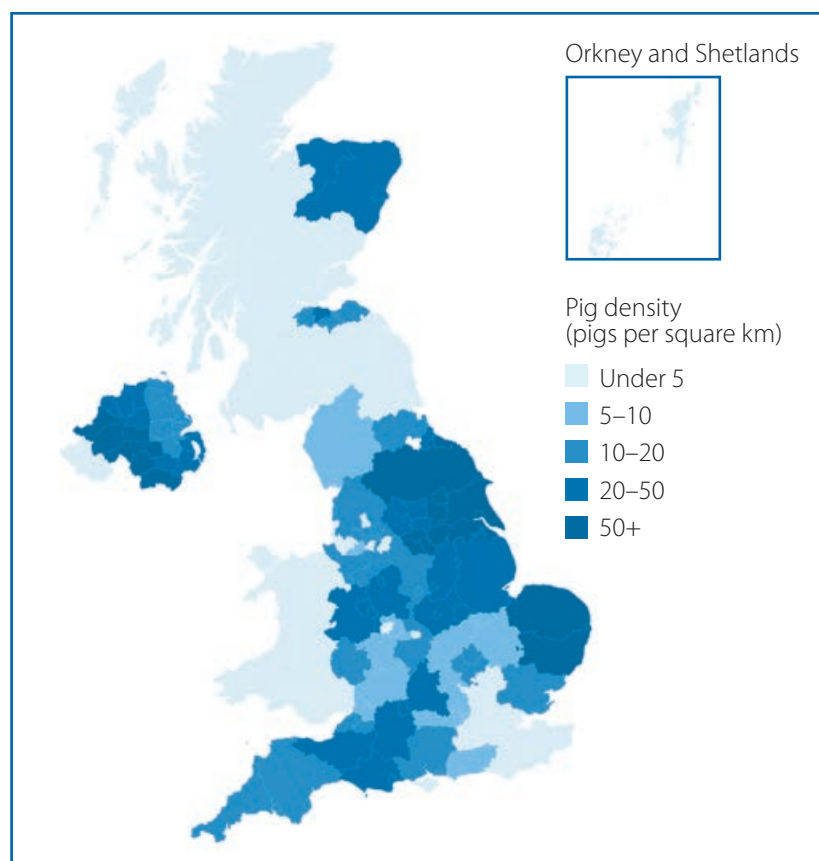
Defra figures from the 2013 June Agricultural Survey show a 1% fall in the number of UK commercial agricultural holdings with pigs between June 2012 and June 2013. However, within this total (11,000), there was an increase in the number of holdings with 1,000 or more pigs to 1,420, a 5% increase on a year before. Between them, these farms accounted for 85% of the UK herd. There was also a drop in the number of farms with breeding pigs, which fell by 2% to just under 6,000. Again, the vast majority of the herd was located on a small proportion of this total; 810 farms with 100 or more sows accounting for 88% of the national breeding herd. The number of holdings with feeding pigs was almost unchanged at 9,200, with around 4,200 of these holdings also having breeding pigs.

The numbers above include many holdings that keep pigs but which are also engaged in other agricultural activities. When holdings were classified based on their predominant activity (over two-thirds of output) there were 5,600 specialist pig holdings in the UK in 2010 (the latest year for which UK-wide figures are available). In England, there were 1,826 specialist pig farms in 2013, around 200 more than in 2010. These holdings accounted for 79% of pigs on commercial holdings in England. The 1,200 specialist pig holdings with breeding pigs had an average of just over 300 breeding pigs. Pig holdings with feeding pigs had an average of 1,630 animals.

3.1.3 Location of pig producers

Pig producers are highly geographically concentrated. Of the 4.5 million pigs in the UK, around 82% are in England, with 11% in Northern Ireland, seven per cent in Scotland and less than one per cent in Wales. In 2013, well over half of England's pigs were concentrated in just four counties: Norfolk, Suffolk and north and east Yorkshire. There are also significant concentrations in Northern Ireland, to the south and east of Lough Neagh and the east of Scotland.

Figure 3.3: Geographical locations of pig production in the UK, June 2013.



3.1.4 Abattoirs slaughtering pigs

The number of abattoirs slaughtering pigs has declined considerably over time as many small plants have stopped trading. During 2014 there were 115 English abattoirs killing pigs, around half the number there were 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 around 70% of all pigs slaughtered during 2014. In fact, the eight largest plants (including two non-specialist ones) killed over three-quarters of all pigs. The four largest companies, with nine sites between them, killed around 80% of English pigs.

3.1.5 Workforce on pig farms

Detailed figures of the workforce on England's 1,800 specialist pig farms is available for 2013. At that time, they employed a total of 6,000 workers, an average of 3.3 per holding. Just over half the workers on specialist pig farms were farmers, partners, directors and spouses, working either full-time or part-time. About 30% were regular full-time workers. The remainder were made up of managers, part-time and casual workers.

The number of people working with pigs on non-specialist pig farms is unknown. However, estimates put the total equivalent at 3,000–4,500 full-time workers (depending on how this is defined). In reality, the workforce will be significantly higher than this, as many will work part-time or will only devote part of their time to pig production.

3.2 Production systems

3.2.1 Housing systems

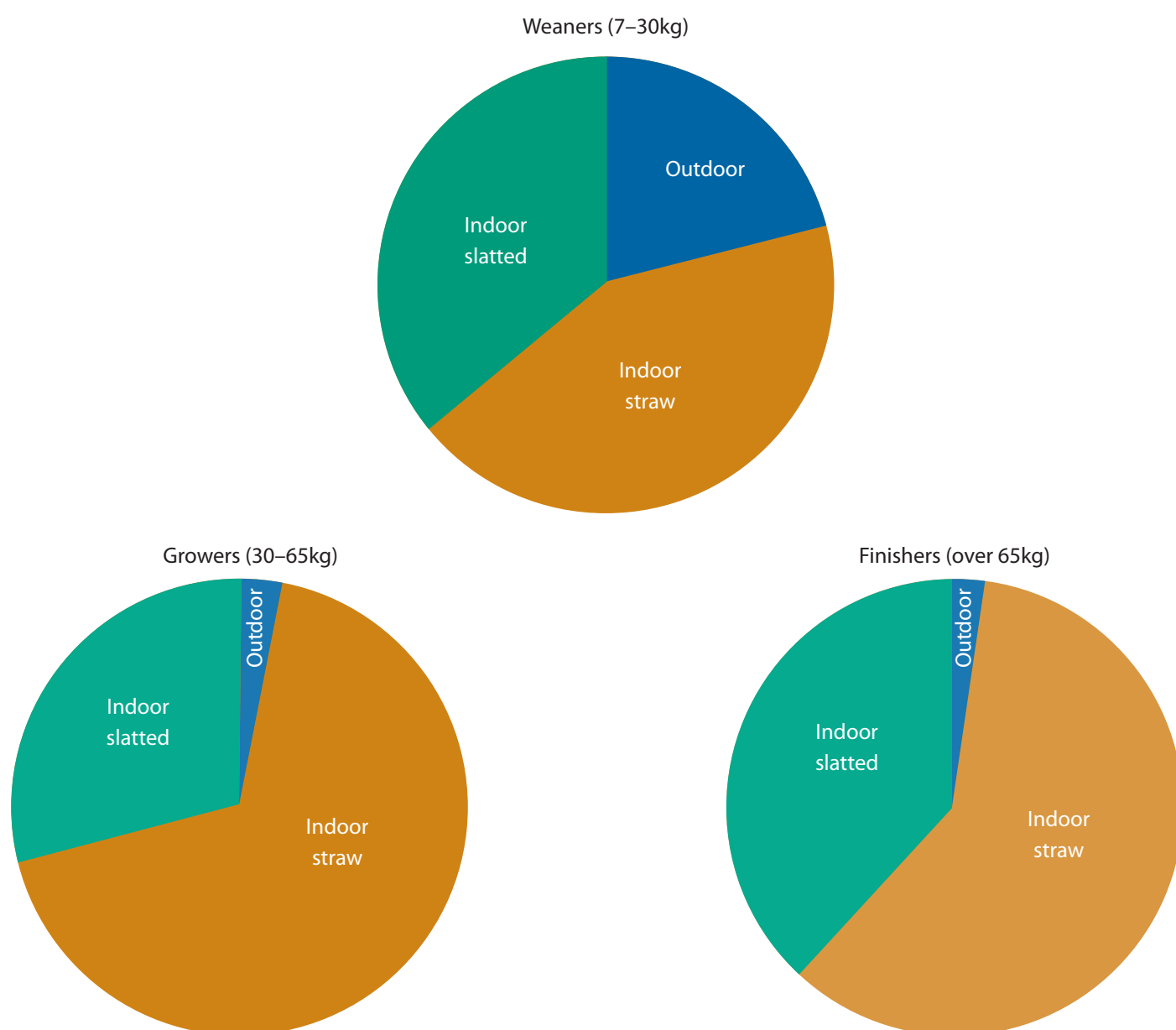
There has been little change to the look of housing systems within England and the wider UK over the past three years. In England, around 40% of the commercial pig breeding herd are kept outdoors. This percentage varies little between different stages in the breeding cycle and has risen from under 30% five years ago. The remaining 60% of sows and gilts are kept in indoor systems but here there are differences across the breeding cycle. During farrowing and while sows are suckling piglets, most are kept on fully or partly slatted floors, although a significant minority are kept on straw. However, for the remainder of the breeding cycle, most indoor sows are kept on straw-based systems. Almost all indoor maiden gilts are kept on straw.

Outdoor breeding pigs are typically housed at a density of around 15 sows/gilts per hectare. In around 80% of cases, outdoor pigs are used as part of a rotation system, with pigs spending an average of 17 months in a paddock before they are rotated. Most outdoor producers provide pig arcs for shelter, with some using cabins or tents as well as or instead of arcs.

Once piglets have been weaned, they are less likely to be kept outdoors. Only around one in five weaners (between 7 and 30kg) are housed outdoors, with stocking densities much higher than for breeding pigs, typically close to 400 per hectare. Where weaners are housed indoors, over half are on straw with the remainder mainly on fully slatted floors.

At later stages in the feeding process, pigs are much less likely to be housed outdoors. Only 3% of commercial growers (between 30 and 65kg) and finishers (over 65kg) are kept outdoors, although these figures are likely to be higher for smaller producers, for whom equivalent figures are not available. The majority of pigs which are housed indoors are on straw, a proportion which has increased in recent years. Finishers are more likely to be housed on slatted floors than growers.

Figure 3.4: Housing systems for English feeding pigs.



Source: Defra Pigs and Poultry Practices Survey, 2009.

3.2.2 Feeding systems

A variety of different types of feed are used by pig producers. All contain a mix of components designed to provide all of the nutrients required by pigs. Different mixes are used for pigs at different stages of their life cycle. Major components of feed in the UK include cereals (mainly wheat, barley or distillery by-products) and oilseed cake and meal (mainly soya or rape). A wide variety of other ingredients are used less frequently. Just over half of producers report that they home-mix some or all of the feed they use, others buy in ready mixed feed.

There are three main forms of feed used by pig producers: pellets, meal and wet/liquid feed. Pellets are the most common form for all stages of the lifecycle and are used by around 80% of producers to feed weaners, about 60% for rearers and finishers and about 40% for sows. Meal is used by around 30% of producers to feed rearers, finishers and sows but only 10% for weaners. Wet feed is most frequently used to feed finishers, with around 20% of producers using it. For sows, wet feed is only used in 10% of cases and for weaners around six per cent. A small number of producers use other feeding approaches.

During 2014, just over 1.8 million tonnes of compound pig feed were produced in the UK, the highest output since 2001. Nearly half of this was finisher feed, just under a quarter was sow feed and about 20% was grower feed. The remainder was made up of feed for piglets and early growers, along with protein concentrates.

