Pig Industry Antibiotic Stewardship Programme

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In May 2016 the National Pig Association published the Pig Industry Antibiotic Stewardship Programme outlining commitments to reduce, replace and refine antibiotic use in UK pig production. In this report the industry's progress to date is highlighted and ongoing activities relating to antibiotic stewardship are outlined. The content of the report was authored and compiled by members of the Pig Health and Welfare Council’s subgroup on Antimicrobial Use.

The Pig Industry Antibiotic Stewardship Programme outlined the following commitments, with the aim of achieving and demonstrating responsible use of antibiotics in the UK pig industry:

- Capture and collate accurate antibiotic use data from pig farms
- Benchmark each farm’s antibiotic use against other farms of a similar type
- Extend education in effective disease control strategies
- Reduce antibiotic use, consistent with responsible human and food-animal medicine
- Promote veterinary prescribing principles to strictly limit the use of antibiotics of critical importance to human health
- Appoint Stewardship Commissars who will continually review industry’s use of antimicrobials and champion initiatives.

The UK pig industry is pleased to report that significant progress towards achieving these commitments has been made, as highlighted in the pages that follow. Notably, data on farm-level use of antibiotics are now collected on a regular basis from all Red Tractor assured pig farms. This not only enables individual pig farmers to monitor their antibiotic use over time, but gives an indication of the national average which in turn allows the industry to track its progress towards reduction targets set by the industry since the initial launch of the Stewardship Programme.

There are multiple initiatives ongoing within the pig industry to extend education in effective disease control strategies, supported by specialist pig vets, the feed sector and other industry organisations. The enormous amount of activity in this area, alongside general awareness-raising of the issue of antimicrobial resistance, has delivered substantial reductions in the use of antibiotics on UK pig farms. These reductions are the result of hard work and commitment displayed by pig farmers and their veterinarians to use antibiotics more responsibly.

However, the pig industry’s efforts do not stop here. There is further work to be done to deliver greater stewardship of antibiotics and limit the development of resistance on UK pig farms. Improvements to biosecurity and the infrastructure of pig buildings will be necessary to improve the overall health of pigs. Better use of diagnostics and surveillance data is needed to support decisions about treatment and management of disease, and collaboration between farmers and vets will be encouraged to facilitate better disease control. Finally, continued monitoring of indicators of pig welfare will also be necessary to ensure that pig welfare is maintained during changes to treatment regimes, the protection of which is of utmost importance.

As the pig industry continues with this planned programme of activity to deliver greater stewardship of antibiotic use in pigs, progress will be reported on regularly. While a number of the commitments listed above are ongoing, any new actions that are needed to support the ongoing efforts will be communicated in subsequent reports.
Antibiotic Use in UK pig production

- In 2016, the volume of antibiotics administered to pigs in the UK dropped by 34% from 278 mg/PCU to 183 mg/PCU.
- This was followed by a further 28% reduction in 2017, to 131 mg/PCU.
- Overall, the UK pig industry has more than halved its antibiotic use within the last two years.
- These estimates of national usage were calculated using data submitted to AHDB’s electronic Medicines Book (eMB). For 2017, the database contained data covering 87% of pigs slaughtered in the UK.

An accepted measure for comparison of antibiotic use over time and between countries is mg/PCU, which reflects the amount of antibiotic used per kilogram bodyweight of livestock (1 PCU = 1kg). This measure has been adopted throughout EU countries.¹

mg/PCU = \[
\frac{\text{quantity of antibiotic active ingredient (mg)}}{\text{number of live/slaughter animals \times standardised average weight at time of treatment (kg)}}
\]

During the same time period, usage in pigs of the classes considered by the European Medicines Agency to be highest priority critically important antibiotics (HP-CIAs), which are 3rd and 4th generation cephalosporins, fluoroquinolones and colistin fell from 0.98 mg/PCU to 0.1 mg/PCU.

HP-CIAs represented just 0.08% of total antibiotic use in pigs in 2017.

