



Department  
for Environment  
Food & Rural Affairs

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## **New and re-emerging diseases, endemic diseases and enhanced surveillance methodology Evidence Plan**

**Policy portfolio: Animal Health: Surveillance, Global Trade and Zoonoses**

**Policy area within portfolio: New and re-emerging diseases, endemic diseases and enhanced surveillance methodology**

**Timeframe covered by Evidence Plan: 2013/14-2017/18**

**Date of Evidence Plan: March 2013**

This evidence plan was correct at the time of publication (March 2013). However, Defra is currently undertaking a review of its policy priorities and in some areas the policy, and therefore evidence needs, will continue to develop and may change quite rapidly. If you have any queries about the evidence priorities covered in this plan, please contact [StrategicEvidence@defra.gsi.gov.uk](mailto:StrategicEvidence@defra.gsi.gov.uk).

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# 1. Policy context

## **What are the key policy outcomes for the policy programme/area?**

Animal disease can cause serious social, economic and environmental damage, compromise animal welfare and threaten human health. Although many diseases are known, new diseases do arise and can have devastating effects, as seen with BSE. The recent emergence of Schmallenberg Virus supports the need for constant vigilance. Early detection of new or unexpected diseases (e.g. re-emergence of diseases believed absent or eradicated) and improved preparedness, such as alternative treatments for pathogens likely to develop resistance, are needed for the effective management of these threats.

The early detection of new and re-emerging (N&RE) disease threats and the development of control methods for the major disease challenges deliver directly to Defra's Business Plan, specifically Departmental Priority One to "Support and develop British farming and encourage sustainable food production", and a further responsibility to "Prepare for and manage risk from animal and plant disease". It also delivers to the goals of the Animal Health and Welfare Strategy for England (2012) and the UK Veterinary Surveillance Strategy which Defra committed to implement following a public consultation in 2003 (reviewed in 2010).

A range of our commitments under EU and international regulations are also supported by an effective scanning surveillance programme providing information on the UK and GB national animal health status. For example, EC Directive 2003/99/EC sets out the legislative requirements for zoonoses monitoring and reporting. Much of the information submitted to the European Commission is based on data acquired through the scanning surveillance programme. The infrastructure provided by activities within this Evidence Plan are an integral part of delivering legislative and policy commitments in other key work areas across GB Administrations and other Government Departments.

Animal Health and Welfare (AH&W) research portfolios are held and administered by Defra on a GB basis in recognition that diseases and animal industries operate in the epidemiological unit of GB and for economies of scale following the devolution of responsibilities and budgets process. The AH&W evidence plans reflect and take into account any aspects of Welsh and Scottish Government's policy requirements where this is not already directly aligned with that of Defra.

The objectives of this evidence plan are:

- Early identification of notifiable and other diseases
- Early identification and assessment of N&RE animal-related threats
- Trend analysis and detection of change in endemic diseases
- The development of improved control methods for endemic diseases
- Collaboration and sharing information with industry and other experts

- Effective gathering and analysis of surveillance data to support identification of notifiable, endemic and N&RE diseases
- Development of improved surveillance methodology

Whilst there is often an economic imperative for the animal health industry to sponsor development of novel treatments, there are many situations where the market is not sufficiently large to provide an economic incentive and so Government co-support can drive innovative solutions. Defra policy and rationale for support in the control of endemic diseases of livestock is being developed in light of the spending review and ministerial priorities.

## 2. Current and near-term evidence objectives

### **What are the current and near-term objectives for evidence and how do they align to policy outcomes?**

Key to the delivery of this policy area is an effective and efficient animal health infrastructure in the UK. This includes provision of expertise and capability to deal with a wide range of N&RE and endemic disease threats. Such expertise is primarily provided through funding of laboratories via the research and surveillance arms of the evidence programme.

The development of N&RE diseases is complex and difficult to predict and a reactive research programme is essential. Investigations into N&RE diseases inform GB about likely risks and help to characterise any need for further research (alongside other actions). Outputs from this programme act as a platform for any necessary further research through the endemics/exotics research programmes. Work conducted within this programme is integral to GB animal disease control effort and capacity to respond to new threats.