3.3 Key facts

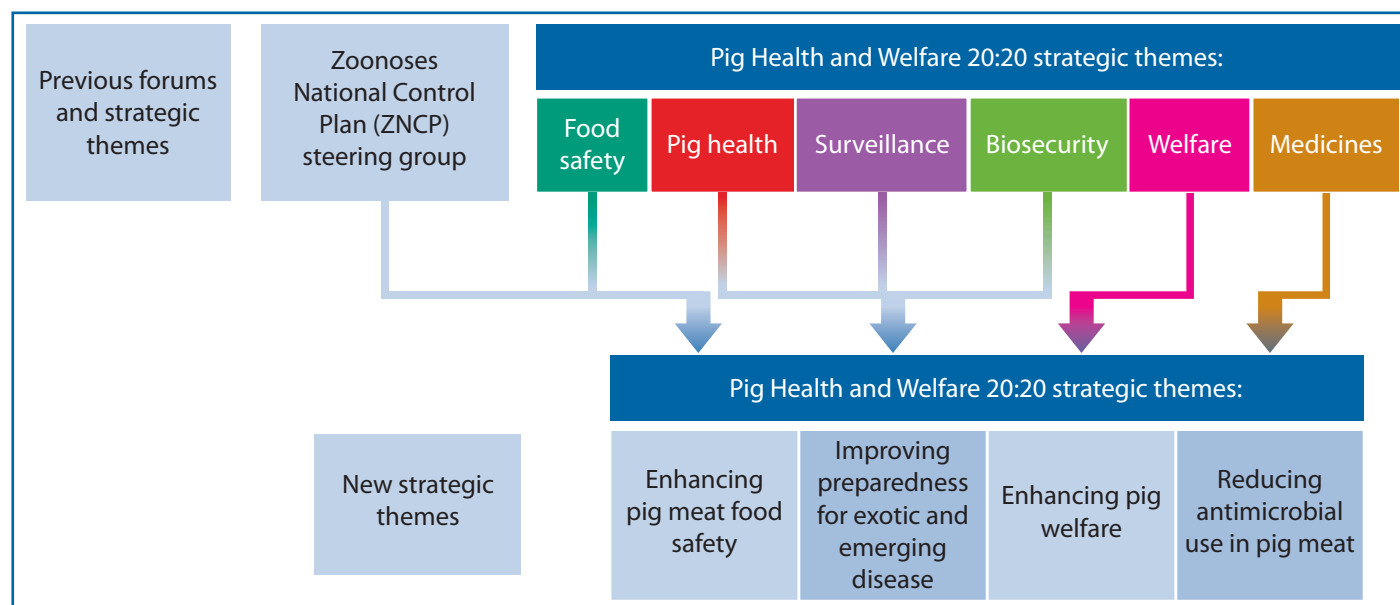
1. **Since the peak of production in 1997-98, the total number of pigs on UK agricultural holdings has fallen from over 8 million to 4.5 million in 2014, a 44% reduction**
2. **The number of female breeding pigs has fallen from 800,000 to 390,000 (51%) over the same time period**
3. **There were 11,000 commercial agricultural holdings with pigs and 6,000 had breeding female pigs (average number 70) and 9,200 had fattening pigs (average number 474) in 2013. With the very small units of five or fewer breeding pigs or 10 or fewer finishing pigs taken out, the average number of breeding females in a herd rises to 158 and finishing pigs to 882**
4. **Of the 4.5 million pigs in the UK, 82% are in England, 11% in N. Ireland, 7% in Scotland and less than 1% in Wales. Over half of the pigs in England are in East Anglia and Yorkshire**
5. **The number of abattoirs slaughtering pigs in England has halved over the last 16 years and there are now only 115, with 14 specialist ones that only handle pigs and account for 70% of pigs killed**
6. **Approximately 6,000 people work on England's specialist pig farms, with others working with pigs on non-specialist farms, although the number of these is uncertain**
7. **Approximately 40% of the commercial pig breeding herd is outdoors, but only 20% of weaning pigs are reared outside. Over 90% of growers and finishers are reared indoors but 60-70% of them are reared on straw rather than slats**
8. **Just over 1.8 million tonnes of pig feed was produced in the UK, 48% for finishers, 23% for sows, 20% for growers and 9% for piglets and early growers.**

4 20:20 Pig Health and Welfare

4.1 Vision

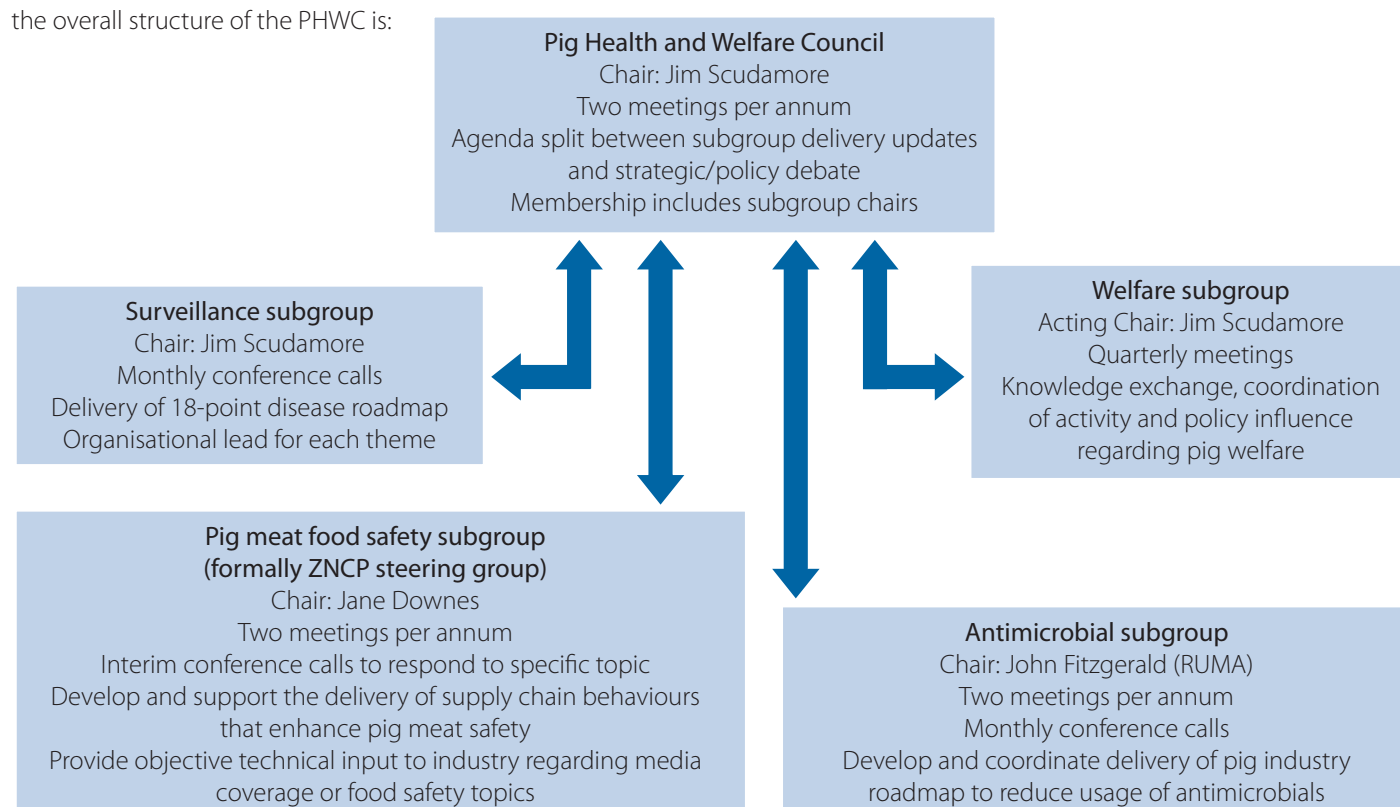
The vision in the 20:20 Pig Health and Welfare report was established in 2012 to be 'An English pig herd where health and welfare are continually improving, which results in better pig performance, the production of a safe and quality product, reduced environmental impact and increased sustainability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

This vision has continued under the new structure of the PHWC but with a more streamlined and targeted approach to try and achieve the same objectives but with a clearer direction on key topics, which have been identified as potential issues for industry. The reduction of topics to a few key areas will allow the PHWC to affect more strategic change.



4.2 Current delivery structure

Following the restructure of the PHWC in 2014, the approach which was taken to continue the delivery of the 20:20 vision was to re-structure 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. Currently the overall structure of the PHWC is:



The PHWC continues to operate and meet on a six-monthly basis. This forum is used as a platform for the four subgroups to report activity and delivery. It also retains its original purpose, which is to bring together a range of industry and government stakeholders engaged in pig health or welfare related activities or policy development resulting in greater visibility, collaboration and coordination between these parties. Efforts are being made to widen the remit of the PHWC to take in a more UK-wide view of health and welfare matters, reflecting that disease does not respect boundaries and that sharing information between the devolved regions will be of universal benefit.

The operation of the four subgroups is more ad hoc and dynamic dependent upon the nature of activity being discussed or delivered. Experience to date indicates that informal, shorter but more regular meetings of the subgroup via webinars and conference calls has resulted in more concerted activity and tangible delivery of this aspect of the strategy.

4.3 Objectives

The main objectives of the 20:20 Pig Health and Welfare strategy for England are to:

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

4.4 Milestones for the PHWC 2013-2014

The existing list of milestones set out in the PHWC report of 2012 specified wide-reaching and ambitious targets for the pig industry and the council to achieve. Some of these targets have taken longer to develop than originally planned and others have required behavioural and structural changes to the sector before the effect can be felt. The new structure of the PHWC took effect in April 2014, but there has been no change to the milestones in the face of these changing circumstances and work.

Key milestones for 2012	Comments	Complete
Establish baselines for health and welfare outcomes	Initial baselines for welfare have been recorded since April 2013. The baseline has been established and this work has been completed. It will require time to ensure it has become equalised and is robust enough for publication.	Complete
Agree specific targets for 20:20 health and welfare outcomes	Targets were agreed and the majority of these have been carried over into the new structure of the PHWC.	Complete
Extend health improvement project to all of England	The Pig Health Improvement Project (PHIP) has been superseded by wider reaching health strategies within the PHWC. Many of the key features, such as the biosecurity tool and swine dysentery charter have been retained and developed further. Demonstrating that the legacy of PHIP is now across England.	Ongoing
Complete development of system for measuring welfare outcomes	The real welfare assessment scheme was launched in April 2013 and has subsequently been recording outcome based welfare measures for that time. 2014 saw the launch of an improved mobile application for ease of recording on farm and instant benchmarking for the assessor.	Complete

Key milestones for 2012	Comments	Complete
Develop national control programme for <i>Salmonella</i> in pigs that is approved by the European Commission (for introduction in 2013)	<i>Salmonella</i> has been an ongoing topic of work within the PHWC. Collaboration with the government R8 study has been an important part of developing a better understanding of <i>Salmonella</i> control mechanisms, as well as the development of <i>Salmonella</i> sampling strategies in the slaughterhouse. The Zoonoses National Control Programme has now been incorporated into the pig meat food safety and disease surveillance subgroups, which have continued the work on <i>Salmonella</i> control.	Ongoing
Establish robust mechanisms for routinely evaluating and scoring biosecurity practices on pig farms and establish baseline national biosecurity status on pig farms	A biosecurity hazard assessment tool was developed in 2013 and was initially available only to PHIP members. This is now available to all English levy payers through the Pig Hub. In 2014, the next generation of this tool was put out to tender and a digital biosecurity hazard perception tool is being developed for release in autumn 2015.	Phase 1: complete Phase 2: ongoing
Review health and welfare research and agree a roadmap for research in this area from 2013 to 2020	Health and welfare research topics were reviewed in 2012 and outlined as part of the horizon 20:20 vision. Many of these areas of research were ambitious and have been adopted since 2014 as part of the ongoing strategies of the new PHWC subgroups.	Complete
Develop accredited health and welfare training modules	There have been several new modules developed for health and welfare training since 2012. In addition to the continued development of the Pig Industry Professional Register (PIPR), there have been programmes for producers and vets covering on-farm welfare as well as specific courses on rodent control and humane euthanasia. Continued efforts have been put in place to maintain the provision of these courses into the next phase of work from the PHWC.	Ongoing
Review of process towards the objectives and targets of the strategy	The PHWC decided to publish its progress in a biennial rather than annual report as many of the milestones require more than a year to become established and to be developed.	Complete

5 Pig health (disease surveillance subgroup)

5.1 Surveillance subgroup

As part of the PHWC restructure, a new disease surveillance subgroup was established upon the foundations of previous work in the area of animal disease managed by the council. At the inception of the new subgroup, industry and allied groups were invited to a round table discussion to form the basis of the work for the group to focus upon in the short, medium and long term.

A round table was organised in April 2014 with presentations and discussions around six topics related to control and prevention of disease in pigs.

The topics were:

- **Horizon scanning**
- **Prevention of introduction**
- **Prevention of contact**
- **Early detection**
- **Rapid response – contingency plans**
- **Strategic plans.**

From these points a 21-point action plan based on the roundtable recommendations was produced. This contained details of the action required, the lead organisation, monthly progress reports and a date for completion. Regular teleconferences are held to ensure that progress was being made.

In terms of horizon scanning, three new or emerging diseases are of concern to the pig industry. Much of the work of the subgroup in the latter part of 2014 has been devoted to Porcine Epidemic Diarrhoea (PED). Contingency planning for the eventuality of the new strains of the disease entering the British Isles was identified as being the major priority for this subgroup. It is testament to the determination of the pig industry and the willingness of Government to assist, that a contingency plan was completed by the autumn of 2014. The teleconferences since July have concentrated on PED, covering updates on the present position with respect to PED, African Swine Fever (ASF) and, where necessary, Porcine Reproductive Respiratory Syndrome (PRRS). This structure for the disease surveillance subgroup has proved to be a successful method of monitoring disease status within the UK and abroad. It has also put in place a framework which can be utilised in the case of important disease threats to the industry.

Further horizon scanning is performed by groups externally to the PHWC, such as the APHA-led Pig Expert Group (PEG) and the expert groups of the Pig Veterinary Society executive committee. These groups, while independent of the PHWC, have representatives who are part of the disease surveillance subgroup present. This allows for a seamless flow of information between the expert groups representing pigs across not only in England but also across the British Isles.

Another aspect of disease surveillance that the PHWC recognise is the provision of active and passive surveillance methodologies. Reliable information on enzootic disease status on farm is critical for health planning and management. Development of a representative and robust picture of the structure of the industry will support surveillance activities aimed at disease detection and control.



5.2 PED contingency planning

PED has been of concern to the PHWC since the emergence of the highly virulent strain in the USA. PED is not exotic to the UK, as the virus has been known to be circulating within Europe since the 1970s, with relatively mild clinical signs. Countries such as Spain and Italy have seen occasional outbreaks of PED in the last decade but these have not seen significant losses of piglets. It is thought that the highly virulent Asian strain of PED was formed as a mutation of one of the pre-existing European strains after it had become established in Asia during the late 90s. The route of entry for the highly virulent strain of PED into the USA is still unclear and an exact explanation is now unlikely. This highly virulent PED poses a significant threat to the UK pig industry due to the high piglet mortality (up to 100% in some cases) seen in China, the USA, Canada and most recently the Ukraine. Although we have previously experienced PED within UK herds, an APHA study carried out in 2014 suggests that less than 9% (and possibly even lower numbers) of pigs have any circulating antibody titre. This suggests that the UK herd has little to no protection against new emergent European strains or the highly virulent USA/Asia strains.