### Reduction Targets

Data on sales of antibiotics and their use in pigs were used to set targets for the pig sector to further reduce and refine its use of antibiotics. The targets were published in the Responsible Use of Medicines in Agriculture (RUMA) Alliance’s Targets Task Force Report. In summary,

- The pig industry aims to reduce total antibiotic use by 62% over five years, to reach 99mg/PCU by 2020.
- Use of HP-CIAs should not rise above the current low levels.
The electronic Medicines Book (eMB) for pigs was launched in April 2016 by the Agriculture and Horticulture Development Board (AHDB), with support from the Veterinary Medicines Directorate (VMD). eMB was created in response to the industry’s need for a single system to collect and collate data on antibiotic use. Its development was guided by the Pig Health and Welfare Council (PHWC), which includes representatives from key sectors of the pig industry in England, Wales, Scotland and Northern Ireland.

Although use of eMB to upload antibiotic use data was initially voluntary, Red Tractor have since created a new assurance standard which requires pig farmers to upload the volume of antibiotics used in their pigs in eMB on a quarterly basis. In Scotland, Quality Meat Scotland (QMS) have required pig farmers to submit antibiotic data to eMB since August 2016.

Data from individual farms are entered into eMB and provide an estimation of overall use at a national, aggregated level, enabling year-on-year comparisons to be made. The data contained within eMB, together with sales data from the VMD’s Veterinary Antibiotic Resistance and Sales Surveillance (VARSS) Report, are being used to monitor antibiotic use in the pig sector and to inform the industry’s Antibiotic Stewardship Programme.

Most recently a new feature of the eMB system has been launched: a benchmarking facility. This enables farmers to see how antibiotic use on their farm compares to grouped, anonymised data from others in the industry with the same farm type. This tool will help farmers assess their current level of use compared to other farms and discuss reduction strategies with their veterinarian.

Quality Assurance

Red Tractor Assurance (covering 94% of pigs produced in the UK) requires the following in its Pigs Standards (version 4):

- Total volume of antibiotics used, including in-feed antibiotics, must be collated and uploaded on a quarterly basis onto eMB;
- Collated antibiotic data must be reviewed at least annually with the farm’s vet;
- All vets attending Red Tractor assured farms must be members of the Pig Veterinary Society (PVS);
- The vet must at all times prescribe antibiotics in accordance with the PVS Prescribing Principles for Antimicrobials (signed veterinary declaration to this effect on the Quarterly Veterinary Review form);
- The farmer must take ultimate responsibility for correct antibiotic use on the farm (signed farmers’ declaration to this effect on the Quarterly Veterinary Review form);
- Justification for every prescription of a CIA must be recorded by the vet in the Veterinary Health Plan.

Quality Meat Scotland’s quality assurance scheme (covering almost 100% of Scottish commercial pig herds) requires the following:

- Records of antibiotic use must be uploaded on a quarterly basis to eMB;
- Antibiotic use data for the farm must be used when reviewing the Veterinary Health and Welfare Plan (done quarterly);
- CIAs may only be used where there is no suitable alternative and where supporting laboratory evidence suggests that their use is appropriate;
- Use of CIAs must be documented and justified in the Veterinary Health and Welfare Plan with an action plan for reducing prophylactic (preventative) use;
- Any increased use in antibiotics from the preceding quarter must be explained on the Quarterly Veterinary Review form.
Improving Pig Health

Biosecurity
Protecting and improving pig health is a priority for the UK pig industry, especially given that efforts to achieve this will undoubtedly result in reduced use of antibiotics. Good husbandry and biosecurity are essential for maintaining a healthy and productive pig industry, both at a local farm level and a wider national level. Keeping disease out of a farm and controlling disease already present on the farm is achieved by attention to detail and continual effort. In 2016 AHDB launched an interactive app called “Think BioRisk” to demonstrate biosecurity best practice and highlight common biosecurity weak points to pig keepers. Training modules within the app cover key areas including visitors, vehicles, livestock movements, pest control, medicine management and deadstock collection. Guidance about biosecurity and effective cleaning and disinfection on pig farms will continue to feature at industry events and as part of training programmes to ensure the messages are constantly reinforced and disease spread is kept to a minimum.