The development of surveillance methodology is a continuous process that contributes to reducing government costs by ensuring resource and expertise are used effectively and efficiently and by improving the likelihood of identifying N&RE animal-related threats rapidly in order to reduce their impact on society. With the development of surveillance methodology there are opportunities to work more closely with industry to address the major endemic diseases of livestock that affect production.

Given the broad nature of the topics covered by this evidence plan and the inherent fluidity of R&D spend across these areas (depending on, for example, the emergence of novel pathogens and the need to develop an innovative surveillance strategy), adaptability is key when prioritising evidence needs. With this in mind and with consideration of limitations in Government finances, R&D programmes have undergone and continue to undergo consolidation, with evidence needs prioritised appropriately. Evidence needs (both current and future) highlighted in this document currently rank as high priority where there is a case for Government investment. The policy objectives and evidence needs articulated are

often broad, whereas some are narrowly focussed, reflecting the nature of this evidence plan. For example, in New and Re-emerging Diseases, the breadth relates to the necessity of maintaining capability in the face of unknown threats.

Other evidence used but not funded by this policy area, includes:

- Internal input from veterinary advisors, economists, social researchers, statisticians, epidemiologists, lawyers and livestock technical specialists
- Data such as reports of international disease monitoring from Defra and from international organisations (EU, OIE, FAO, WHO)
- Scientific information published in literature and accessed through AHVLA Library and various catalogue subscriptions etc.
- Surveillance reviews (by the independent Surveillance Advisory Group (SAG) on surveillance in England and Wales, and the Kinnaird Review of Veterinary Surveillance in Scotland<sup>1</sup>) including recommendations on how to enhance both value for money and impact.
- Comparable evidence from human and other related fields, recognising the important of a ‘one health’ approach and the interdependence of human, animal and ecosystem health and the need for an international, multi-disciplinary approach to the surveillance, control and prevention of emerging diseases (for example assessing the value of the use of syndromic surveillance tools in animal disease surveillance).

Policy Objective	Current/ Near-term Evidence needs	Future Evidence needs
Early identification of notifiable and other diseases.	<ul style="list-style-type: none"> <li>• A multi-disciplinary programme of research and surveillance evidence in-line with policy objectives on a range of diseases to enable GB to respond promptly to N&amp;RE and endemic diseases of animals.</li> <li>• Focus of research evidence on better understanding the characteristics of novel pathogens/diseases, potential control measures, and control of economically important endemic diseases to reduce the impact on businesses and rural</li> </ul>	<ul style="list-style-type: none"> <li>• Continued provision of expertise and capability to inform decisions on a wide range of disease threats in addition to addressing policy specific evidence questions as they arise.</li> <li>• Continued early warning surveillance.</li> <li>• To continue to support a small, reactive</li> </ul>