Despite the disease being of extreme significance to pork production, there is no risk from the disease to human health as the virus is not zoonotic, which is why the contingency planning has been led by industry with assistance from government when needed. The most successful contingency programme against PED has been observed in Canada and the PHWC contingency plan for England has been based upon this approach. The development of the contingency plan for England, standard operating procedures (SOPs) and diagnostic tests have required close collaboration across the pig industry, with assistance from APHA and government. This close working relationship is likely to set a precedent for contingency planning for other diseases of significance to the industry in future.

In the summer of 2014 the PHWC disease surveillance subgroup developed a contingency plan for PED should it reach British shores. The plan was created as a living document, allowing for modification based upon the latest in scientific understanding as there are still significant knowledge gaps in the understanding of the aetiology of the disease. AHDB Pork and APHA have been working collaboratively to provide free diagnostic testing (PCR) for PED for all cases of diarrhoea from English pigs passing through the government laboratory. The PHWC disease surveillance subgroup is looking to continue the work outlined by the contingency plan during 2015, providing pig producers with technical information, SOPs and resources to help control the disease should an outbreak occur.

5.3 Scope of investigation for the disease surveillance subgroup

The subgroup aims to:

- **Identify the needs of the pig industry and the scope of surveillance required and, in particular, the needs which are not being met by the current arrangements**
- **Review the present arrangements for delivering information on the occurrence and prevalence of pig diseases and welfare issues in England**
- **Consider whether the benefits delivered by surveillance activities meet the industry's needs**
- **Consider how the capability for both active and passive surveillance can be improved**
- **Review robustness of population data to act as a baseline against which to**
 - **Measure targets and changes in disease prevalence and**
 - **Ensure prompt and targeted intervention in the event of local, regional or national outbreaks requiring a coordinated response to control**
- **Identify sources of disease information not currently used to their full potential and mechanisms that could be developed for improving their outputs**
- **Define the technical and legal requirements for the sharing of data**
- **Advise on needs for scientifically rigorous analysis of available data sets**
- **Outline a method for the integration of existing pig surveillance mechanisms and a strategy for exploiting synergies between programmes**
- **Advise on approaches to improving public and stakeholder engagement**
- **Outline the short, medium and long-term research, development and delivery needs for surveillance until 2020**
- **Estimate cost of proposals for future surveillance and their benefits to different stakeholders**
- **Establish priorities for delivery**

- **Develop an implementation plan for future delivery of surveillance**
 - **Identify potential funding sources, both public and private**
 - **Establish robust mechanisms for routine monitoring of the prevalence of key endemic diseases and baseline national health status.**

5.4 Pig Health Improvement Project: PHIP and its legacy

Under the new structure of the PHWC and a change to the structure of BPEX, PHIP was incorporated into a broader remit of disease prevention and control within BPEX itself, with PHIP being phased out in early 2014.

Many aspects of PHIP have continued to be developed as part of its ongoing legacy and as part of the contingency measures set in place for PED, the swine dysentery charter has been expanded to form a Significant Diseases Charter. This can be used by industry as a method for quick notification of disease outbreaks in the area and as a means of mutual agreement to unite in the face of potential outbreaks of significant disease. Currently the Significant Diseases Charter only covers swine dysentery and PED but there is capacity for expansion to include any other non-notifiable disease which is of concern to industry.

The biosecurity risk assessment tool, initially developed for the PHIP scheme is now being developed into a biosecurity hazard perception tool, which will provide interactive training for farm staff and managers around the biosecurity risks and hazards found on the average indoor or outdoor unit. The tool will assess the ability of the student to assess on-farm biosecurity risks, how to mitigate them, as well as having an understanding on what the current thoughts are on best practice.

6 Welfare (pig welfare subgroup)

6.1 20:20 Pig Health and Welfare

The scope of investigation specifies the need to:

- **Evaluate the usefulness of measuring welfare outcomes and work with farm assurance schemes on incorporating a harmonised approach into standards.** Such schemes can be used to earn recognition for progress made and provide a clear focus on ongoing improvement
- **Achieve progress in improving pig welfare that is not at the expense of deterioration in other areas, eg production costs that are unsustainable; reductions in tail docking should not be at the expense of an increase in pigs that are tail bitten**
- **Promote high welfare standards to consumers and work with retailers to create a virtuous cycle of investment and reward that should become the driver of progress in improving pig welfare**
- **Work specifically on the following:**
 - Reduction in the damage to pig tails
 - Welfare and production impacts of piglet teeth clipping and feasible ranges for reduction in teeth clipping and grinding
 - Reduction in the incidence of lameness
 - Improvements in the farrowing environment.

Regular welfare outcome assessments have now been required for all units finishing pigs under the Red Tractor Pig Scheme since 2013. This means that between two and four times a year, veterinarians trained in welfare assessments visit farms and assess the welfare of a representative sample of finisher pigs. Although the introduction was challenging, thanks to the continued involvement of key stakeholders, the scheme is now an established and accepted part of Red Tractor Farm assurance for finisher pigs. Freedom Food and the Soil Association have also started to incorporate a more extensive welfare outcomes assessment into their schemes, with data being collected through their trained assessors. The two welfare outcome assessments are aligned to avoid duplication. The PHWC has considered the Farm Animal Welfare Committee (FAWC) review of the implications for animal welfare of farm assurance schemes and agrees with the conclusion that overall, farm assurance schemes have helped to deliver improved animal welfare.

Prevention of tail biting remains a primary focus of the pig welfare subgroup, with a small programme of work planned for 2015. The group continues to consider the latest developments in welfare science, including the farrowing environment and is looking forward to the FAWC opinion on the subject.

7 Food safety and public health (pig meat safety subgroup)

7.1 20:20 Pig Health and Welfare

Under the new structure of the PHWC, the area of pig meat food safety was considered to be of key strategic importance so was established as a group. The recently formed subgroup incorporates the work of the Zoonoses National Control Plan (ZNCP) steering group. The aim of the subgroup is to support the whole of the UK pig meat supply chain in the delivery of safe and traceable pork. Working with the baseline data from the 2013 disease surveillance survey, the subgroup selected Hepatitis E and *Salmonella* as the target organisms for investigation and research, while awaiting the outcome from EFSA in relation to *Toxoplasma* and *Yersinia*. Potential sources of surveillance currently available from industry data have been identified and a gap analysis undertaken. The group is looking into how to close these knowledge gaps. Discussions have taken place on how information from surveillance data would be used to further reduce the risk from pig meat. The group will meet twice a year, with the use of webinars between meetings to monitor progress.

7.2 Zoonosis National Control Programme (ZNCP) and its legacy

The objective of the Zoonoses National Control Programme for *Salmonella* in pigs (ZNCP) was to reduce the risk to consumers through preparing the industry for the proposed new EU regulations on reducing *Salmonella* in pig meat products. ZNCP focused on increasing understanding of *Salmonella* risk and control throughout the pork chain. The proposed regulation has not been adopted but the work has continued to monitor *Salmonella* levels in UK-produced pig meat and provide the industry with strategies for ongoing improvement. There are elements of the ZNCP work surrounding on-farm biosecurity which have been incorporated and which have informed both the disease surveillance and the antimicrobial subgroups.

One aspect of the ZNCP work was a government-funded, four year, research project with several objectives pertaining to *Salmonella*. This project has already achieved several of its objectives and will continue to feed into the work of the relevant PHWCs. Some of the areas undertaken will have wider influence than on control of *Salmonella* alone, with the results of the disinfectants trial work, undertaken by the APHA, having great potential for better understanding best practice in on-farm cleaning and disinfection protocols.

Under the revised structure the PHWC is continuing to support the legacy of the ZNCP group, utilising the information to inform the relevant sections of industry as results are made available.

7.3 Revision of meat inspection

In October 2011, the European Food Safety Authority (EFSA) published its scientific opinion on the public health hazards to be covered by inspection of pig meat. EFSA identified *Salmonella*, *Yersinia enterocolitica*, *Toxoplasma gondii* and *Trichinella* as the key public health risks and made a series of recommendations to address them.

In line with the EFSA opinion, the European Commission developed a legislative package on modernising pig meat inspection, which achieved a qualified majority of member state agreement on 22 May 2013. These new legislative changes to pig meat inspection applied from 1 June 2014.

The changes include the visual inspection of pig carcasses and offal by officials at post mortem, a strengthened Process Hygiene Criterion for *Salmonella* and a more risk-based *Trichinella* testing regime. The subgroup will be monitoring the effects of these changes and supporting the industry in their implementation.

The new testing regime for *Trichinella* as applied in the UK from 1 November 2014. The build-up of negative data contributes to establishing that the UK has disease free status.



7.4 BPEX Pig Health Scheme (BPHS)¹

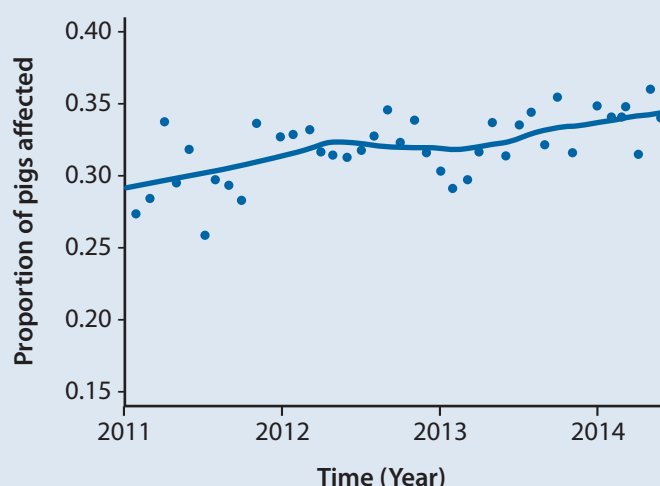
All English levy payers are eligible for free BPHS abattoir reports if they are in a BPHS catchment area and submit animals to slaughter on the days BPHS is running. Previously, this was only available to PHIP members so it will further help producers to identify subclinical disease, which may not otherwise be obvious. An analysis of the results from BPHS in 2014 by Scotland's Rural College (SRUC) has shown some interesting findings.

The prevalence of enzootic pneumonia-like (EP-like) severe lesions seems to have stabilised overall, although there has been a slight increase in the last quarter, which could be related to seasonal variation. The prevalence of pleurisy lesions continues to show a slight decrease over the last quarter. The proportion of EP-like lesions shows a slight increase over the last quarter, suggesting there was an increase in mild lesions of EP but not severe lesions. The batch prevalence highlights that this increase is mainly due to there being at least one animal and not several animals affected per batch. The BPHS data demonstrates that the prevalence of pleuropneumonia lesions and viral-like lesions appear to have stabilised overall since the beginning of 2014, though with some slight fluctuation linked to seasonal variation.

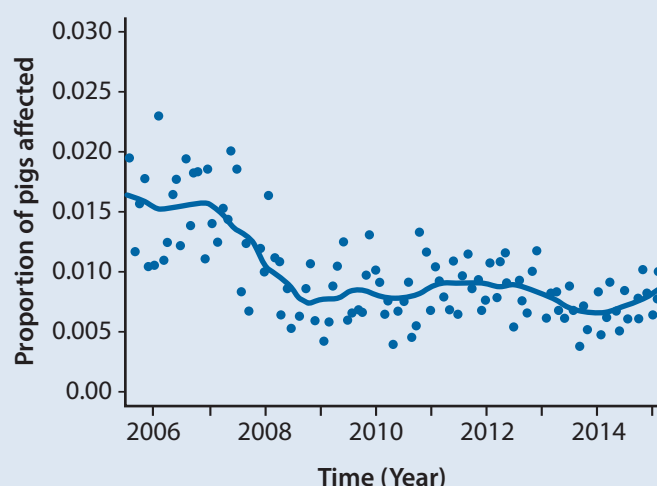
The proportion of peritonitis, milk spots, pericarditis, papular dermatitis, hepatic scarring, pyaemia, abscess in the lungs and tail damage seems to have remained stable since the beginning of 2014, although some lesions show seasonal variation.