Environmental conditions
AHDB’s Environment and Buildings team provides technical information, training and other services to help farmers optimise their building performance to deliver good health and welfare for their pigs. Manuals have been made available outlining optimal design and operation of buildings, including the Buildings Manual, Ventilation Manual and Controlled Environment for Livestock. One farmer was able to completely cut out use of antibiotics for pneumonia as a result of help from the team to improve his ventilation. It was estimated that this saved in the region of £2 per pig.

Adequate, good quality drinking water is a precious resource and essential for maintaining good pig health. Additionally, where treatment with antibiotics is necessary, more and more pig producers are looking to deliver antibiotics via water instead of through the feed as it is a more targeted approach. With this in mind, earlier this year AHDB published a guidance booklet on “Designing a water supply system for livestock” which covers infrastructure, cleaning, drinking system design and in-water medication. A deeper understanding of key considerations for a water supply system for pig units will help farmers identify ways to improve existing systems or put their best foot forward when installing a new one.

Health monitoring
Surveillance and monitoring of disease on farm and at the abattoir enables swift identification of the effects of any changes in the health status of individual herds and the national herd. An abattoir scheme, now known as The Pig Health Scheme, for monitoring carcass conditions has been in operation for twelve years and provides useful information to farmers about the health of their pigs during that time. The scheme recently underwent a major review to ensure it can continue to meet the needs of the pig industry. Providing pig farmers and vets with data on the prevalence of certain conditions detected in their pigs at the point of slaughter is extremely valuable as this can highlight subclinical disease and help inform on-farm health improvement programmes.
Promoting good use of diagnostics

Prompt veterinary investigation of disease outbreaks is important to guide appropriate treatment. This involves laboratory testing as necessary, particularly where outbreaks are more severe, unusual, unresponsive to treatment or otherwise persistent. This is aided by the fact that private veterinary practitioners attending the majority of commercial pig farms are dedicated to pigs and visit assured pig farms at least four times a year.

There are two main areas requiring investment in the application of technology. Firstly, the development of more rapid, accurate and cheap diagnostic tools to help avoid the use of antibiotics in cases where disease is not caused by a bacterial infection but is not easily distinguishable on clinical signs alone. Secondly, further development is needed in the use of early warning systems to help identify pigs which are unwell early in the course of disease to allow early intervention and, where appropriate, treatment. Earlier detection improves the chance of successful treatment while minimising disease spread and the effects of disease on pig health, welfare and productivity. There is increasing use of non-invasive methods, such as using ropes to collect saliva from groups of pigs for detection of pathogens such as porcine reproductive and respiratory virus (PRRSV) and swine influenza. This is beneficial because these viral infections, in particular PRRSV, can make pigs more susceptible to bacterial pneumonias and other infections requiring antibiotic treatment, and their diagnosis and control assists responsible antibiotic use.

Guidance on the diagnosis of common disease presentations in pigs at different ages is provided on the Animal and Plant Health Agency’s (APHA) website in the form of a diagnostic handbook. This is complemented by the recently launched GB pig disease surveillance dashboard which shares surveillance information from 2012 onwards derived from submissions to the GB veterinary diagnostic network. It is an interactive tool and allows interrogation of the data and selection of different parameters including pig age, main clinical sign, year, diagnosis and geographic region.

As well as confirming or ruling out the involvement of bacterial disease in outbreaks, diagnostic investigations provide material for autogenous vaccine production where a bacterial pathogen is isolated. Such vaccines are increasingly being considered for use where commercial vaccines are not available or not providing sufficient control, for example for disease caused by *Streptococcus suis* and *Haemophilus parasuis* in growing pigs.

Controlling endemic disease

The pig industry is seeking to secure Rural Development Programme (RDP) funding from government for an Area Regional Control (ARC) scheme to reduce or eliminate the prevalence of PRRSV in the English pig herd. Due to its immunosuppressive nature bacterial diseases often occur concurrently with PRRSV infection, and consequently PRRS can result in increased antibiotic use. PRRS may also adversely affect responses to vaccination for other diseases.

PRRSV is perhaps the single most important endemic infectious disease affecting UK pigs and there has also been an upward trend in the rate of diagnosis of the virus from pigs in recent years. Hence, a coordinated scheme to determine the PRRS infection status of herds and control disease, through partnership between pig farmers, veterinarians and government, has the potential to reduce the pig sector’s use of antibiotics, whilst also improving productivity. A regional control programme has already begun in East Anglia and achieved some success.

