



Department of
**Agriculture,
Food and the Marine**
An Roinn
**Talmhaíochta,
Bia agus Mara**

Animal Health Surveillance Strategy for Ireland 2016-2021



1. Rationale for developing an animal health surveillance strategy for Ireland



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In Ireland, the agri-food sector is an important source of employment and revenue. In 2014, it accounted for 12.3% of Ireland's exports and 8.6% of total employment. Livestock enterprises are a key component of the agri-food sector. Ireland is the largest net exporter of beef in the EU. It also produces considerable quantities of milk based-products, sheep meat, pig meat, and fish for export.

Ireland has a favourable animal health status and is free of many diseases, some of which were endemic until recent times. Our animal health status is underpinned by a well developed state veterinary service and veterinary laboratory service. There is also a well developed animal identification system, particularly for cattle, which allows the tracking of animal movements and traceability of animals and products. The aquaculture sector in Ireland enjoys high health status in relation to the diseases listed in Council Directive 2006/88/EC, all of which are covered by the national disease surveillance programme.

However, there are still a number of challenges to our animal health status. While good progress has been made in recent years in the eradication of bovine tuberculosis, the presence of *M. bovis* in wildlife will present a challenge to the stated aim of the Department of Agriculture, Food and the Marine (DAFM) to eradicate this disease from the Irish cattle population by 2030. There are a number of other specific diseases that reduce on-farm productivity. In cattle, these include Johnes disease, bovine viral diarrhoea (BVD), infectious bovine rhino-tracheitis (IBR) and pathogens causing mastitis. Programmes are currently being implemented by Animal Health Ireland (AHI) to address these latter diseases. Concerns remain regarding the risk to the public of exposure to agents present in animals such as the enterocytotoxin-producing strains of *Escherichia coli*, including verocytotoxin producing *E. coli* (VTEC) and *Campylobacter* spp. Another challenge is the increase of antimicrobial resistance (AMR) in animal pathogens and the effect that this could have on animal and public health concern.

There are a number of national and international drivers of change in animal health. The international drivers include globalisation, climate change, EU policy initiatives, geo-political instability and new technologies. The national drivers of change include intensification, reduced veterinary presence on farms, increased animal mobility and national policy initiatives such as FoodWise 2025.

Surveillance is a key factor in improving our animal health status, thereby maximising the economic return for farmers from their animals, while helping to maintain high animal welfare standards. Animal health surveillance has been defined as '*the systemic (continuous or repeated) collection, collation, analysis, interpretation and timely dissemination of animal health and welfare data from defined populations*' (Hoinville et al., 2013). A wide range of animal health surveillance activities are carried out in Ireland and there are a large number of stakeholders. These include farmers, private veterinary practitioners, the meat and dairy industry, government bodies involved in agriculture and educational and research institutions. Animal health surveillance programmes are implemented by a variety of organisations including DAFM, Animal Health Ireland and the Marine Institute. The number and diversity of stakeholders poses a major challenge to the delivery of surveillance in a coordinated and effective manner. It also poses a challenge to the adequate representation of the views of



stakeholders on the development of policy. While recognising the contributions of the different organisations involved in animal health surveillance in Ireland, DAFM decided to take a leadership role in developing and coordinating animal health surveillance and in ensuring that a high-quality surveillance programme was in place. This approach is consistent with the leadership role of DAFM which is set out in its mission statement, i.e. “to lead the sustainable development of the agri-food, forestry and marine sector and to optimise its contribution to national economic development and the natural environment”. It is also consistent with the major role that DAFM has played in the area of animal health surveillance and the close working relationship that it has had with many of the stakeholders over a prolonged period. With this in mind, in 2013, DAFM set up an Animal Health Surveillance Steering Group. The main role of the Steering Group is to develop general policy in the area of animal health surveillance, to coordinate surveillance activities and to monitor implementation.