¹ <http://www.bpex.org.uk/health-welfare/health/safe-traceable-pork/bphs/>

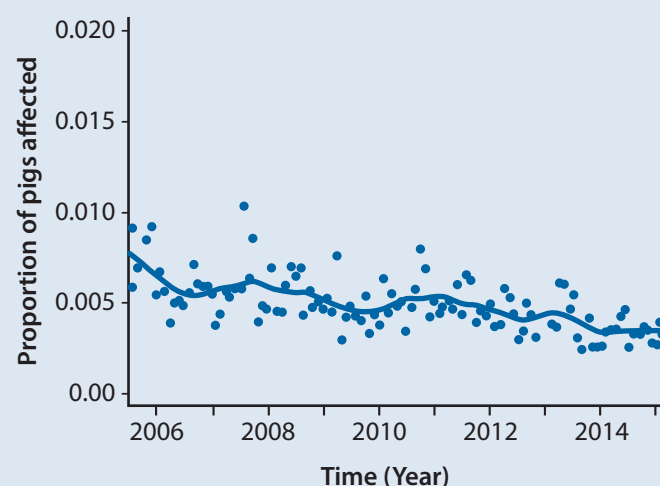
Monthly prevalence and fitted trend for EP-like lesions 2011–2014



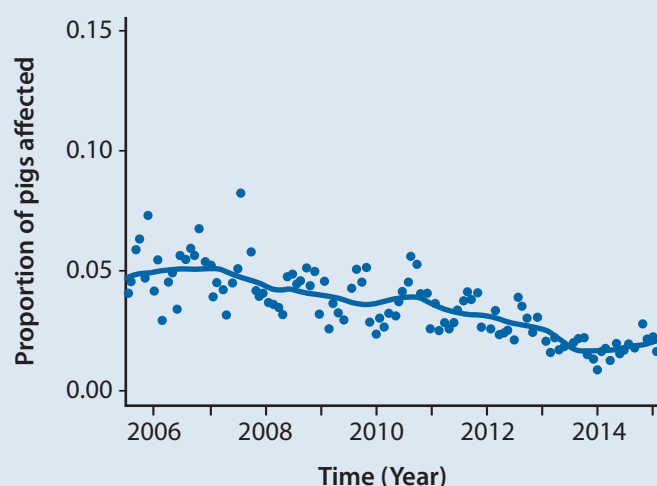
Monthly prevalence and fitted trend for pleuropneumonia lesions



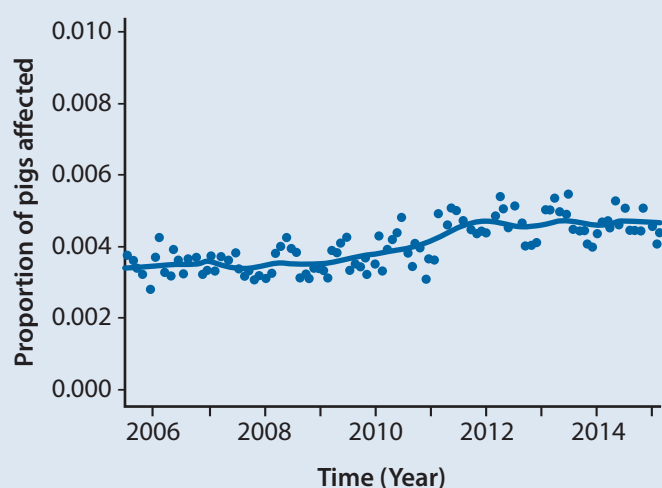
Monthly prevalence and fitted trend for peritonitis



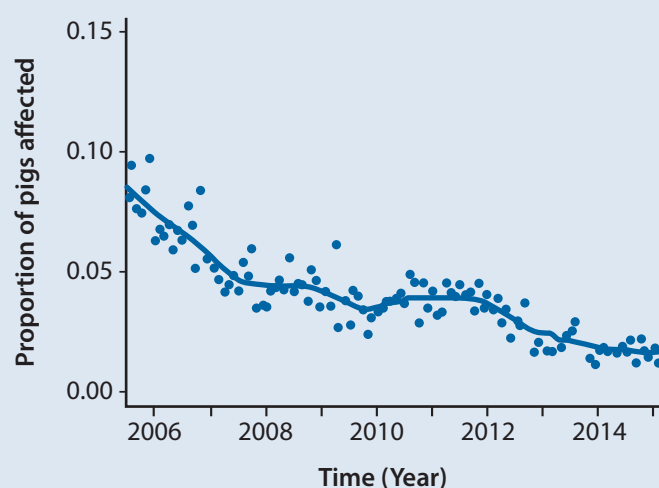
Monthly prevalence and fitted trend for milk spots



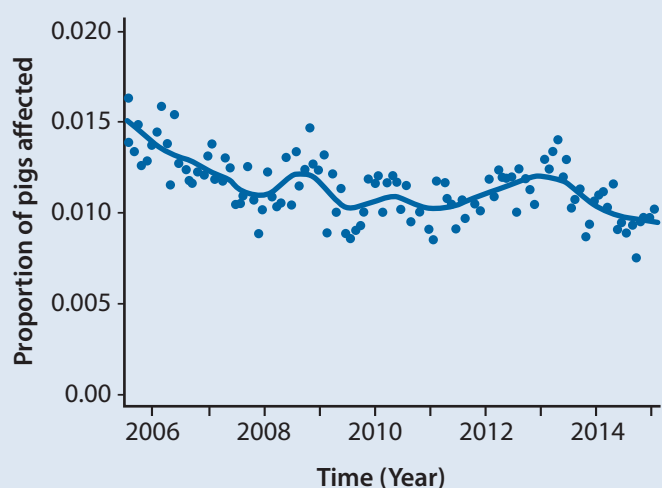
Monthly prevalence and fitted trend for pericarditis



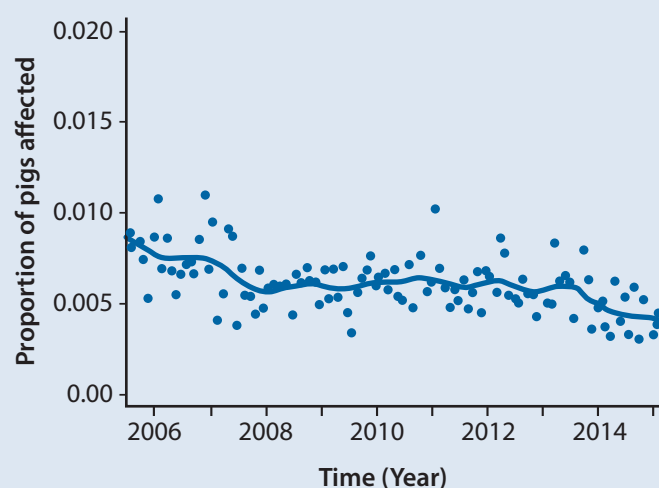
Monthly prevalence and fitted trend for hepatic scarring



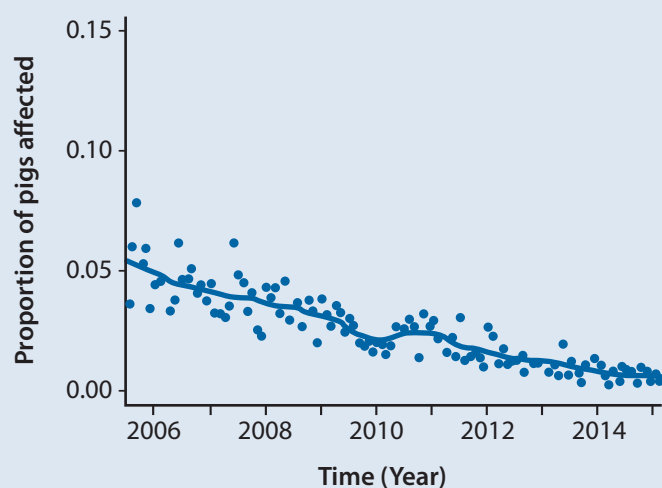
Monthly prevalence and fitted trend for pleurisy



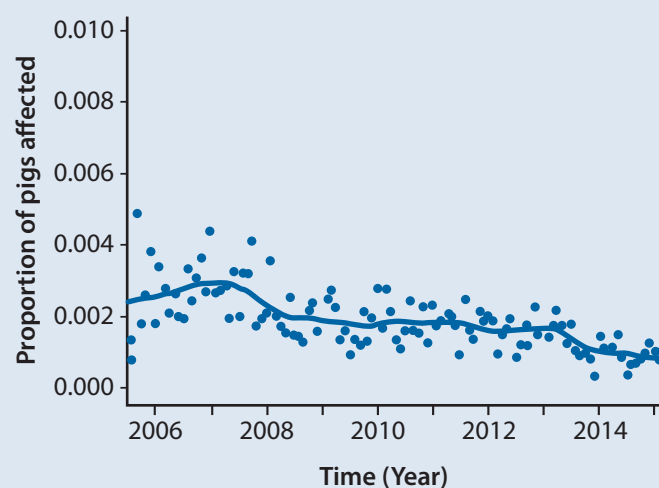
Monthly prevalence and fitted trend for abscess



Monthly prevalence and fitted trend for papular dermatitis



Monthly prevalence and fitted trend for pyaemia



8 Medicines (antimicrobials usage subgroup)

Scope of investigation

The subgroup aims to:

- **Determine the quantity of antibiotic used, by active ingredient, in UK pig production taking into account EU requirements**
- **Determine how antibiotics are used in UK pig production and how the amount and frequency of use can be optimised, taking account of practices in other species and other countries, while maintaining production levels and health and welfare standards**
- **Identify actions already in hand to ensure responsible use of antibiotics in pig production and ways to increase publicity of this work**
- **Inform pig producers and vets on how they can use antibiotics responsibly**
- **Produce an action plan of short, medium and long term tangible actions and to monitor progress against the plan each month.**

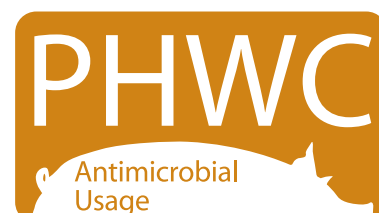
Veterinary medicines are used in pig production to treat, control and prevent disease. The responsible use of them is beneficial to livestock as it helps to keep them healthy and maintain good welfare, and to producers who want to keep medicine costs to a minimum while having productive animals. A simple definition of responsible use is: managing the farm to reduce the risk of disease and then treating ill animals in accordance with veterinary advice. It is recommended to use medicines 'as little as possible but as much as necessary'.

Antimicrobial resistance (AMR) is an important issue that could lead to antibiotics not working in human and veterinary medicine. The livestock sector is working to implement the UK's five year AMR strategy to tackle this. Use of antimicrobials increases the risk of resistance and with most antimicrobials in UK livestock being used in pig production, the PHWC focus will be on methods of measuring the UK's antibiotic usage.

Following the restructuring of PHWC and the formation of the antimicrobials usage subgroup, an industry roundtable meeting was held on 9 October 2014, with representatives from all levels of pork production. The meeting hosted speakers from within the UK pork industry and also representatives from the European pig and the UK poultry sectors. Several key areas of importance were discussed including: collection of data, optimisation of antimicrobial usage, strengthening of international collaboration and alternative approaches to protecting or enhancing pig health. The outcomes of these discussions were used as the basis for creating objectives and an action plan on which the subgroup has been leading. This has led to the development of an informed approach to antimicrobial management, as concerns were raised on the health and welfare implications of a forced reduction with arbitrary targets.

It is widely recognised that reduction of antimicrobial use alone may assist in reducing the risk of resistance developing but will also have potential impacts upon the welfare, productivity and economics on farm. This poses some concerns to the UK farming sector and so the PHWC initiated a report on the different strategies for controlling antimicrobial use in the pig industry across the member states. Practical study trips have been arranged as a way of observing first-hand how these approaches are working in other EU member states.

The subgroup has also recognised that alternative approaches to current methods need to be explored in more depth and so the group needs to engage research in key strategic areas. There is an important need for more research into medication through water lines within the UK. Currently, there are few systems which are set up to use this technology and a lack of expertise in the field to medicate in this way. Another area for further investigation is the development of new or more effective diagnostic tests, which can provide quicker and/or more accurate results to vets and producers to enable them to effectively treat disease. Alternative treatments to antimicrobials, such as vaccines or neutraceuticals, were also posed as potential areas of interest to the PHWC.



9 Biosecurity

20:20 Pig Health and Welfare

Biosecurity remains a key area of the horizon 20:20 vision and will be developed alongside the strategies of each of the four subgroups and within the existing knowledge transfer network.

It is widely recognised that biosecurity underpins the maintenance of good health and welfare on farm and is a contributing factor in helping reduce dependence upon antimicrobials. Following the restructure of the PHWC, it was agreed that a holistic approach to biosecurity would be taken, with each of the separate subgroups encouraging and developing appropriate approaches to biosecurity fitting their own specific remit.

During 2013 and 2014 PHWC contributed to a number of biosecurity measures demonstrating how integral the theme of biosecurity is to the work of the council. Many of the standard operating procedures developed as part of the PED contingency planning process are related to biosecurity throughout the production chain. The SOPs were a collaborative effort with all aspects of the pig industry involved in the creation of the documents. These documents will form the backbone of our defence against PED, as biosecurity appears to be the only effective strategy against the disease. There is potential for expansion of the use of SOPs tailored for other specific diseases if the uptake of these protocols is favourable.

Another approach that has been taken as a result of the council's work has been the development of a biosecurity risk assessment tool, this was formerly only available to members of the PHIP group but has now been made available to all levy payers online through the Pig Hub. This tool provides a method for producers to identify potential weak areas within the biosecurity measures on their farm and an explanation on how to make effective changes. Further measures have been taken to initiate the development of an online biosecurity hazard perception tool. The tool utilises video of on-farm practice to assess the ability of farm staff to recognise potential failures in biosecurity protocols. The development of this tool was initiated in the autumn of 2014 and is due to be completed by the autumn of 2015.

Biosecurity remains of key importance to the pig industry at every level of production, protecting the pigs, the consumer, the industry workers, the farmer and the wider industry itself from disease and financial problems resulting from disease. Questions have been raised regarding the acceptance and understanding of biosecurity as a term and the PHWC is keen to improve knowledge transfer on matters of biosecurity throughout the industry. AHDB Pork is developing a biosecurity hazard perception tool aimed directly at farm workers to demonstrate the basic principles of biosecurity based in a realistic on farm setting. The tool will rely upon visual learning approaches more suited to demonstrating good practice on farm. A range of topics will be covered, such as cleaning and disinfection, transportation, visitors, etc. with outdoor and indoor systems covered separately for each topic.

10 Facilities and infrastructure

Under the restructuring of the PHWC, it was agreed that facilities and infrastructure were no longer a key strategic theme for the PHWC. The foundation for this decision was that the PHWC is not the most appropriate forum to affect change in this area and that there may be other stakeholders within the group who were already contributing work in the field. In the absence of strategic benefit, this area of work was removed from the remit of the PHWC from 2014.