The Scottish Pig Health group is also working to improve control and regional elimination of PRRSV. This is supported by an ongoing programme of endemic disease elimination from Scottish herds. Additionally, funding from the Scottish Rural Development Project (KTIF) is currently being used to develop the Scottish Pig Health Network which brings together data sources for health monitoring including *Salmonella* screening, abattoir monitoring, eMB and Quarterly Vet Reports.
Monitoring antimicrobial resistance in pigs

In November of each year, the UK Veterinary Antibiotic Resistance and Sales Surveillance (UK-VARSS) report for the previous year is released by VMD. These reports contain antimicrobial resistance data derived from testing pathogens isolated during diagnostic investigations submitted to APHA's scanning surveillance network, including those from pigs. The report makes it clear that the resistance levels found in isolates from scanning surveillance are not indicative of actual prevalence of resistance as diagnostic submissions are often biased towards disease outbreaks which are severe, unresponsive and unusual. However, for pathogens isolated with reasonable frequency the reports show interesting patterns and trends. It is useful for veterinary practitioners prescribing antibiotics for use in pigs to be aware of these and they are highlighted in GB pig disease surveillance reports. Encouragingly, colistin resistance has not been detected in *Escherichia coli* or *Salmonella* isolates from APHA diagnostic submissions from pigs (at the time of publication) since its detection in 2015\(^3\). This is likely to reflect, at least in part, the very low colistin use reported in UK pigs.

The GB pig disease surveillance reports provide information about new, rare or emerging antimicrobial resistances detected in diagnostic investigations, which usually have a history of treatment failure clinically on-farm. These reports are highlighted on the PVS website and to PVS members. Examples of unusual resistances detected in 2016 and 2017 include beta lactam resistance in *Pasteurella multocida* and *Haemophilus parasuis* and LA-MRSA in a pig with skin disease.

APHA and SRUC scanning surveillance are more likely to involve diagnostic submissions from disease outbreaks which are severe, unusual and/or unresponsive. However apparent treatment failure does not necessarily equate with the presence of resistance as there are other causes, such as treating too late or the disease being caused by something other than bacterial infection. Case studies are also presented in the report to illustrate the issue of possible antimicrobial resistance to vets and farmers, so that pig keepers alert their veterinary surgeons to suspected poor response to treatment, who will then investigate and instigate diagnostic examinations as necessary.

The GB disease surveillance reports also provide information about disease trends and patterns and unusual diagnoses or presentations to veterinarians attending pigs, to help them have a more comprehensive view of endemic disease and potential threats. The November 2016 and 2017 Pig Veterinary Society meetings both included sessions on antimicrobial use and resistance to disseminate knowledge, with case studies to increase awareness of successful approaches and good practice.

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\(^3\) Colistin resistance in *Salmonella* and *Escherichia coli* isolates from a pig farm in Great Britain. *Journal of Antimicrobial Chemotherapy*, Volume 71, Issue 8, 1 August 2016, Pages 2306–2313
Optimising and monitoring pig welfare

Good pig welfare is both a factor and a product of responsible antibiotic use. For example, some conditions, such as tail biting, may result in an infection that requires antibiotic treatment. On the other hand, failure to administer antibiotics to a pig in need of treatment will infringe on the welfare of that animal by prolonging pain and suffering. UK pig farmers are therefore encouraged to adopt practices that are good for pig welfare and, at the same time, monitor indicators of welfare to ensure good welfare is maintained throughout efforts to reduce antibiotic use.

Analysis of data collected between 2013 and 2016 as part of the industry’s “Real Welfare” scheme, which monitors indicators of welfare in finisher pigs on all Red Tractor farms, demonstrated a reduction in the prevalence of welfare problems over time from an already low base⁴. The Real Welfare scheme will continue to be used by vets and farmers to assess and monitor the welfare of finisher pigs alongside efforts to reduce and refine antibiotic use.

Educating current and future vets

Undergraduate teaching of pig medicine in the UK’s veterinary schools is mostly delivered by experienced external veterinary practitioners rather than university staff. To reduce the variability in course content, these practitioners are developing the core teaching messages that are essential to clinicians, including responsible use of antibiotics, alternative strategies and interventions for disease control.