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In 2014, DAFM, through the Animal Health Surveillance Steering Group, set up a working group to develop an animal health surveillance strategy for the period 2016-2021. The terms of reference were to:

- Review international best practice in animal health surveillance strategies;
- Tabulate the current surveillance programmes implemented in Ireland;
- Develop a national strategic plan for Ireland;

The aim of the strategy is to ensure Ireland maintains its international reputation as having a high animal health status whilst improving national on-farm productivity. It will enable effective and optimum monitoring and control of existing diseases and minimise the potential impact for exotic diseases.

A review of the various approaches to animal health surveillance in a number of countries was undertaken including Australia (AHA, 2010), Canada (NFAHWC, 2011), Denmark (DVFA, 2012), England and Wales (DEFRA, 2012), Netherlands (GDAH, 2015), New Zealand (MAF, 2008 and 2009), Scotland (ScotGov, 2011), and Switzerland (FVO, 2010). This review provided an insight into international best practices, technologies utilised, the allocation of resources, and possible problems that can be encountered when launching an animal health surveillance programme.

In preparing the strategy, the Working Group consulted with the divisions in DAFM responsible for developing and implementing specific surveillance programmes. Meetings were also held with individual external stakeholders and a forum on animal health surveillance was held in April 2016, to which all stakeholders were invited.



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2. Surveillance in Ireland today

In Ireland, animal health surveillance comprises a combination of activities within the public and private sectors. In 2015, 27 active surveillance programmes were carried out in Ireland in a wide range of species, including cattle, sheep, pigs, horses, poultry, fish and wildlife species. DAFM is responsible for implementing many of the active surveillance programmes such as the TB Eradication Programme and the BSE Eradication Programme. It is also responsible for organising and coordinating passive, i.e. observer-initiated, surveillance for new, re-emerging and exotic diseases. The DAFM laboratories, including the Central Veterinary Laboratory and the Regional Veterinary Laboratories play a key role in this activity.

Other organisations are also involved in animal health surveillance. AHI is an industry-led, not-for-profit partnership between livestock producers, processors, animal health advisers and government. Its remit includes dealing with certain endemic diseases and conditions of livestock in Ireland, which are not currently subject to regulation or coordinated programmes of control. The Marine Institute is the Competent Authority for the implementation in Ireland of Council Directive 2006/88/EC, which deals with the health of aquaculture animals and the prevention and control of certain aquatic diseases. Organisations such as the private laboratories, the Centre for Veterinary Epidemiology and Risk Analysis (CVERA), the Irish Cattle Breeding Federation (ICBF) and Teagasc play important roles and provide critical resources for animal health surveillance in Ireland.

Ireland's animal health surveillance system has many strengths. Systems and procedures are in place for active surveillance programmes and to facilitate the reporting of new, re-emerging and exotic disease and chemical hazards. There is good awareness in relation to exotic diseases among key stakeholders, particularly farmers and PVPs. There is a well developed laboratory structure with high levels of expertise. Animal identification and traceability systems, IT systems and supporting legislation are in place. The organisations involved in the carrying out of animal health surveillance have a proven track record of successfully implementing animal health surveillance programmes.

However, there are many areas where improvements could be made. In particular, there would be benefit from greater involvement of stakeholders in decision-making and, in particular, in setting priorities and in providing feedback on surveillance programmes. There is a need to maximise the value of surveillance information, particularly information available from the DAFM databases. The different sources of information need to be developed into an integrated system that will identify new, re-emerging and exotic hazards in a timely manner. The physical infrastructure of the RVLs needs to be upgraded, the processes for scanning¹ surveillance need to be improved, and there is a need for better use of the expertise of RVL staff through specialisation. In general, surveillance could be further improved by the development of quality control systems throughout the surveillance network. It could also be improved by the further development of communication systems which could provide useful information to stakeholders, maximise stakeholder engagement, and create awareness and the necessary trust that will result in early reporting of new, re-emerging and exotic diseases and allow full participation in control programmes for endemic diseases. There is scope for improving the integration and communication of surveillance activities in line with the One Health concept.