11 Research

20:20 Pig Health and Welfare

The vision specifies the need to:

- **Review health and welfare research with a view to setting out a roadmap by the end of 2012 for research in this area from 2013 to 2020**
- **Encourage relevant industry partners to explore the potential value of an animal health research and technology club with the Biotechnology and Biological Sciences Research Council (BBSRC) that would seek to exploit recent advances in genetics and genomics for the advancement of pig health and welfare between 2011 and 2016**
- **Support research on non-invasive diagnostic testing, eg saliva analysis for groups of pigs, colostrum, etc.**

PHWC continue to promote and support research into the areas of pig health and welfare topics. This is in recognition of the need to continue to develop and help the English pig industry to become a lead on the world stage. Research topics commissioned by the PHWC are wide and varied and contribute towards the aims and objectives of each of the strategic areas, now the subgroups, of the council.

Continued efforts are directed towards supporting research on non-invasive diagnostic testing methods for groups of pigs. Funding was awarded to AHVLA for the 'development of tools and/or techniques for the detection and identification of pathogens and antibodies in oral fluids of pigs'. BPEX also funded a PhD studentship at Newcastle University to investigate tools for the detection and identification of pathogens and antibodies in oral fluids. This PhD yielded a successful and applicable test, with the method being extended further to look into swine influenza and PRRS. The BPEX Innovation Conference 2015 focused on novel diagnostics and treatments of infectious disease.

BPEX commissioned a review of health and welfare monitoring by SRUC/AHVLA, the key questions addressed were:

- **Are sufficient data available to pursue a project to accurately establish the current baseline health and welfare status of pigs in England?**
- **Have we any estimate of the baseline health and welfare status of pigs in England, based on currently available data sources?**

In their stage 1 report, the project team considered that the answers are 'yes, depending on how you define the health and welfare status' and 'yes, but there are some significant gaps', respectively. In stage 2, a framework will be developed for linking different data streams so that information can be brought together for comparison or analysis with the capacity for other streams to be added or to replace current data streams. The objective is to improve capacity to set baselines, monitor changes and identify emerging trends.

Funding was also awarded to SRUC by BPEX for 'the development of tools and/or strategies for providing a robust herd health score and/or cost calculator for pig breeding and finishing herds'. In a stage 1 report SRUC made specific recommendations to be applied in stage 2 of the project, in which a herd health score (HHS) and a cost calculator will be devised and tested. Key parameters to be included in herd health score would be:

Breeding herds:

1. Number of returns per sow
2. Number of pigs per sow per litter born alive
3. Number of pigs per sow per litter weaned
4. Treatment of sows (vaccine and antimicrobial)
5. Treatment records of piglets
6. Sow mortality.

Finishing herds:

1. Mortality
2. Average live weight gains
3. Antibiotic usage
4. Abattoir data
5. Veterinarian consultations
6. Vices.

At abattoir level (carcase lesions):

1. Percentage of pneumonia (EP-like lesions, APP-like lesions and viral-like lesions)
2. Skin lesions (papular dermatitis)
3. Percentage of other pathology
4. Tail bites
5. Arthritis (not measured in the BPHS)
6. Pericarditis
7. Colitis (not measured in the BPHS).

Data that are already collected under various schemes could be merged, centralised and used in designing an integrated HHS and cost calculator. Ideally the process should be automated with results reported to producers and vets with the regular BPHS reports. The cost calculator to be devised based on HHS in the second stage needs to be generic, avoid double counting and have enough flexibility to represent different systems.

In 2014, BPEX launched the new strategy 'going for growth'. The new strategy has a greater emphasis on running of protocol-driven scientifically robust on-farm field trials and engaging with producers and the wider industry via tailored on farm reviews and regional forums. Health and welfare topics that are currently being looked at through the new trial programme include: optimal environments for rearing pigs, optimising the management of small newborn piglets and the use of UHF ear tags.

On and off farm training continues to be a priority within the new structure. One thousand training hours are planned under the health and welfare for pig's RDPE spec for 2015 including: responsible use of veterinary medicines training, supervising welfare, minimising disease risk and moving and handling of pigs. Health and welfare topics such as teeth clipping and tail docking have also been included in the BPEX practical pig app, a series of short 1-2minute video clips highlighting routine pig tasks within the industry.

A list of research projects that the PHWC are involved in can be found in appendix 2.

12 Knowledge transfer and training

12.1 20:20 Pig Health and Welfare

The vision specifies the need to:

- **Maintain awareness of international advances in research, nutrition, micro-nutrition and husbandry and develop effective mechanisms for promoting rapid uptake**
- **Promote and encourage detailed and accurate farm recording and exchange of information**
- **Encourage first-adopter farms in PHIP to act as a network of demonstration farms to allow new techniques, products and technologies to be tried and tested and improvements in health and welfare to be showcased. The target is to have two demonstration farms in each participating region by 2015.**

The PHWC recognises that knowledge transfer (KT) is vitally important to the successful implementation of the health and welfare strategy and fully support the training and accreditation activities undertaken by AHDB Pork, which are listed below.

12.2 Specific activities and services

In 2013 and early 2014 BPEX knowledge transfer activity focused on helping businesses improve herd performance through delivery of the Two-Tonne Sow Campaign (2TS). The aim of the campaign was to help the English pig industry achieve an overall average of 2,000kg of pig meat per sow per year. In the fourth quarter of 2013 the production figures demonstrated that the top third of the industry were achieving this target. This led to a change of focus for 2014 away from production and more towards closing the strategic knowledge gap between the English pig industry and some of its European counterparts.

In 2014 BPEX launched its new strategy called Going for Growth, within that, the KT team is working on the 'closing the gap' aspect of the strategy, in which we are helping producers with three main key performance indicators: +1 pig weaned, improving FCR by 0.1 and DLWG by 50g/day.

The following range of services is on offer from AHDB Pork to help producers achieve these targets:

- **On-farm reviews**
- **On-farm investigations and field trials**
- **Innovation grants**
- **Staff development and training**
- **Business insight trips**
- **Regional producer events**
- **Environment and building services**
- **Media and publications**
- **Practical Pig App**
- **On-farm training**
- **Pig clubs**
- **Regional forums**
- **Boar semen analysis through the AI standard.**

12.3 Staff development and training

The opportunities for training and development in the pig industry include:

- **Certificates of competence in pig husbandry skills and pig unit operation and supervision**
- **Stockman development scheme**
- **Stockman plus (introduced in 2012)**
- **Technical manager's scheme**
- **Institute of Leadership and Management (ILM) award**
- **AHDB Professional Managers Development Scheme (PMDS)**
- **Local workshops and training groups and on-farm practical pig app training.**

BPEX launched a skills strategy in 2013 with the objective to recruit, retain and reward highly motivated and enthusiastic people and provide training in a format that is practical, relevant and easy to access. This is being continued and AHDB Pork is now working together with AHDB on cross sector skills development with an AHDB skills policy set to be developed during 2015. Although the technical skills and training will differ across sectors, the aim is to combine resources and events for business and people management.

13 Integrated approach

13.1 20:20 Pig Health and Welfare

The vision specifies the need to:

- **Address issues of coordination and integration in annual reviews of progress towards the objectives and targets of the strategy**
- **Ensure that where the 20:20 Pig Health and Welfare strategy, other industry initiatives and Defra's structural reform priorities (Defra business plan 2011-2015) are aligned, then activity can be integrated for mutual benefit.**

13.2 Agricultural Industries Confederation (AIC)

Over the last eighteen months the feed manufacturing industry has worked closely with the Pig Veterinary Society and the National Pig Association to standardise a method of collating and reporting the quantity of antibiotics added to feed. This data is needed to allow a more meaningful review of total antibiotic use at farm level and also allow benchmarking at the veterinary practice, national and international level.



The pressure on the feed industry to play its part in reducing antibiotic use to minimise the chances of antibiotic resistance (AMR) has increased exponentially and so the feed manufacturers have redoubled their efforts to research and trial ways of maintaining cost effective performance and welfare with non-antibiotic feed additives. A much greater understanding now exists of the role non-antibiotic feed additives can play, though many would conclude their limitations have become much more clearly defined than replacements discovered. Research in this area has led the feed industry into new and promising research avenues and to work with producers and other agencies on reinforcing management strategies to promote health at farm level as a route to antibiotic reduction.

The feed industry exists to provide nutrients as cost effectively as possible and has willingly gone beyond this to provide medicated feed as a service to their customers. The pressures to reduce antibiotic use and the increased scrutiny around the handling of antibiotics (tighter legislation and public interest) has added to the complexity and cost of medicated feed manufacture and initiated an internal debate within the feed industry about its ability to offer this service in the long term. The feed industry supports effective legislation which allows responsible use of antibiotics in medicated feed to continue. The feed industry also feels it is responsible to recommend producers to consider water medication in all their new build and refurbishment projects.

Precision nutrition has remained central to the feed industry's research and development over the past two years. Significant strides have been made in bedding-in the better descriptors of nutrients for feed ingredients and specifications of diets across the whole industry. The move to nutrients which better describe the use by the pig at various age classes improves efficiency and has cost saving and sustainability benefits, in addition, it reduces any stress on the pigs excretory and immune systems.

As new genotypes are introduced and the rate of change increases in breeding pig performance (eg increasing numbers of pigs born per litter) the challenge of defining nutrient requirements remains. The feed industry is also working hard with producers to help exploit the great strides that are being made in feed delivery technologies at farm level. The new feed systems allow increased complexity in the blending of feeds to deliver the most appropriate diet to each different age group. Precision nutrition is moving from the research phase into the development phase.

In its last report, the feed industry spoke of its plans to reduce zinc oxide use. Some progress in its work with the veterinary profession to enable the maximum benefits from pharmaceutical levels of zinc oxide to be achieved at lower levels of inclusion (this can only be included by a veterinary surgeon through a Medicated Feedingstuffs Prescription (MFSp)) has been made and more will be done. A reduction in the use of a heavy metal additive like zinc oxide will reduce diet cost, benefit the environment and significantly reduce the likelihood of a ban on zinc oxide in the future, thereby safeguarding this valuable medicinal additive for the British pig producer.

13.3 Animal and Plant Health Agency (APHA)

The APHA was formed in October 2014, following the merger of the former Animal Health and Veterinary Laboratories Agency (AHVLA) with parts of the Food and Environment Research Agency (FERA), responsible for plant and bee health, to create a single agency responsible for animal, plant and bee health.



The APHA supports the work of PHWC and participates in the council as well as providing input into the surveillance, antimicrobial use and zoonoses subgroups in working towards improvements in both health and the welfare of British pigs and food safety. APHA plays a wide ranging and key role in pig health and welfare through its involvement in notifiable disease surveillance and contingency planning, disease diagnosis and scanning surveillance, animal welfare, international trade, *Salmonella* and antimicrobial resistance monitoring, among other activities. APHA's scientific expertise in pig pathogens, such as classical swine fever, swine influenza, porcine reproductive and respiratory syndrome (PRRS) virus and *Salmonella*, and disciplines such as virology, bacteriology, epidemiology and pathology, are highly relevant to the council's work.

Since the emergence of PED in North America in 2013, APHA has collaborated as part of the PHWC surveillance subgroup in developing a contingency plan, in particular contributing to identifying risk pathways for PED introduction and implementing surveillance for early detection of the virus. The APHA international disease monitoring team has maintained awareness of developments in Eastern Europe on outbreaks of African swine fever in wild boar and domestic pigs and has provided regular updates highlighting the continuing threat of this disease from the region.

Surveillance by APHA veterinary investigation centres across England and Wales underwent significant change during 2014. Following recommendations from a series of reviews and public consultation the number of APHA post mortem examination (PME) sites has been reduced, with non-APHA PME providers offering a service in some areas no longer covered by APHA and a carcass collection service operating to cover other areas.

Pig disease surveillance has continued to identify significant changes in trends in endemic diseases, including a continuation of summer outbreaks of *Klebsiella* septicaemia in pre-weaned piglets, the increasing diversity of PRRS virus involved in disease outbreaks, identification of pandemic (H1N1) 2009 and H1N2 as the predominant influenza virus strains causing outbreaks in pigs, the persistence of swine dysentery in certain parts of the country and an upward trend in disease incidents due to *Escherichia coli*.

Surveillance reports are available from: <https://www.gov.uk/government/publications/pig-disease-surveillance-reports-2014>

Provision of training and dissemination of surveillance outputs to veterinary practitioners who work with pigs and pig producers continues to be an essential component of APHA's role in knowledge transfer and maintaining disease awareness and preparedness for both non-notifiable and notifiable pig diseases. Recognition of African and classical swine fever and surveillance and diagnosis of PED and other exotic and endemic disease threats are examples of the topics presented.

13.4 Red Tractor (Assured Food Standards)

Some key initiatives were undertaken during the course of the year to improve the overall performance and integrity of the Red Tractor scheme.



Real welfare was rolled out with effect from 1 April 2013 and frequent assessments (either three or four visits per year) are being undertaken by veterinarians on all Red Tractor finisher farms. The five principle measures being assessed are lameness, tail lesions, body marks, enrichment use and hospital pigs (those which the vet considers should be relocated to a hospital/recovery pen for their own benefit).

A full review of all the farm standards was completed, the objective of which was to make the standards easier to understand and ensure they cover key reputational risks. The revised standards were written by Technical Advisory Committees, made up of experts from within the industry in consultation with producer representative organisations, stakeholders, retailers and other interested parties.

With increasing focus on antibiotic use there was a need for the industry to demonstrate responsible use of medicines. A new standard was introduced to require an annual collation and record of total antibiotic use on farm, including in-feed antibiotics, plus an annual review with the farm vet to identify any trends.

Outbreaks of PED in other parts of the world led to a tightening of biosecurity standards to help to deliver effective systems. Other changes included new standards on traceability and changes to standards on staff training which are good business practice and not onerous.