All vets attending Red Tractor assured pig farms must be members of the Pig Veterinary Society which holds twice-yearly continuous professional development (CPD) meetings, at which updates on matters relating to antimicrobial resistance and responsible use of antibiotics often feature, including new technologies and alternative approaches to disease management. The papers from all of these sessions are available to members in the resources section of the PVS website. Attendance at the annual European Symposium of Porcine Health Management enables veterinarians and other pig health professionals to exchange information with European colleagues on techniques that reduce antibiotic use.

The Society also provided pig CPD sessions at the 2016 and 2017 London Vet Shows which included advice on diagnostics and antimicrobial use. These were attended by predominantly non-specialist vets who tend to visit pigs kept on small-scale or mixed holdings.

The Control of Antimicrobial Resistance in Scotland (CARS) programme is working to develop long-term relationships with educators in Scottish vet schools to help identify knowledge gaps and share best practice to support teaching of antibiotic stewardship and AMR to students of veterinary medicine and vet nursing. This will highlight areas which are difficult to teach or difficult for students to grasp and try to optimise knowledge exchange.
Educating Farmers

In addition to the role of the vet as the “gatekeeper” of antibiotics prescribed for farm animals, the pig sector also recognises the responsibility held by farmers when using those antibiotics on farm. Raising farmer awareness, knowledge and understanding of disease control, drug resistant infections and responsible antibiotic use will support both farmers and vets in delivering sustainable antibiotic stewardship.

The Animal Medicines Best Practice (AMBP) project, an industry stakeholder-led initiative, has recently been developed to help coordinate and standardise training for farmers on the responsible use of antibiotics. Training materials will be available from mid-2018 after which they can be integrated into new and established training provisions. These include training offered by private pig veterinary practices, the AHDB Pork Stockman Development Scheme, the City and Guilds Certificate of Competence in the Safe and Responsible Use of Medicines and via supply chain partners, industry associations and pig discussion groups. These coordinated training developments will improve awareness and understanding amongst pig farmers and support the industry in meeting the targets set by the RUMA Targets Task Force.

The Pig Health and Welfare Council antimicrobial subgroup has developed a practical guide for farmers on the responsible use of antibiotics on pig farms. The guidance outlines the most appropriate ways to administer antibiotics to pigs be it through the feed, water, or by injection. The purpose of the guidance is to advise farmers on how to administer antibiotics appropriately and responsibly, when antibiotic treatment is necessary, so as to minimise the development of antibiotic resistance.
Support from the feed industry

Safe and nutritionally balanced feed is not only a prerequisite to pig health and wellbeing, but also a means to further enhance the overall health status of animals through specific feeding strategies, feed composition, feed formulations and/or feed processing. The role of the feed industry is to supply nutritionally balanced pig diets and feeding management advice which, together with good livestock management and husbandry, can help to reduce the need for antibiotics on pig farms.

- The microflora of a pig's gut can be impacted by how the feed it consumes has been processed. For example, the rough grinding of feed is well known as a way of controlling the multiplication of Salmonella in the digestive tract, through the competitive microbial exclusion mechanism.

- Correct storage and transportation of feed is essential to ensure it remains free from contaminants including bacteria.

- Specific products such as probiotics, organic acids, prebiotics, symbiotics, zinc oxide, botanicals, immune-modulators, antimicrobial peptides, competitive exclusion products, predatory bacteria, bacteriophages and antibodies may also exert a positive effect on gut health and some of them have been granted specific authorisations as feed additives.

The feed industry has been investigating how optimum nutrition of the gestating sow can help to ensure her piglets achieve adequate levels of maternally-derived immunity. Ensuring optimum foetal development will ultimately result in piglets being strong at birth that are more likely to suckle early on and obtain adequate levels of immunity-boosting colostrum. Nutritionists within the pig sector have also been working on achieving a good transition between sow gestation and lactation diets. This helps to ensure sows are provided with optimum energy for farrowing and can help to shorten the duration of farrowing, resulting in piglets being born with high vitality, which again means they are more likely to suckle. Good sow nutrition can also increase colostrum production and reduce mastitis, metritis and agalactia (MMA), a complex syndrome caused by bacterial infection of the udders and birth canal around the time of farrowing and which usually requires treatment with antibiotics.