	<p>communities often where global markets are not large enough to interest Industry investment.</p> <ul style="list-style-type: none"> <li>• Current research is directed at projects to determine the pathogenesis and transmission of Schmallenberg Virus (SBV) and projects to increase diagnostic capacity against a number of viruses currently exotic to the UK.</li> <li>• Early warning surveillance to monitor the health of defined animal populations to enable timely detection of new, unexpected or changed patterns of disease.</li> <li>• National and international disease and scenario modelling to inform risk analysis of disease incursion to the UK and the impact of policy changes on the probability of disease outbreaks.</li> </ul>	<p>research programme for N&amp;RE diseases to support the early identification and assessment of N&amp;RE disease threats.</p> <ul style="list-style-type: none"> <li>• To fulfil our statutory obligations on disease surveillance (both endemic and N&amp;RE disease) through support for reference laboratories with recognition of the underpinning nature of research activities on reference laboratory function.</li> <li>• Continued awareness of overseas surveillance for evidence of the emergence of N&amp;RE disease threats</li> <li>• There is a general need for increasing socio-economic research especially in relation to behaviours that influence disease risk.</li> </ul>
Assessment of N&RE threats.	<ul style="list-style-type: none"> <li>• Surveillance programmes to monitor disease prevalence / spread and adapt our control policies accordingly.</li> <li>• Capability to characterise new or re-emerging animal related threats (NRT) through advice from national and international disease experts (including epidemiology, pathology and pathogen expertise).</li> <li>• Scientific and operational input from national and international disease experts and industry representatives.</li> </ul>	<ul style="list-style-type: none"> <li>• To ensure provision of scientific consultancy to the UK and to represent the UK nationally and internationally on a wide range of endemic and N&amp;RE diseases.</li> <li>• Continued provision of surveillance programmes.</li> <li>• Maintenance of capability to characterise NRT through national and international disease experts.</li> <li>• Continued input from national and international disease experts and industry representatives.</li> </ul>
Trend analysis and detection of change in endemic diseases.	<ul style="list-style-type: none"> <li>• Endemic diseases research projects are directed at the major infectious diseases of poultry, pigs, cattle and sheep and include viral, bacterial and parasitic conditions. Whilst a number of diseases and conditions can no longer be</li> </ul>	<ul style="list-style-type: none"> <li>• To ensure provision of scientific and disease specific expertise to inform the analysis and detection of endemic</li> </ul>



	<p>supported in this programme, the current focus is on Marek's Disease, Sheep Scab, infectious bronchitis, gut health for pigs and poultry as well as respiratory diseases of pigs. Whereas these are of significant concern to the GB Industry, there is not a sufficient economic imperative for the animal health Industry to act alone. Government co-funding supports a more sustainable and productive livestock sector.</p> <ul style="list-style-type: none"> <li>• This is a cross cutting evidence area and some aspects of endemic diseases overlap with other funding areas such as animal welfare and co-funding/collaboration must remain options for consideration.</li> </ul>	<p>diseases.</p> <ul style="list-style-type: none"> <li>• To continue to seek opportunities to undertake cross cutting approaches on animal health issues.</li> <li>• Future research needs are likely to be informed in part through European and international research coordination efforts alongside domestic policy requirements. This may include viral diseases of poultry, respiratory and gut conditions of pigs and some parasitic diseases of livestock, for example sheep scab and fluke.</li> </ul>
<p>The development of improved and alternative control methods.</p>	<ul style="list-style-type: none"> <li>• A cross cutting research programme to develop immunological approaches to disease control as an alternative to the use of pharmacologically active compounds – thus helping to minimise the hazards to animal welfare posed by pre-existing disease, and minimise the risk to food and the environment and protecting human health from residues of medicinal products.</li> </ul>	<ul style="list-style-type: none"> <li>• Development of improved disease control methods, including consideration of user behaviour and uptake, focusing particularly on decreased dependence on antimicrobial use.</li> <li>• To continue to seek opportunities to undertake cross cutting approaches on animal health issues.</li> </ul>
<p>Effective surveillance data gathering and analysis</p>	<ul style="list-style-type: none"> <li>• Data are derived from laboratory submissions and a close working relationship with veterinarians, animal keepers and the industry to establish a baseline against which to detect unusual events that may indicate N&amp;RE disease. Such investigations have enabled early intervention to limit the impact of both exotic disease incursions (e.g. avian influenza) and new diseases (e.g. SBV).</li> </ul>	<ul style="list-style-type: none"> <li>• Continued surveillance data gathering.</li> <li>• Development and use of new or improved methodologies for collating, interpreting and analysing such diverse data is likely to be needed to aid in the implementation of improved surveillance methodologies.</li> </ul>
<p>Collaboration and sharing information with industry, farmers, vets and other experts.</p>	<ul style="list-style-type: none"> <li>• Identify existing datasets and understand their limitations.</li> <li>• Define and engage with stakeholder Networks, including industry, farmers and vets, stakeholder groups and species</li> </ul>	<ul style="list-style-type: none"> <li>• Focus on improving data quality through representation and raising the value of feedback.</li> </ul>