Other initiatives have focussed on assessor training and compliance and integrity checks. Red Tractor has developed e-learning training for farm assessors that carry out assessments. The e-training provides information on Red Tractor, good assessment techniques and also a scheme standards course for each sector. It includes content setting out why the standards are needed and what they deliver for the scheme member.

The Compliance and Integrity (C&I) programme consists of independent C&I audits of scheme members, where auditors make an assessment of scheme member compliance against a number of high risk reputational issues and also a judgment as to whether the previous assessment was sufficiently robust/challenging.

13.5 Agriculture and Horticulture Development Board Pork (formerly BPEX)



Responsible pig production is at the core of all AHDB Pork activity. A focus of the activity is to help producers and processors with efficiency on farm by reducing the knowledge gap between producers and our global counterparts. Improving pig health and welfare is key to sustainable development of the pig industry, developing opportunities for driving costs down and improving performance efficiencies and also for generating growth.

AHDB Pork has worked with industry and government to drive contingency planning for the potential of an outbreak of PED virus in the UK. This has required a strong working relationship between many industry and allied industry organisations to ensure that there is sufficient resources and information available should an outbreak occur. One outcome from this work has been the development of the significant diseases charter, which has been developed as part of the legacy of PHIP, with the swine dysentery charter forming the backbone of the new scheme. The new charter will allow industry to nominate diseases, which fall outside the EU or national remit for notifiable status but are still considered by producers to be of threat to the industry.

The real welfare scheme, developed by AHDB Pork with guidance from PHWC, has led the way in recording outcome-based measures of welfare on farm. This has helped British producers to maintain their competitive market advantage of high welfare standards in production. The real welfare project has heralded many firsts within the industry and with the development of the iPig application for tablets, on-farm analysis can now be executed with instant feedback on welfare parameters. In addition to this work, AHDB Pork has continued to work on providing the industry with best practice advice on tail docking and teeth clipping. This culminated in the development of a video on teeth clipping, which was made available on the practical pig app in late 2014.

AHDB continues to work closely with Defra, the Food Standards Agency (FSA) and the pig industry on plans regarding potentially zoonotic pathogens, this has included work to develop a better understanding of Hepatitis E virus. One such project is the ongoing four-year study on improving the control of *Salmonella* in pigs being led by AHVLA. In addition to these projects, AHDB Pork is continuing to lead, alongside the FSA, the transition of BPHS to an enhanced CCIR service, which provides more detailed information on carcase pathology and condemnations to all pig producers within England.

Finally, AHDB Pork has been working alongside the Veterinary Medicines Directorate and the PHWC antimicrobials subgroup to develop a 'medicines hub'; this will fulfil the requirements of the EU to have a total value of antimicrobials used within the pig industry by 2017.

13.6 British Meat Processors Association (BMPA)



In 2014 the BMPA commissioned a collaborative research proposal with Public Health England, Leatherhead Food Research and the Food and Environment Research Agency. The main elements of this proposal are a validation of methods for detection of Hepatitis E virus in pork products and a survey of UK and imported pork products to explore the presence of Hepatitis E to genotype and group level in order to investigate if there is a link with the virus found in human clinical cases. The research proposal is now being overseen by the PHWC pig meat food safety subgroup. This proposal has been circulated to trade associations in the UK and Europe to determine interest in funding the research collaboration.

and it has been presented to the AHDB Pork board with a request for funding. The board agreed in principle to support relevant research to assist in developing an industry position and response on Hepatitis E and pork.

The BMPA pork standards have been thoroughly reviewed and will include mandatory lorry washing of each lorry that delivers pigs to member abattoirs. Sites will have to install lorry washing facilities appropriate to the number of lorries that serve them and that allow proper cleansing and disinfecting. The new standards were issued in April 2015 and enforced from July 2015.

13.7 British Pig Association (BPA)

During 2012, the BPA developed an accreditation scheme for small-scale producers designed to raise awareness of the legal requirements for pig keepers and the importance of biosecurity for even the smallest pig herds. The association has also worked with AHVLA and Defra to address issues around the conservation of rare breeds during exotic disease outbreaks. The aim was to develop policies to ensure that control measures are not delayed or compromised while protecting Farm Animal Genetic Resources (FAnGR) where possible. The association also worked with the PHWC to raise awareness of the pig health and welfare strategy amongst agricultural show organisers and remind them of the importance of biosecurity at these events.



In 2013 the BPA launched the accreditation scheme for small-scale producers. The BPA will continue to work with AHVLA and Defra to ensure that concern for the conservation of rare breeds and FAnGR does not affect the implementation of control measures for exotic disease. They will also continue to stress the importance of biosecurity protocols to pig keepers who exhibit pigs at agricultural shows.

The BPA has identified the threat of importing non-notifiable diseases such as highly pathogenic (HP)-PPRS and will work with the PHWC and other sectors to ensure that pedigree breeders and small-scale pig keepers are aware of the need for additional testing of imported animals.

13.8 National Pig Association (NPA)

Pressure has been mounting on the use of antibiotics in livestock following concerns of increasing antimicrobial resistance in humans. In order to demonstrate responsible use in the pig industry, Red Tractor assured members must now collate their annual use of antimicrobials, including in-feed, and demonstrate they have reviewed the figure with their vet. To make life easier, the NPA's allied industry group has been working behind the scenes with feed companies to create an agreed report and ensure data for in-feed use is automatically mailed to each pig unit every six months. The industry's key compounders have already signed up to the scheme and others will follow over the coming months.



The NPA has continued to put pressure on the EU Commission with respect to action over PEDv control and has provided them with a copy of the imports protocol that was mentioned in the 2012 report. This protocol helped to prompt the EU Commission into updating their own import requirements for live animals into the EU and included both PED and Swine Deltacoronavirus. We also ensured that tougher controls on the import and use of blood plasma were introduced. NPA has also been working with Defra, APHA, BPEX, PVS and BPA to provide the case to make PEDv a notifiable disease in the UK in order to ensure that we can contain and control the disease as quickly as possible should it enter the UK.

The NPA has provided briefings on all of the major health and welfare issues facing the pig industry and placed them on the NPA website. The briefings are publicly available so not only provide information for those who are interested, such as the media but also give members the opportunity to understand the NPA policy line on certain issues.

13.9 Pig Veterinary Society (PVS)

The optimisation of health is often rated among the highest priorities of profitable and sustainable pig production. Farmers working closely with their veterinary advisors provide health inputs to British farmed pigs. This farm advice can cover specific inputs to vaccine and medication requirements, biosecurity and hygiene measures, slaughterhouse and blood check monitoring, farm autopsy and other diagnostics and inputs to management investment decisions.



A second level of veterinary and farmer cooperation exists in broader objectives towards implementing the PHWC's pig health and welfare strategy and 20:20 vision that cover the English industry. This level will cover inputs to current topics such as British and EU disease surveillance requirements, regional health improvement plans and farm assurance programmes aimed for consumers.

The 250 members of the PVS discuss these issues and are kept informed on all these and other issues via a twice-yearly national scientific meeting and the expanding professional website (www.pigvetsoc.org.uk).

13.10 Responsible Use of Medicines in Agriculture Alliance (RUMA)



RUMA published revised guidelines for farmers and vets on the responsible use of antimicrobials in pigs in November 2013. These guidelines are available to download from the RUMA website www.ruma.org.uk free of charge. They include practical advice for vets and farmers and highlight the 'four golden rules on disease control':

- **Limit pig-to-pig contact**
- **Avoid stress**
- **Good hygiene**
- **Good nutrition.**

Proposals to amend European veterinary medicine and medicated feed additive legislation were published in 2014 and RUMA is working with council members to consider how the proposals are likely to affect the health and welfare of UK pigs and the ability to achieve the medicines targets in the 20:20 Pig Health and Welfare strategy.

13.11 Royal Society for the Prevention of Cruelty to Animals (RSPCA)



Improving pig welfare is an important aim of the PHWC, as demonstrated by the establishment in 2013 of the council's welfare subgroup. The focus of this group on non-health related welfare issues is testament to the industry's commitment to progressing this area and is welcomed and supported by the RSPCA.

Over 30% of pigs in the UK are reared to the RSPCA welfare standards through the Freedom Food scheme. The standards and the scheme are therefore the most tangible way for the society to practically support and contribute to the delivery of the aims set out in the 20:20 strategy. The aim is to set the RSPCA standards at the limit of what is achievable in terms of animal husbandry and commercial viability and are developed using a range of information, including the latest scientific research and practical farming experience. The society continues, where possible and appropriate, to incorporate recommendations arising from discussions at council into its welfare standards, notably on interim measures to tackle the tail damage issue and on aggression, both of which are key issues identified as being of high priority by the welfare subgroup.

The RSPCA continues to support other key aims of the 20:20 strategy, including in the area of improving the farrowing environment. The RSPCA phased out the use of farrowing crates in its standards from 2010. Freedom Food members must use systems that allow the sow to turn around freely at all times. The society continues to engage with producers, academics and the wider industry on this topic and will be including more detailed guidance within its welfare standards in the near future.

14 Horizon scanning

The disease-related threats identified in this period are summarised below. More details on each threat or potential threat are available in the quarterly GB pig emerging threats reports. These reports are produced by the APHA pig expert group and include actions taken to address identified threats.

Pig: disease surveillance reports, 2014: <https://www.gov.uk/government/publications/pig-disease-surveillance-reports-2014>

Pig disease surveillance reports – quarterly: <http://webarchive.nationalarchives.gov.uk/20140707141401/http://www.defra.gov.uk/ahvla-en/publication/pig-survreports/>

Summary of disease-related threats and potential threats to GB pigs identified in 2013-2014.

Note: Threats highlighted in blue were not detected in GB pigs.

Type of threat	Description of threat	Brief summary	Relevant disease surveillance report
Notifiable and reportable disease	African Swine Fever in Eastern Europe	a) Further cases in wild boar in Poland, Estonia, Latvia and Lithuania	Q4 2014
		b) Spread in EU in Eastern Europe continued to cause disease and deaths in wild boar in Estonia and in wild boar and backyard pigs in Poland, Latvia and Lithuania and there was continued geographic spread in the region. A large commercial pig unit considered to be biosecure was infected in Lithuania	Q3 2014
		c) Poland reported further cases in wild boar and in June 2014 Latvia joined Poland and Lithuania as the third EU member state to report disease in wild boar and also reported an outbreak in backyard pigs	Q2 2014
		d) ASF detected in Lithuania: first report of spread into the EU from neighbouring Eastern European countries.	Q4 2013
	Differential diagnoses for swine fevers – diseases in which gross lesions may resemble those of the swine fevers	a) Multiple haemorrhages due to thrombocytopenia purpura in piglets in negated swine fever report case	Q4 2014
		b) Haemorrhagic disease due to <i>Pasteurella multocida</i> septicaemia	Q3 2014
		c) Sporadic case of haemorrhagic disease in negated swine fever report case, likely due to acquired amegakaryocytic thrombocytopenia	Q3 2013
		d) Severe skin haemorrhages in weaners with erysipelas.	Q1 2013
	Aujeszky's disease (AD) in vaccinated pigs in China	Outbreaks of AD reported in vaccinated pigs in China involving a virus variant. Tong-Qing An and others (2013). Emerging Infectious Diseases 19 (11) 1749-1755.	Q2 2014

Type of threat	Description of threat	Brief summary	Relevant disease surveillance report
New disease or pathogen	Astrovirus and type All congenital tremor	Blomström A, Ley C, Jacobson M (2014). Astrovirus as a possible cause of congenital tremor type All in piglets? <i>Acta Veterinaria Scandinavica</i> 2014, 56:82	Q4 2014
	<i>Brachyspira hampsonii</i> as a cause of diarrhoea	a) <i>Brachyspira hampsonii</i> reported in Belgian pigs imported from the Czech Republic, examined during quarantine. Mahu and others. (2014). <i>Veterinary Record</i> 2014 174: 4	Q2 2014
		b) <i>B. hampsonii</i> isolated from pigs imported into Germany. Rohde and others 2013, <i>Veterinary Microbiology</i> 168: 432-435	Q4 2013
		c) Novel cause of porcine colitis, <i>Brachyspira hampsonii</i> , identified in North America. Harding, 2013. <i>Pig Journal</i> 68: 95-96.	Q2 2013
	Swine deltacoronavirus	Swine deltacoronavirus detected in PED-like outbreaks in North America. Marthaler and others 2014. <i>Emerging Infectious Diseases</i> . http://dx.doi.org/10.3201/eid2008.14-0526	Q1 2014
	Neonatal Porcine Diarrhoea Syndrome	Neonatal Porcine Diarrhoea Syndrome study revealed no specific cause and established case definition. Kongsted and others 2013, <i>BMC Veterinary Research</i> , 9:206.	Q3 2013
	<i>Mycoplasma bovis</i> infection in pigs	Disease due to mycoplasma bovis disease detected in Austrian pigs in contact with cattle. Spargser and others, 2013, <i>Veterinary Microbiology</i> 164:299-306.	Q1 2013
New pathogen variant/subtype	Virulent Porcine Epidemic Diarrhoea Virus (PEDv)	a) Outbreaks of INDEL strain of PEDv (OH851 described first in US, reportedly milder) in Western Europe (Italy, Germany, Netherlands, France) and virulent PED in Ukraine (strain similar to virulent strains in North America)	Q4 2014
		b) Update on virulent Porcine Epidemic Diarrhoea virus in North America and spread to Canada in January 2014	Q1 2014
		c) Spread of virulent Porcine Epidemic Diarrhoea virus within US: by January 2014, 23 US states had reported at least one confirmed case of PED	Q4 2013
		d) Emergence of virulent porcine epidemic diarrhoea virus in the US. Williamson and others, 2013, <i>Veterinary Record</i> 173: 146-148.	Q2 2013