Well-formulated pig feed is also an important component of supporting piglets at the time of weaning. For example, good nutrition will ensure sows produce good quality milk in sufficient quantity, in turn providing optimum levels of energy intake for piglets at weaning. Also, providing appetising feed containing the correct blend of nutrients will encourage weaned piglets to consume adequate levels of dry matter (fibre), which can promote healthy gut development.

With this knowledge and the means to communicate it to livestock farmers (for example through members of the Feed Adviser Register) the feed sector is assisting in achieving reduced use of antibiotics on pig farms.

Nevertheless, more research involving innovative techniques is needed to better understand the benefits of nutrition in enhancing the immune system of animals. It is also extremely important that any legislative framework supports the practical use of innovative nutritional approaches as alternatives to antibiotics. For example, the feed labelling legislation could be adapted to allow animal health supportive claims for compound feed, beyond and above dietetic feed claims.
Control of Antimicrobial Resistance in Scotland (CARS)

The CARS programme was initiated in Scotland in response to the UK Government 5 year AMR Strategy, 2013-2018. The programme adopts a One Health approach, where public, animal and environmental health aspects are considered together to address the shared problem of AMR.

In December 2015 representatives from the veterinary and livestock sectors and Government agencies, gathered to form the Scottish Animal Health and AMR Group. The group aims to support best practice in relation to managing AMR through bringing stakeholders together and to agree on joint actions. Outputs to date include a collaborative review of Scotland’s Healthy Animals website\(^5\).

The website is a vehicle for communication and knowledge exchange with the wider veterinary, agricultural and allied communities, where trusted guidance is collated in one place in a simple easy-to-read style, with functionality to allow tailoring by vets, vet nurses and animal owners. Biosecurity guidance will be complemented by antimicrobial stewardship and prescribing guidance for disease management in veterinary practices.

CARS collaborates with social scientists at Glasgow Caledonian University on Behavioural Insights studies. The latest project will:

- Explore in depth the meaning and understanding of ‘One Health’ among different sectors of society;
- Gather expert consensus regarding drivers of antibiotic stewardship in farm animal veterinary practice, considering barriers and facilitators for both vets and farmers.

In March 2017 CARS convened the Scottish Veterinary Antimicrobial Stewardship Group, which aims to optimise stewardship in vet practice by drawing together representation from all veterinary sectors, including pigs. To date the group has collaboratively reviewed Scotland’s Healthy Animals prescribing and stewardship web content and are being consulted on possible introduction of practice antimicrobial stewardship policies, monitoring and accreditation programmes.

In association with VMD, and consequent to a survey of private veterinary labs, CARS is developing and sustaining working relationships with vet diagnostic labs to support harmonisation of practice and feedback to vets, and sharing of data.

\(^5\)www.scotlandshealthyanimals.scot
Antimicrobial Stewardship in Northern Ireland

Farmers in Northern Ireland welcomed the development of the eMB database. Through recording antibiotic use voluntarily and independently on the database, farmers recognised that meaningful reduction targets could be set.

In 2015 the Northern Ireland Pork & Bacon Forum set up a working group of key stakeholders including representatives from the Forum, DAERA, Pig Regen, the main Pig Producer Groups and the private vets, to determine a way of delivering training to farmers on biosecurity and disease control. The outcome was a series of training workshops delivered through the Family Farm Key Skills programme. These proved to be hugely popular among pig farmers and their staff and delivered practical solutions that were easily implemented on farm in conjunction with the farm's health plan. Further training and workshops of this nature are planned for 2018.

The majority of the elements introduced in the training workshops were essentially straightforward and included additional signage designating no entry points and biosecurity practices translated into languages such as Polish and Bulgarian to accommodate the European workers on the farms. The latter is particularly relevant to enforce correct procedures when those workers travel home and back again.

After the workshops, DAERA’s pig advisers and the private vets followed up with individual farms as a matter of course. Reviews are undertaken by the stakeholders on a regular basis. Continuing education and professional development in this area is central to Northern Ireland’s approach to antimicrobial stewardship. Knowledge transfer and sharing experience with counterparts across the UK is also hugely beneficial.