	expert groups.	
Development of improved surveillance methodology	<ul style="list-style-type: none"> <li>• Current research on surveillance methodology is directed at preliminary research, looking to develop surveillance methodologies, working with colleagues both in the UK and wider to identify and enable the adoption of best practice wherever it is developed, and to encourage international bodies such as the OIE and EU to adopt efficient approaches in their regulatory frameworks.</li> </ul>	<ul style="list-style-type: none"> <li>• Recommendations from recent reports<sup>1</sup> in addition to advice from cross-administration bodies such as the Veterinary Risk Group (VRG) will inform the definition and prioritisation of future research requirements in this area.</li> </ul>

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<sup>1</sup> independent Surveillance Advisory Group (SAG) on surveillance in England and Wales ([http://vla.defra.gov.uk/science/docs/sci\\_sag\\_final\\_report.pdf](http://vla.defra.gov.uk/science/docs/sci_sag_final_report.pdf)) and the Kinnaird Review of Veterinary Surveillance in Scotland (<http://www.scotland.gov.uk/Publications/2011/11/09091744/0>)

### 3. Future evidence needs

#### **What are the longer-term evidence needs for the policy area/ programme?**

Globalisation, biological variability and changes in both climate and human behaviour mean there is a constant risk of N&RE animal disease that could threaten society through threats to public health, the rural economy or biodiversity, animal welfare and international trade in animals and their products. Social science, exploring the scope for alternatives to regulation and the associated research requirements, is underway including a review of behavioural evidence.

Endemic disease is accepted to account for significant production losses with associated impacts on sustainability and greenhouse gas emissions. Since the field of research exploring the synergies between Animal Health and Greenhouse Gas Emissions is an emerging one in which Defra has been a global leader, more detailed understanding of the emissions and production savings could lead to innovative policy approaches. Endemic diseases are no different from others in that as a result of constant evolution of pathogens the situation is dynamic. The development of innovative control approaches, including a drive towards alternatives to antibiotics will become increasingly important.

For information on the broad, longer-term aims of these policy areas please see the table above. However there is inherent uncertainty in identifying long-term needs for this evidence programme due to the complex and unpredictable nature of N&RE diseases. This makes prioritisation difficult, however, maintaining capability and capacity to respond to disease threats as well as ensuring appropriate and proportionate surveillance is in place for emerging disease threats is of priority and key to ensuring appropriate, proportionate interventions are in place.

### 4. Meeting evidence needs

#### **What approach(es) will be taken to meeting evidence needs?**

The approach to meeting research evidence needs is guided by standard Defra procedures. Prioritisation and specification of both surveillance and research is determined from the relative importance of different diseases informed both by the evidence base in the D2R2 decision support tool<sup>2</sup>, and through discussion with policy colleagues (across GB Administrations), veterinary advisors, the Animal and Plant Health Evidence and

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<sup>2</sup> The D2R2 decision support tool was created to help prioritise animal health issues so that government efforts to detect and control animal diseases are directed at those which are likely to have the greatest risk and impact on society. It uses validated objective evidence to rank animal diseases on the basis of their relative importance in the context of the four reasons for government intervention (RFI), as defined by the GB Animal Health and Welfare Strategy. These are to protect public health, to protect and promote the welfare of animals, to protect the interests of the wider economy, environment and society and to protect international trade. It also provides disease briefing from a profile created for each disease and a means of risk assessment which reflects the level or likelihood of disease and current control measures.

Analysis (APHEA) team, disease experts and livestock industry sector groups as well as being informed by the Animal Health and Welfare Risk Management Cycle. More recently, the Animal Health and Welfare Board for England has also been involved in high level discussions over evidence needs.

The Animal Health and Welfare portfolio of R&D programmes is managed by a single Evidence Team, which enables very close working and easy identification of cross-cutting issues, which can be addressed in a complementary way. Amongst others, APHEA, the wider Defra Evidence & Analysis Community, and procurement processes also facilitate identification of opportunities for working across the Department on issues that affect disparate policy areas.