Type of threat	Description of threat	Brief summary	Relevant disease surveillance report
New pathogen variant/subtype	Klebsiella pneumoniae septicaemia (Kpp) outbreaks	a) New developments in Kpp outbreaks in 2014; first incident outside East Anglia, first outbreak with concurrent mastitis, first isolate with multi-drug resistance	Q3 2014
		b) First Kpp septicaemia outbreak in postweaned pigs	Q3 2013
		c) Klebsiella species septicaemia outbreak on an indoor unit.	Q2 2013
	Genotype 2 (North American) PRRSv remains a threat to GB pigs	Genotype 2 PRRSv should not be overlooked while there is high concern about ASF and PED. Genotype 2 PRRSv has never been detected in UK pigs but is present in many other pig producing countries in the world including Europe, North America and Asia.	Q3 2014
New, rare or emerging antimicrobial resistance	Livestock-Associated Methicillin Resistant (LA-MRSA) <i>Staphylococcus aureus</i>	a) First detection in GB pigs of LA-MRSA: detected in piglets with skin disease in diagnostic submission to APHA. Hall, S., Kearns A. and Eckford S. (2015). <i>Veterinary Record</i> 176:151-152	Q4 2014
		b) First detection of LA-MRSA in Northern Ireland: incidental finding during diagnostic investigation of respiratory disease due to PRRS virus.	Q2 2014
	Monitoring penicillin sensitivity in clinical <i>Streptococcus suis</i> isolates following detection of two penicillin resistant 2009-10 isolates	a) 38 isolates tested: one further penicillin resistant <i>S. suis</i> serotype 1 isolated from lungs in June 2013	Q3 2013
		b) 215 isolates tested: one penicillin resistant <i>S. suis</i> serotype 1 isolated from lungs in March 2013.	Q1 2013
Public health-related – zoonosis, toxin	<i>Ascaris suum</i> as a potential zoonosis	US publication reporting cases of ascariasis in people in contact with infected pigs and highlighting the potential risk of <i>Ascaris suum</i> to humans. http://wwwnc.cdc.gov/eid/article/21/2/14-0048_article	Q4 2014
	Alert regarding possible mycotoxin threat	Increased risk of ergot identified in 2014 cereal crops used for pig feed and information circulated on clinical signs.	Q3 2014
	Vitamin D toxicity incident in sows	Hypervitaminosis D as a result of vitamin D being added in significant excess to the affected ration resulting in kidney damage. Voluntary restriction of cull sows on-farm for a specified period agreed to protect the food chain.	Q2 2014

Type of threat	Description of threat	Brief summary	Relevant disease surveillance report
Changes in endemic disease trends	Upward trend of porcine reproductive and respiratory syndrome (PRRS) diagnoses	a) Analysis of seasonality of PRRS diagnoses in GB showed October to December 2014 (Q4) to have the highest quarterly diagnostic rate since 2004. Annual trend of increased PRRS diagnoses also continued	Q4 2014
		b) Trend analysis of the seasonality of GB PRRS showed the diagnostic rate during July to September was higher than the same quarter in any of the last ten years and showed no summer reduction	Q3 2014
		c) Genetic diversity continues to increase in PRRSv and seasonal increase in PRRS diagnoses.	Q1 2014
	Porcine circovirus 2-associated disease (PCVD)	a) Outbreaks in vaccinated pigs: diagnostic rate of PCVD outbreaks remained at a low level but there was an increase in diagnoses in Q3 2014 to the highest rate since Q3 2012. Incidents occurred in pigs which missed routine vaccination, in pigs with delayed vaccination and, possibly, due to variability in maternal PCV2 immunity. None involved variant PCV2b	Q3 2014
		b) Porcine circovirus 2 genotyping of PCV2 virus in cases of PCVAD diagnosed by AHVLA in 2011-13 revealed all but one to be PCV2b strains typical of those found previously in GB. One novel PCV2 2b variant found	Q1 2014
		c) PCVD as a cause of paralysis. Zlotowski and others, 2013. Veterinary Record 172:637	Q2 2013
		d) PCVD in PCV-2 vaccinated pigs in North America. Opriessnig and others, 2013, Veterinary Microbiology 163:177–183 .	Q1 2013
	Systemic porcine cytomegalovirus (PMCV) infection	a) Second outbreak diagnosed in fading weaners in 2014, possible earlier swine influenza involvement	Q3 2014
		b) Uncommon systemic manifestation of PMCV diagnosed with swine influenza and streptococcal disease in fading piglets.	Q2 2014

Type of threat	Description of threat	Brief summary	Relevant disease surveillance report
Changes in endemic disease trends	<i>Escherichia coli</i> disease incidents	a) First diagnosis of oedema disease in East Anglia for many years	Q4 2014
		b) Higher diagnostic rate of <i>E. coli</i> disease continued in Q2 2014 and a few outbreaks of enteric colibacillosis in older post-weaned pigs	Q2 2014
		c) Unusual outbreak of oedema disease causing ataxia, weakness and recumbency	Q1 2014
		d) Increase in oedema disease incidents: increased trend in <i>E. coli</i> diagnoses in the last three years with oedema disease incidents prominent.	Q1 2014
	<i>Pasteurella multocida</i> septicaemia outbreaks	Small cluster of cases of <i>P. multocida</i> septicaemia diagnosed by AHVLA. Typing of the isolates did not reveal a novel or single emergent strain associated with these outbreaks.	Q2 2014
	<i>Haemophilus parasuis</i> (Hps) disease incidents	a) Increased rate of diagnosis of Hps disease incidents continues: no evidence of association with a predominant serotype	Q4 2013
		b) Glässer's disease with severe skin lesions: outbreak in weaned pigs with wide areas of skin necrosis	Q3 2014
		c) Increased diagnoses of disease associated with Hps: highest diagnostic rate since 2002 in January to March 2013.	Q1 2013
	Swine dysentery	a) Diagnostic rate of swine dysentery shows an annual decline but outbreaks persist in Yorkshire	Q4 2013
		b) Tiamulin-resistant <i>Brachyspira hyodysenteriae</i> isolate in Thirsk region.	Q3 2013
	Swine influenza	a) Swine influenza outbreaks with salmonellosis in weaners	Q4 2013
		b) Avian-like H1N1 swine influenza strain detected again in GB pigs	Q3 2013
		c) Swine influenza remaining prevalent: higher diagnostic rate in Q2 2013 compared to the same quarter in 2011 and 2012.	Q2 2013
	Mulberry heart disease	Mulberry heart disease diagnosed in pre-weaned piglets: unusually early occurrence on farm with home-mixed ration.	Q1 2013
	Erysipelas outbreaks	Practitioners reported increased erysipelas cases, some in vaccinated pigs. Serotyping of <i>erysipelo</i> thrix species isolates from outbreaks.	Q1 2013

Type of threat	Description of threat	Brief summary	Relevant disease surveillance report
Unusual diagnoses or presentations	Rare piglet deformities	a) Malformations for short period in outdoor breeding herd. Deformities due to insult prior to day 16 of gestation. The timing is not suggestive of involvement of an infectious agent	Q4 2014
		b) A few piglets with unusual craniofacial deformities were born at term in litters from any parity of sow due to an undetermined insult early in pregnancy on an indoor herd	Q2 2014
		c) Single episode of piglet deformities on outdoor unit.	Q4 2013
	Unusual diseases associated with deficient home-mix diets	• Haemorrhage due to copper deficiency in pigs on milk-based diet	Q4 2014
		• Nutritional cardiomyopathy and myopathy in pigs on diet without vitamin-mineral supplementation.	Q4 2014
	Staphylococcal skin disease	Staphylococcal skin disease causing skin lesions resembling pig pox.	Q3 2014
	Atrophic rhinitis in a Scottish pig herd	Atrophic rhinitis was diagnosed in a pig herd in Scotland in post-weaned pigs on an indoor breeding to finishing unit which was previously unaffected.	Q2 2014
	Nervous disease due to porcine sapelovirus (PSV) infection	Two unconnected outbreaks diagnosed – the first diagnoses of PSV infection by AHVLA since 2008.	Q1 2014
	Middle and inner ear disease	a) Otitis causing head tilt with bacterial and mycoplasmal involvement in pigs with swine influenza	Q4 2013
		b) Bacterial ear infections in outdoor gilts showing head tilt.	Q3 2013
	Paresis due to spinal cord motor neuron chromatolysis	Unusual pathology in weaners with sudden onset transient paresis: possible mycotoxicosis.	Q4 2013
	Disease due to <i>Streptococcus suis</i> type 17	Severe polyarthritis and meningitis due to <i>Streptococcus suis</i> type 17 on a newly established unit. This <i>S. suis</i> type is not commonly associated with primary disease in AHVLA submissions.	Q3 2013
	Two incidents of necrotic pharyngitis and tonsillitis in growing pigs	<i>Streptococcus suis</i> isolated from both outbreaks together with <i>Fusobacterium necrophorum</i> from one and <i>Haemophilus parasuis</i> from the other. No viral involvement detected – PCVAD has been diagnosed in previous cases.	Q3 2013

Type of threat	Description of threat	Brief summary	Relevant disease surveillance report
Unusual diagnoses or presentations	Meningoencephalitis of likely viral aetiology	No cause established for cases of meningoencephalitis of likely viral aetiology in growers on one farm. Immunohistochemistry did not detect porcine teschovirus, sapelovirus, PCV2 and louping ill virus. Lesions were distinct from those seen in Aujeszky's disease.	Q2 2013
	Border disease virus outbreak	Border disease virus infection diagnosed in a commercial pig herd causing sporadic cases of illthrift, anaemia and haemorrhagic disease in growing pigs.	Q1 2013

15 Milestones for 2015

Under the new structure of the PHWC, each of the strategic subgroups has set 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 PHWC is to ensure that these milestones are on target to achieve their objectives and that progress is continuing to be made.

Key milestones for the PHWC 2015	Comments
<ul style="list-style-type: none"> Review of progress towards the objectives and targets of the strategy 	PHWC will continue to review the progress of the milestones for each of the strategic subgroups and the chair of the subgroups will update the council at the biannual meetings.
<ul style="list-style-type: none"> Produce biennial report for 2013-14. 	The report for the PHWC has been produced to reflect the progress over a two year period, in line with the length required to meet the strategic targets.

Key milestones for the PHWC disease surveillance subgroup	Comments
<ul style="list-style-type: none"> Test the contingency plan for new and emerging diseases in a realistic, virtual exercise and identify resources required for effective control of the disease threat 	The PHWC subgroup will develop and implement the contingency plan to a point that a realistic virtual exercise can be carried out and the resources tested in a realistic situation.
<ul style="list-style-type: none"> Identify existing and future data sources which would enable detection of current, new and (re) emerging threats to pig health and describe the surveillance system required to integrate them 	PHWC supports the development of a disease surveillance system. This can potentially utilise existing information in a 'big-data' approach.
<ul style="list-style-type: none"> Review options and, if appropriate, develop a sustainable methodology for syndromic surveillance of GB pig disease. 	PHWC is aware of the limited resources available to provide syndromic surveillance under current strategies, so is actively exploring alternative approaches.

Key milestones for the pig welfare subgroup	Comments
<ul style="list-style-type: none"> Gather information from those units that do not dock as to specifically what enables them to rear pigs with intact tails 	The PHWC subgroup is proposing to investigate if specific husbandry methods can be attributed to low incidence of tail biting on farm.
<ul style="list-style-type: none"> Gather data on 'solutions' from PVS members for when an outbreak of tail biting has occurred 	The PHWC subgroup is supportive of investigating better methods of managing tail biting on farm when outbreaks occur, with the aim to inform the industry on what is best practice.
<ul style="list-style-type: none"> Review current practice with respect to euthanasia training at vet schools and for newly graduated vets and ensure the latest information on best practice is provided to producers, including non-assured farms and smallholders. 	The PHWC subgroup has identified the importance of euthanasia training provided to veterinarians as being of significant importance in maintaining welfare on farm and at slaughter. In turn, this will ensure dissemination of information to fellow vets, producers and smallholders.

Key milestones for the pig meat food safety subgroup	Comments
<ul style="list-style-type: none"> • Monitor levels of <i>Salmonella</i> in slaughter pigs using industry data submitted to the FSA's database. Review the <i>Salmonella</i> control plan and recommend changes as necessary 	The PHWC subgroup supports the continued monitoring of <i>Salmonella</i> , recognising it as one of the most important zoonotic pathogens within the pig industry, which continues to require attention.
<ul style="list-style-type: none"> • Support the commissioning of research to verify a method for the detection and measurement of live Hep E virus in pork and pork products 	PHWC has identified Hepatitis E as a pathogen which has the potential to be of concern to health. Existing knowledge is limited so further research is required.
<ul style="list-style-type: none"> • Support the commissioning and delivery of four work streams to reduce the risk of Hepatitis E in slaughter pigs <ol style="list-style-type: none"> 1. Using trace back of samples from the 2013 Zoonoses study to the farm and map risk factors 2. An on-farm study to consider the transmission route at farm level and why some pigs are viraemic at slaughter 3. The identification of possible risk factors and interventions 4. Development of a risk assessment tool. An AHDB Pork-sponsored PHD commencing September 2015. 	As part of a structured approach to better understand the characteristics of Hepatitis E as a pathogen, the PHWC subgroup has developed a staged strategy to investigate potential risk factors and routes to mitigate risk which could be utilised by the industry.