The Forum also has a Collaborative Network made up of farmers, processors, grain trade and DAERA which plans to look at research projects that might improve antibiotic usage, such as the use of probiotics in feed.

As an island, it makes sense for the Northern Ireland pig industry to work with neighbours in Republic of Ireland in relation to disease control. There are schemes already in place, developed in conjunction with private vets in Northern Ireland and ROI, as DAFM, pig farmers DAERA and the Pork & Bacon Forum. These focus on importation of livestock and semen and the controls and processes required to keep disease out.
Knowledge Exchange

EU PIG

The EU Pig Innovation Group (EU PIG) is a consortium of pig research, knowledge transfer and farmer partners that have formed a network to share findings from existing research, share best practice and exchange approaches to knowledge transfer with pig farmers and associated advisors.

Each year, pig farmers and other experts identify two emerging issues under each of its four pillars (pig health management, precision production, welfare and meat quality) and share knowledge and best practice related to those issues. The main route by which best practice is identified is the EU PIG Grand Prix, an annual EU-wide contest that sees more than 300 farmers competing to be one of eight EU PIG Ambassadors. All of the case studies are shared via virtual farm tours, photos and technical reports with accompanying evidence and cost-benefit from the literature.

Priorities identified under the pillar of “Health Management” for 2016-2017 and 2017-2018 are shown below:

<table>
<thead>
<tr>
<th>Pillar</th>
<th>Challenges identified as priorities for the network (2016-2017)</th>
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</thead>
<tbody>
<tr>
<td>Health management</td>
<td><strong>Biosecurity:</strong> Good practices including internal and external biosecurity to prevent introduction and transmission of pathogens</td>
<td><strong>Zinc Oxide:</strong> Therapeutic zinc oxide to weaners is due to be out phased within the next 5 years. Which other good practices, including the use of alternatives and optimising management strategies, can be used to prevent post weaning diarrhoea (without using therapeutic Zinc and without increasing antibiotic treatment)?</td>
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<tr>
<td>Health management</td>
<td><strong>Use of antimicrobials:</strong> Good practices that reduce and enhance usage of antimicrobial substances, such as prophylactic use of vaccines, innovative systems of antimicrobial delivery, optimizing management, feeding and housing conditions and benchmarking/farm comparisons (dashboards)</td>
<td><strong>Vaccination strategies:</strong> Vaccines are in many situations a cost-effective alternative to treatments and are able to generally improve the health status and production efficiency. What is the optimal vaccination strategy for the most common pathogens in pigs?</td>
</tr>
</tbody>
</table>
Case Studies

AHDB’s Knowledge Exchange team meets regularly with pig farmers to highlight information and practical solutions for reducing and refining antibiotic use without compromising pig welfare. AHDB is also setting up a number of Strategic Farms, which will facilitate farmer-to-farmer knowledge exchange and offer farmers a platform to share their progress regarding improvements in disease control. Numerous case studies detailing how pig farmers have successfully implemented measures resulting in improved pig health and reduced need for treatment are available online.

Nuffield Farming Scholarships

Two Nuffield Farming Scholarships have been awarded in recent years focusing on measures to improve antibiotic stewardship in pig production.

- Reducing antibiotic use in pig production - is there a need for systemic change?
  Funded by AHDB Pork, 2017 Nuffield Scholar Georgina Crayford travelled to a number of countries exploring what, if any, changes to the way in which pigs are kept and managed are needed to reduce antibiotic use. She also met with social scientists to learn more about how behavioural “nudges” might be employed to encourage good antibiotic stewardship by farmers.

- ‘Point of care diagnostics: What can we learn from the medical industry?’
  Generously supported by the Elizabeth Creak Charitable Trust as a Clyde Higgs Scholarship, 2018 Nuffield Scholar Charlotte Evans will embark on eight weeks of travel to various countries to gather knowledge from the field of diagnostics. The pig industry is in urgent need of rapid pen-side diagnostics to facilitate veterinary treatment decisions, resulting in better and more targeted use of antibiotics.

http://www.farmantibiotics.org/ideas-hub/antibiotics-case-studies/