¹ In the context in which it is used in this document, scanning surveillance refers to the monitoring by the Regional Veterinary Laboratories of diagnostic submissions, including carcasses, blood, swabs, milk, faeces, to detect changes in health patterns caused by exotic, new or emerging diseases and to detect trends in endemic diseases

3. A national strategic plan for animal health surveillance in Ireland



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1.1 Our vision

Animal health surveillance plays an integral role in supporting Ireland's livestock industry at all levels, which in turn contributes to the economy, and protects our public health and environmental well-being. Our vision fits into a broader vision for Irish agriculture set out in FoodWise 2025 and in particular, the target of being best in class in terms of the products that we supply. In this context, best in class is defined as producing safe and high quality food that is sustainably produced, while being able to verify those criteria objectively and credibly.

In our vision, all the stakeholders will be working together in an integrated surveillance system which utilises resources efficiently, narrows the focus onto agreed surveillance priorities, and effectively responds to new/emerging or existing threats. The programmes will be ambitious but realistic, practical and cost-effective. They will achieve the highest standards with the resources available. There will be timely communication of results and surveillance outputs will be well communicated to internal stakeholders and to trading partners. Surveillance will be one of the main pillars in promoting trade.

The strategy set out in this document provides the framework upon which to coordinate animal health surveillance activities until 2021, but progress will be dependent on ongoing review of the actions required to implement recommendations, and sufficient resources to complete the work. Success will depend on all of the stakeholders working together closely to achieve shared goals. It is hoped that the more inclusive structure set out in this document will stimulate dialogue among stakeholders which may lead to more active engagement and cooperation. DAFM can play a pivotal role in providing coordination and leadership.

Four key goals were identified as essential elements underlying the strategy:

1. Improving the governance of animal health surveillance in Ireland;
2. Delivering a high quality surveillance system;
3. Prioritisation of surveillance activities;
4. Improving communication of surveillance activities;

1.2 Governance of animal health surveillance in Ireland

There was extensive consultation with stakeholders in relation to governance in the preparation of the animal health surveillance strategy. The main feedback from stakeholders on this issue was that the current organisational structure for animal health surveillance is fit for purpose. The active and passive surveillance programmes undertaken by DAFM Divisions, Animal Health Ireland, the Marine Institute and other organisations are working well. The Steering Group of DAFM has the potential to coordinate the diversity of animal health surveillance activities. However, it was recognised that the role of the Steering Group needs to be further developed, that there needs to be ongoing consultation with stakeholders and that the governance structure needs to be reviewed on an ongoing basis. It was also recognised that funding mechanisms for animal health surveillance need to be reviewed and that an economic assessment should be an integral component in the development of any new animal health surveillance programme.



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1.3 Delivering a high quality animal health surveillance system in Ireland

While the quality of animal health surveillance is good, there is room for improvement in a number of areas. In relation to early warning surveillance, there is a need to further ensure that there are high levels of awareness in relation to new, re-emerging and exotic diseases, strong incentives for farmers, PVPs and other stakeholders to report suspect cases and that there is a high level of expertise, high-quality facilities and equipment at the laboratories.

The scanning surveillance undertaken by the RVLs could be further improved by the addition of enhancements such as a telephone helpline, an incentivised fee structure, the provision of a carcass collection service and by further development of staff expertise in terms of species-specific professional qualifications or discipline-based qualifications. The latter could be supported by the development of specific RVLs as designated centres of specialist competence in particular species or sectors.

Existing enhanced passive surveillance and scanning surveillance could be supplemented by novel surveillance methods or methods using existing data that are not currently being used for surveillance purposes, or only being used to a very limited extent. These include:

- Monitoring of data from animal collection services and knackeries;
- Monitoring milk recording data;
- Monitoring herd management data;
- Monitoring on-farm antimicrobial use;
- Abattoir-based surveillance;
- Sentinel herd surveillance;
- Syndromic surveillance;
- Pathogen-free surveys;
- Event-based surveillance;
- Participatory surveillance and field sampling;

In developing a high quality surveillance system, it is essential that the different sources of data are integrated efficiently and effectively and that the necessary resources are provided for this purpose.

In relation to animal health surveillance, it is also essential that performance standards are laid down based on clearly defined goals and that systems are in place for monitoring the quality of surveillance programmes. The Steering Group can play a key role in this area.