Key milestones for the antimicrobials usage subgroup	Comments
<ul style="list-style-type: none"> • Establish a standardised format of antimicrobial usage data collection which can be used by all parties across the whole of the UK pig production sector 	The PHWC subgroup recognises that better data collection and record keeping is a vital step in measuring baseline antimicrobial usage and informing changes in practice.
<ul style="list-style-type: none"> • Prepare guidelines for veterinary surgeons on the frequency necessary to review their clients' prophylactic use of antimicrobials and what should be included in the review 	The PHWC subgroup recognises the role of the veterinary surgeon as an on-farm advisor and prescriber of medications, which makes them a key figure in developing a responsible approach on farm.
<ul style="list-style-type: none"> • Identify and disseminate best practice advice on examples where antimicrobials are not being used or being used minimally, in pig production both in the UK and elsewhere 	The PHWC subgroup recognises that alternatives to antimicrobials will need to be explored, as well as alternative approaches in the use of antimicrobials. Based on available data and on-farm field trials, PHWC aims to transfer knowledge directly to the industry.
<ul style="list-style-type: none"> • Carry out study tours to best practice farms in the UK, Denmark and The Netherlands and develop an action plan for introducing best practices identified. 	The PHWC subgroup recognises the value in practical proof of principle and are planning to visit farms where best practice can be demonstrated.

16 Conclusions

Establishing the 20:20 vision remains a major breakthrough in coordinating the improvement and sustainability of the pig industry in England. Even though the structure of the PHWC has changed during the 2013-2014 period, the continued work and output of the council and its subgroups have remained in line with the original intentions set out in the 20:20 vision. The achievements made so far, as well as the milestones set for the future, are testament to the continued active support and participation of all the members of the PHWC to making a real difference within the pig industry.

The four main sub-committees of disease surveillance, pig welfare, pig meat food safety and antimicrobials are to be commended for their efforts to move the industry forward. The disease surveillance group has worked to develop the PED contingency plan, which is a true example of cross industry and governmental working. While the approach has been novel, the benefits of such collaboration are clear to see and are an encouraging sign in uncertain times. Similar examples of cross industry working can be seen with the efforts of the research group investigating *Salmonella*, with vital information now being released to support control strategies and risk factors for the pathogen in UK production systems. The BPEX Pig Health Scheme, now available to all levy payers using accredited slaughterhouses, has monitored endemic disease and the changes that have taken place over the last nine years and identified areas for review.

Antimicrobials have become a key area of interest to the pig industry following global concerns on the development of antimicrobial resistance and safeguarding antibiotics for human medicine. This theme had its origins as a strand within the Pig Health Improvement Programme (PHIP) but has now developed into a key area on its own. Since inception, the PHWC antimicrobials subgroup has identified many challenges such as the need for improved measuring of antimicrobial use as well as informing and educating the industry on best practice. Plans are already underway on the development of a 'medicines hub' but further work is required to empower the industry to further optimise their antimicrobial usage.

Knowledge transfer is key to improve training and stockman skills. It is introducing advances in all aspects of health, management and best practice. Transfer of ideas is informed by best practice locally, across Europe, the wider world and other sectors.

Horizon scanning continues to be of great value in identifying a number of threats from exotic disease. Established risks, such as, US-PRRS, CSF, ASF and Aujeszky's disease remain ever present, but unforeseen threats such as hvPEDv, LA-MRSA and Hepatitis E have become significant, these pathogens pose potential risks to industry. Improved welfare can also improve the productivity of pigs, as well as differentiate them from overseas competition. Continued surveillance of disease via BPHS can also give early warnings of increasing disease levels so that prompt responses can be introduced.

Export opportunities continue to be based on the sustained effort by the English pig industry and have provided a higher market price when compared with our European counterparts.

In 2015, the work of the PHWC will continue to move the 20:20 vision and strategy forward. Thanks are due to all members of the PHWC, the pig farmers, allied industries and Government for their past support and their future commitment to the task ahead.

17 Glossary of abbreviations

17.1 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 Pork	Agriculture and Horticulture Development Board Pork
AHVLA	Animal Health Veterinary Laboratories Agency (now APHA)
BMPA	British Meat Processors Association
BPA	British Pig Association
BPEX	British Pig Executive (now AHDB Pork)
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
PVS	Pig Veterinary Society
RDPE	Rural Development Programme for England
RT	Red Tractor (see also Assured Food Standards)
RUMA	Responsible Use of Medicines in Agriculture Alliance
RSPCA	Royal Society for the Prevention of Cruelty to Animals
SRUC	Scottish Rural University College
QMS	Quality Meat Scotland

17.2 Abbreviations of terms

AMR	Antimicrobial Resistance
ASF	African Swine Fever
BPHS	BPEX Pig Health Scheme
EP	Enzootic Pneumonia
FMD	Foot and Mouth Disease
hvPEDv	highly virulent Porcine Epidemic Diarrhoea virus
KT	Knowledge Transfer
MFSp	Medicated Feedingstuffs Prescription
PCR	Polymerase Chain Reaction
PED	Porcine Epidemic Diarrhoea
PEDv	Porcine Epidemic Diarrhoea virus
PHIP	Pig Health Improvement Programme
PRRS	Porcine Reproductive and Respiratory Syndrome
ZNCP	Zoonosis National Control Programme
2TS	Two Tonne Sow campaign

Appendix 1

Subgroup terms of reference

The new subgroups, as well as the PHWC, have established key milestones for each group for 2015 which are available through the AHDB Pork website.

PHWC terms of reference

- The council will advise on strategic policy and setting priorities for surveillance, research and disease risk assessment, management, elimination and control
- The council will work with pig keepers, the veterinary profession, the livestock, food and allied support industries, Government, consumers and other stakeholders to foster ownership of the strategy and a shared commitment to its outcomes
- The council may investigate any topic falling within the scope of the strategy and publish such advice, analysis and commentary as it considers appropriate
- The council will promote a coordinated and integrated approach to best practice in the prevention and control of disease to maintain and/or enhance the health, welfare and well-being of pigs in England.

PHWC subgroups

There are four subgroups of the council.

The disease surveillance subgroup will:

- Provide evidence based advice to the PHWC on proposals for effective surveillance of pig health and welfare in England and the wider UK when required
- Work with pig keepers, the veterinary profession, the livestock, food and allied support industries, Government, consumers and other stakeholders to identify surveillance needs and delivery mechanisms
- Investigate issues of relevance to the delivery of surveillance for the pig industry
- Gather and analyse relevant information on all aspects of new and emerging diseases including scientific, practical experience, commercial, economic issues and identify crucial gaps in knowledge
- Facilitate better knowledge exchange with EU and global colleagues
- Provide the PHWC with analysis, commentary and recommendations on endemic and exotic diseases as appropriate
- Facilitate ongoing activities and set measurable milestones and objectives for each issue being addressed
- Advise the PHWC but final decisions on adopting any strategy shall rest with the council.

The pig meat food safety subgroup aims to:

- Identify and focus on zoonoses identified by industry, current research and survey findings to be the most relevant biological hazards to public health
- Facilitate and promote implementation of a risk management plan which drives the reduction of the risks to consumers from significant hazards of food safety and public health concern in UK pigmeat products, eg Salmonella by the following activities:
 - i. Evaluate, coordinate and promote new knowledge and effective protocols for reducing food safety and public health risks from zoonoses of pigs
 - ii. Promote the open exchange and timely dissemination of information on management of zoonotic risks
 - iii. Promote an integrated whole chain approach to improving pig meat safety with all stakeholders, allied support industries, retailers, foodservice and Government
 - iv. Provide expert support to the communications teams in respect of pig meat safety

- Review progress in reducing food safety risks and changes in the prevalence of zoonotic or indicator organisms at key cost effective stages, such as on pig carcasses in abattoirs
- Support development and implementation of a national control programme, if required by statute
- Support the implementation of the revision of meat hygiene controls in 854/2004 that require the collection and reporting of FBO testing against the Salmonella criterion and an action plan and strict supervision of its outcome for FBOs who regularly fail to comply with the Salmonella criterion limits in 2073/2005 as amended
- Provide expert evidence to the competent authority when required.

The antimicrobials subgroup:

- Provide evidence-based advice to the PHWC on proposals to ensure effective and responsible antibiotic usage for the pig industry in the UK
- Gather and analyse relevant information on all aspects of antibiotic usage in the pig industry and identify crucial gaps in knowledge
- Investigate issues of relevance to antibiotic usage for the pig industry
- Facilitate cooperation and collaboration between all relevant parties (pig keepers, scientists, consumer organisation(s), the veterinary profession, the livestock, food and allied industries, Government and other stakeholders with relevant expertise, eg agricultural economist, social scientist)
- Facilitate ongoing activities and set measurable milestones and objectives for each issue being addressed
- Provide advice on approaches to public and stakeholder engagement and communication
- Communicate to the public and stakeholders as necessary.

The welfare subgroup:

- Aims to achieve consensus on the key pig welfare issues to be investigated and on the ultimate aims for each issue
- Will gather and analyse relevant information on all aspects of the welfare issues to be addressed – welfare science, practical experience, commercial, economic – and identify crucial gaps in knowledge
- Will provide the PHWC with analysis, commentary and recommendations as appropriate
- Will facilitate cooperation and collaboration between all relevant parties (pig keepers, welfare scientists, consumer organisation(s), the veterinary profession, the livestock, food and allied industries, Government and other stakeholders with relevant expertise, eg agricultural economists, social scientists) to enable development of strategies and feasible timelines for addressing each welfare issue, including undertaking initiatives aimed at effective support mechanisms and knowledge transfer, etc
- May co-opt relevant experts from outside the group as necessary on an ad hoc basis
- Will facilitate on-going activities and set measurable milestones and objectives for each issue being addressed.

All subgroups may co-opt relevant experts from outside the group as necessary on an ad hoc basis.

Appendix 2 research

Research project title	Institution/contractor	Type of research	Description	Status
Towards eradication of <i>Mycoplasma hyopneumoniae</i> from the UK pig herd	Royal Veterinary College	PhD	<i>Mycoplasma hyopneumoniae</i> remains a significant disease within the UK pig sector and is thought to be an underlying factor in many other diseases. This study sets out to investigate strategies for eliminating the disease.	Complete
The interaction of PRRSV with innate immunity	APHA (AHVLA)	PhD	PRRSV remains a significant endemic disease within the UK. Effective vaccination has proved challenging so far, therefore, a study of immunity could provide vital information on how this virus affects immunity.	Complete
The infection biology of pig-associated <i>Salmonella</i>	Liverpool University	PhD	<i>Salmonella</i> remains one of the most important zoonotic infections in pigs and reduction strategies to date have proved only partially successful. This project aims to investigate the relationships of the infection biology in more depth, to help formulate a more successful reduction strategy.	Complete
Assessment of three novel methods of reduction of pathogen load in the environment of pigs	Royal Veterinary College	PhD	In the past decade there have been advances in alternative methods for reducing pathogen loads in environments where health is important, such as hospitals. This project investigates the use of air filtration systems and metal ionic paints as potential methods of reducing pathogen load in the environment.	Complete
Enhancing the impact of regional health improvement programmes	Warwick University	PhD	The uptake of regional health improvement programmes has proven to vary considerably between regions in the UK. This research seeks to answer why this is the case and to outline potential alternative strategies which may be employed to maximise engagement in the scheme.	Complete
New approaches to diagnosis of <i>Haemophilus parasuis</i> related disease in pigs	Cambridge University	PhD	<i>Haemophilus parasuis</i> (Glässers Disease) remains a significant pathogen to the industry, with 15 known serotypes. Effective and quick diagnostic testing for this pathogen to determine serotype has previously not been available. This research sets out to determine alternative diagnostic measures that could be used to quickly identify the disease by serotype.	Complete
Improving udder quality traits in sows to aid survival, health and lifetime performance of piglets	Newcastle University	PhD	Udder quality is vital in the sow to ensure that the maximum number of piglets can be reared with a view to ongoing health, vitality and performance. This research is investigating some of the genetic traits which are required to optimise the measures mentioned.	Ongoing
Production animal pathology with a research component and specialisation in porcine pathology	Royal Veterinary College	Residency	Disease surveillance continues to remain under-resourced, with the risk of industry-specific expertise being lost if replacements are not trained. This project sets out to develop a veterinary surgeon in the area of pig pathology to continue to invest in expertise within the sector.	Ongoing

Research project title	Institution/ contractor	Type of research	Description	Status
Development of novel (bio)sensor technology for boar taint detection to assist with the production of taint-free pork	University of the West of England	PhD	Boar taint remains a significant factor in consumers being put off consuming fresh pork and pork products. Currently, the UK does not castrate pigs and slaughters at a younger age to reduce the risk of taint. However, occasionally taint is still present. This research has the potential to identify animals developing taint before it reaches the consumer.	Ongoing
An evaluation of the impacts of rodent control training provision	FERA	Project	As part of the ongoing biosecurity and <i>Salmonella</i> reduction strategy rodent control testing has been provided for free by BPEX. This project sets out to investigate if there is any correlation between reduction in rodent numbers and the attendance of the rodent training programme.	Complete
Development of a mobile app for measuring on farm medicines usage	I Mortimer	Project	Recording of antimicrobials on farm is a legal requirement but will also form an essential step in the measuring of antimicrobials used within the UK. However, producers require a method of recording which is fit for purpose and user friendly. This project sets out to create a programme which fulfils these needs and to test them in a real farm situation.	Complete
Transition from BPHS to CCIR opinion for BPEX: What would success look like?	J D Mackinnon	Project	The BPEX Pig Health Scheme has been running for almost a decade, however, it remains a costly scheme for the levy payer, to which not all producers can benefit from. Enhancing the existing FSA CCIR programme could provide a way in which the benefits of the scheme could be made available to a wider number of producers. This report investigates the feasibility of this transition and how success would be measured.	Complete

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