During the year, priorities are identified through the channels outlined above and then meetings are held with the policy team, representatives of the devolved administrations and evidence specialists, where the evidence gaps are ranked based on short term and long term policy need, scientific likelihood of success, whether they will significantly augment our existing evidence base or help maintain essential scientific capability and the estimated cost of any proposed new research. Where appropriate, policy and science leads may convene to undertake a multi-criteria analysis that allows comparison of research across the programme.

Once identified, research needs are procured either through open competition or direct commissioning, with open competition as the default position. All applications are peer reviewed internally and externally regardless of procurement route. Peer review engages appropriate external scientific experts as well as industry representatives to ensure there is both scientific as well as operational challenge to any proposed research. Research projects are monitored by annual reports, site visits and by advisory groups for larger projects that require greater Defra and/or stakeholder steer. In addition, research final reports are peer reviewed where appropriate and revised if necessary prior to publication on the Defra web-site. Researchers are also strongly encouraged to publish their results in peer reviewed journals. The goal is to fund high quality scientific research that informs policy decisions and also maintains necessary expertise.

Extensive meetings are held between contractors, the Evidence Team in AHVLA, Defra and other GB administrations' policy colleagues as well as industry stakeholders to ensure that project results are transmitted and interpreted for use in a policy context. This close relationship also allows feedback of changing policy priorities to the researchers during a project which can allow for projects to be altered if necessary.

Defra engages in a number of international fora for information exchange and research coordination. At an EU level, Defra participation in, for example, ERA-Net and the EU framework programme, has levered significant funds from EU and European member state funding organisations resulting in a total expenditure of more than €45M, of which Defra contributed approximately €5M. This kind of coordinated approach drives the formation of international research collaboration, thereby enhancing the connectivity and expertise of national research groups available to Defra and other GB administrations, and shares the cost of the research between several Member States, thereby offering almost unparalleled

value for money. Strategic research agendas developed by these international fora also help to inform Defra's research procurement and prioritisation.

There is also always a focus on cross-policy work and where appropriate, cross-cutting research is considered in order to maximise the benefit to multiple policy groups and share the costs accordingly.

Groups that may also feed into this risk assessment process include:

- The Veterinary Risk Group (VRG)
- The Human Animal Infections and Risk Surveillance (HAIRS) Group
- The Chemical Hazard Identification & Risk Surveillance (CHaIRS) Group
- The Defra Antimicrobial Resistance Co-ordination (DARC) Group
- The UK Zoonoses, Animal Diseases and Infections (UKZADI) Group
- The Independent Surveillance Advisory Group (SAG)

## **New and Re-emerging Diseases**

The unpredictable nature of N&RE animal-related threats means that new evidence requirements are largely unknown. However, continuous early warning surveillance needs to be maintained to enable their early detection. Potential threats identified are then fed into the Animal Health and Welfare Risk Management Cycle. Initially they are raised at the Veterinary Risk Group (VRG). This cross-administration body meets monthly to consider potential N&RE animal-related threats identified by early warning surveillance alongside threats raised by other animal health and welfare policy teams collated in an Emerging Threats Highlight Report (ETHiR). The VRG provides a means of preliminary risk assessment and comments on proposed risk management options including potential further research which are then reported back to risk managers and to the Chief Veterinary Officers of the four UK administrations.

The drivers for further research on N&RE conditions will be linked to the priorities of GB administrations. To assist in assessing the relative importance of an emerging disease to GB, available information on the disease may be collated and inputted into a modified disease profile in the D2R2 prioritisation tool. This document informs discussion on potential risks to public health, animal welfare, international trade or wider society. When sufficient information is available, it can also be used to rank an emerging disease against known diseases which helps prioritise allocation of resource.

## **Endemic Diseases**

Evidence gaps are identified through interaction with policy stakeholders including the Administrations in Wales and Scotland, and with the livestock industry via groups such as BPEX and the Poultry Research Committee. New research needs are discussed and the potential for co-funding explored.