1.4 Prioritisation of surveillance activities

While animal health surveillance is growing in importance, concomitant resources, either human or financial, are not endless. Therefore, it is necessary to focus on those activities that are of priority. In order to effectively prioritise surveillance activities, a transparent process needs to be developed based on rational criteria that ensure that surveillance activities carried out are the most effective and add most value. Such criteria must be developed in consultation with all stakeholders so that decisions on future prioritisation of surveillance activities are understandable and consistent for all those involved. Agreed criteria should be flexible and ensure better buy-in from stakeholders, resulting in more consistent decision making. With these guidelines in mind, DAFM should, in consultation with stakeholders, develop a prioritisation process and establish criteria by setting up a working group with stakeholders. The priorities should be reviewed annually.



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1.5 Communication

Communication is important in ensuring that ongoing, accurate information is provided to all relevant stakeholders on the current health status of Irish livestock. In relation to exotic diseases, It is important that stakeholders, particularly farmers, PVPs, abattoir personnel, knackery personnel and DAFM staff involved in carrying out official controls are aware of and have information on the main diseases and that they report unusual signs of disease to the appropriate competent authority. It is also important in ensuring that the policy makers and the general public are aware of the economic and public health impact that the incursion of an exotic disease can have on Ireland so that necessary civic mindedness and support is present for disease control measures, particularly in times of crises. The support and participation of stakeholders, particularly farmers and PVPs, is vital in the implementation of control and eradication programmes for endemic diseases. To achieve this, stakeholders should be involved in the decision-making process and they should be kept fully informed on the progress that is being made. Communication is also important in creating awareness among farmers of the impact of production diseases. This information can be used to improve efficiency and effectiveness in animal health at farm level.

A wide variety of communication methods have come into use over recent years, particularly social media, that must be embraced and harnessed effectively in communicating animal health surveillance needs and activities. Current systems for disseminating animal health surveillance information to stakeholders, including the general public and policy makers, need to be reviewed and updated with a view to ensuring that the most appropriate methods are used and that newly developed technologies are fully utilised. The available methods include traditional methods such as workshops, correspondence, press releases and farmer discussion groups. Regular meetings with key stakeholders are a key component of good communication. Information can also be disseminated through the farming organisations and through marts. Surveillance awareness may also be highlighted at gatherings of appropriate stakeholders e.g. the farming community at agricultural shows. Clinical societies and veterinary conferences are a good mechanism for creating awareness of surveillance among PVPs. Agriculture-related courses at universities, agricultural colleges and the institutes of technology are an ideal platform for introducing the concept of animal health surveillance.

Email, websites and on-line chat forums can be used to provide data in a quick and efficient manner. Agricultural websites such as 'The Farmers Journal' and 'Agriland.ie' are key vectors for communication. DAFM has developed a surveillance website (<http://nahsp.agriculture.gov.ie/>) as a central repository for information on surveillance activities and disease programmes undertaken in Ireland. This repository may provide the type of information that other countries/partners may require when considering trading with Ireland. It should be promoted as a shop-window through which our surveillance system could be appreciated, and also allow potential partners to develop an initial positive appreciation of our system before actively engaging through other channels. However it is vital that the website is kept up-to-date and reflects the current animal health situation in Ireland.



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DAFM has a contingency plan to disseminate information to the general public in the event of an outbreak of an exotic disease. This involves providing disease information packs to PVPs and farmers, along with press releases, TV/radio interviews, TV/radio adverts and the provision of an out-of-hours telephone helpline. The public are increasingly using alternative forms of media to access information. Television and newspapers are no longer the only means for the public to have access to the news. SMS text alert systems and social media such as Facebook and Twitter are an effective way to alert farmers and the general public during a period of heightened disease threat.

Interdisciplinary collaborations and communications on issues common to human and animal health and environment should be further developed with the Department of Health and other organisations involved in human health surveillance. It is also important that the links in place with Northern Ireland in the area of animal health surveillance are fostered and further developed.

Large quantities of data are potentially available for surveillance purposes, including data available in the AIM, AHCS and LIMS systems of the DAFM. However, much of the data are not being fully utilised for surveillance purposes. Consequently, the full benefits of these data are not available. Computer programmes should be developed to allow these data to be utilised on the basis of agreed prioritisation and resources should be made available to allow ongoing interrogation of the data provided by these programmes.

Overall, a lot of progress has been made in the area of animal health surveillance and Ireland can be proud of the system that is in place. This strategy document sets out a clear way forward, through which Ireland can refine and improve its animal health surveillance system. Implementation of the recommendations set out above will result in a world class surveillance system which will serve Ireland well in ensuring high levels of health and welfare for its animals, protecting public health and ensuring access to global markets.



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4. Recommendations

Governance

Recommendation 1

As part of its leadership role, DAFM should ensure active participation of stakeholders in the development of policy and in the implementation of animal health surveillance programmes.

Recommendation 2

The governance structure of animal health surveillance in Ireland should be reviewed on an ongoing basis and updated, as necessary.

Recommendation 3

Funding mechanisms for animal health surveillance should be explored in line with principles set out in the Animal Health Strategy produced by DAFM. DAFM should promote a clearer understanding of the private and public benefits accruing from animal health surveillance programmes and this should be reflected in the funding of those programmes.

Recommendation 4

An economic assessment should be an integral component in the development of any new animal health surveillance programme.

Surveillance quality

Recommendation 5

A working group should be set up to develop an appropriate mix of early warning surveillance activities and to carry out an ongoing review of the information gathered from the different early warning surveillance activities. Key performance indicators should be set for each activity based on clearly defined goals.

Recommendation 6

With regard to scanning surveillance, the possibility of the DAFM Laboratory Services using an alternative integrated approach, along the lines set out below, should be investigated:

- Provision of a dedicated telephone help desk for PVPs, manned by clinical specialists;
- Refinement of the RVL fee structure to attract carcasses and clinical samples of high surveillance value;
- Use of a dedicated animal collection service to ensure that animals of surveillance value from a wide geographical distribution are delivered to an RVL;
- Setting up of designated centres of specialist competence in particular species or sectors;

Recommendation 7

The Animal Health Surveillance Steering Group should monitor surveillance quality through the ongoing examination of particular surveillance programmes using specific sets of criteria and using the evaluation tools available for this purpose.



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Prioritisation

Recommendation 8

DAFM should develop a prioritisation process for animal health surveillance activities and establish criteria by setting up a working group with stakeholders. The priorities should be reviewed annually.

Communication

Recommendation 9

Based on agreed priorities, DAFM should set up a working group to review what needs to be done to get optimum value in the area of animal health surveillance from its existing databases, particularly the LIMS, AIM, AHCS and AFIT systems. The working group should also develop procedures for making data available to relevant stakeholders.

Recommendation 10

Current systems for disseminating animal health surveillance information to stakeholders, including the general public and policy makers, should be reviewed and updated with a view to ensuring that the most appropriate methods are used and that newly developed technologies are fully utilised.

Recommendation 11

DAFM should continue to develop and maintain the national animal health surveillance website and ensure that it is kept up-to-date.

Recommendation 12

DAFM should continue to develop links with third level institutions with a view to ensuring that animal health surveillance is promoted among students.

Recommendation 13

DAFM should encourage the One Health concept by expanding links with other Departments and agencies involved in animal and human health surveillance and environmental sustainability.

Governance
Surveillance
Prioritisation
Communication





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List of Abbreviations used in the text