## Enhanced Surveillance Methodology

At a strategic level, the Independent Surveillance Advisory Group (SAG) was established so all those with an interest in veterinary surveillance in England and Wales could help shape a future model and ensure that all issues were thoroughly considered. It was comprised of representatives from academia, government, the veterinary profession and the livestock farming and private laboratory industries. The SAG recently produced a set of recommendations which are being taken forward by the AHVLA Surveillance 2014 project. Veterinary and Epidemiological Advisers with expertise and knowledge of surveillance, risk assessment, animal disease, and livestock husbandry systems advise on future evidence policy needs, assess research proposals and reports, liaise with delivery agents, industry and NGOs on concerns and information presented and translate evidence into a form suitable for policy colleagues and Ministers to understand and use. Defra economists and a range of industry representatives, who participate in species expert group meetings, contribute to discussions on evidence needs and future priorities.

## 5. Evaluating value for money and impact

### **What approach(es) will be taken to maximise and evaluate value for money and impact from evidence?**

Research will be procured according to the Evidence Handbook and is subject to internal expert input and external peer review that provides an independent scientific challenge.

An effective multi- and inter-disciplinary approach to fulfilling evidence needs is ensured through use of relevant expertise, advisory bodies and collaboration with other funding bodies, both in GB and externally. There is also increasing engagement internally with teams such as APHEA in Defra that offers expertise in statistical data and analysis, social research and economic analysis. This, alongside external peer review, ensures robust and high quality evidence.

Value for money will be guided through peer review of all research proposals (value for money is a specific question we ask peer reviewers to consider). Close monitoring of projects to ensure that projects do not drift off course and that researchers can, when feasible, adjust projects mid-stream in the light of new findings and/or policy priorities, ensures projects continue to deliver value for money as much as possible.

Where possible, value for money is also ensured, through co-funding with the animal health industry or other UK research funders (e.g. BBSRC) and more recently with other European Member States. Strong links with other funders enable leverage of funds where possible.

Defra evidence officials have begun work on a long term exercise, commissioned by the Animal Health and Welfare Board for England, to consider the value for money achieved from all Defra's animal health and welfare spending. The project may contribute to future Evidence Plans.

Project specific dissemination strategies are developed at the start of every research project to ensure effective communication, including how the evidence generated from the work will be used by policy, how stakeholders will be involved and how knowledge will be retained and promoted. Once completed, each project is also evaluated with regard its delivery, timeliness and policy impact, either through internal or external review.

Early warning surveillance was reviewed and re-characterised after inquiries into the BSE and FMD epidemics recommended that earlier detection would have reduced their impact. This led to the publication of the UK Veterinary Surveillance Strategy in 2003 with a 10 year implementation plan to enhance early warning surveillance. This was reviewed in 2010 and subsequent work both within government and by the independent Surveillance Advisory Group (SAG) on surveillance in England and Wales, and the Kinnaird Review of Veterinary Surveillance in Scotland resulted in a number of recommendations to enhance both value for money and impact; these are now being taken forward.

Policy objectives are regularly tested through discussions with internal and external stakeholders (through expert groups) as appropriate. European and international institutions and other Government Departments may also inform policy development and implementation.

The evaluation of evidence in Defra is an important and continuous activity at project level and contributes toward ensuring that good quality, robust evidence is used to underpin departmental policy<sup>[1]</sup>. Evaluating the impact of evidence on policy development is complex and often only possible over the long term. Evaluation will necessarily be linked to Defra's Evidence Investment Strategy, which provides a strategic overview of how evidence fits with Defra needs. Programme level evaluation to assess the impact of evidence on policy will be explored (depending on available resource) following publication of the new Evidence Investment Strategy. It will be important that evidence currently being explored will have time to make an impact and for any new direction emerging from the new Evidence Investment Strategy to be tested and incorporated.

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[1] <http://archive.defra.gov.uk/corporate/docs/policy/evidence-policy-report.pdf>