AFBI	Agri-Food and Biosciences Institute
AFCG	Animal Feed Control Group
AFIT	Agriculture Field Inspection Testing
AHCS	Animal Health Computer System
AHI	Animal Health Ireland
AIM	Animal Identification and Movement
AMR	Anti Microbial Resistance
BSE	Bovine Spongiform Encephalopathy
BTL	Blood Testing Laboratory
BVD	Bovine Viral Diarrhoea
CAP	Common Agricultural Policy
CSF	Classical Swine Fever
CSO	Central Statistics Office
CVERA	Centre for Veterinary Epidemiology and Risk Analysis
CVO	Chief Veterinary Officer
CVRL	Central Veterinary Research Laboratory
DAFM	Department of Agriculture, Food and the Marine
DSL	Dairy Science Laboratory
ECDC	European Centre for Disease Prevention and Control
EFSA	European Food Safety Authority
EI	Equine Influenza
EU	European Union
FSAI	Food Safety Authority of Ireland
GIS	Geographical Information System
IBR	Infectious Bovine Rhinotracheitis
IEC	Irish Equine Centre
ICBF	Irish Cattle Breeders Federation
LAVS	Local Authority Veterinary Service
MII	Meat Industry Ireland
NAHSS	National Animal Health Surveillance Strategy
NRCP	National Residues Control Plan
OIEWorld	Organisation for Animal Health
PVP	Private Veterinary Practitioner
RVL	Regional Veterinary Laboratory
RVO	Regional Veterinary Office
SAT	Surveillance, Animal by Products, and TSE
SBV	Schmallenberg Virus
SFPA	Sea Fisheries Protection Agency
SRM	Specified Risk Material
SSVI	Senior Superintendent Veterinary Inspector
SVI	Superintendent Veterinary Inspector
TSE	Transmissible Spongiform Encephalopathy
UCD	University College Dublin
UK	United Kingdom
VFSL	Veterinary Food Safety Laboratory
VI	Veterinary Inspector

**List of
Abbreviations
used in
the text**



Background information and rationale for developing an animal health surveillance strategy

1.1 Definition of animal health surveillance and its uses

Animal health surveillance has been defined as ‘*the systemic (continuous or repeated) collection, collation, analysis, interpretation and timely dissemination of animal health and welfare data from defined populations*’ (Hoinville et al., 2013). Such information is essential for describing health-hazards and for contributing to the planning, implementation and evaluation of risk-mitigation options. Surveillance data are collected for a number of reasons:

- 1) To achieve early detection of the incursion of an exotic disease;
- 2) To achieve early detection of newly emerging or re-emerging diseases;
- 3) To monitor endemic diseases and establish baseline prevalences;
- 4) To provide proof of freedom from a disease within a population;
- 5) To detect chemical hazards that may arise due to exposure in the environment, feed chain or other routes;
- 6) To evaluate the effectiveness of a control or an eradication programme;

More generally, surveillance information can be used to guide animal health policy makers, public health policy makers and to support trade. Surveillance enables people at all levels to make more effective decisions regarding animal health.

Animal health and human health are inextricably linked as captured within the concept of One Health². This concept forms the basis for a worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans, animals and the environment. Veterinary science, including animal health surveillance, has an important contribution to make to the maintenance and promotion of public health in support of One Health by monitoring the health status of animals with respect to zoonotic and new or re-emerging diseases. Timely communication of such information to colleagues in the human health fields can support more effective control strategies.

Effective animal health surveillance is dependent on knowledgeable and motivated stakeholders, simple reporting structures, well equipped and resourced laboratories, effective transport and communication networks, and a legal framework supporting compulsory and voluntary notification of disease.

² One Health is "the collaborative effort of multiple disciplines — working locally, nationally, and globally — to attain optimal health for people, animals and the environment"

1.2 Importance of animal health for Irish agriculture

1.2.1 Agriculture and the Irish economy

Livestock

In Ireland, agriculture uses 65% (4.5 million hectares) of the total land mass (6.9 million hectares), with almost 81% (3.6 million hectares) of agricultural land used for pasture, hay and silage production (DAFM, 2015). In December 2015, the cattle population was 6.4 million and the sheep population 3.3 million (CSO, 2015). The agri-food sector accounts for 12.3% of Ireland's exports and 8.6% of total employment. (DAFM, 2014). In 2015, agri-food exports increased by an estimated 3% to approximately €10.8bn (Bord Bia, 2016).

In 2014, gross agricultural output was valued at €7.12 billion (DAFM, 2015), highlighting the importance of Irish agriculture to the Irish economy. In 2015, Ireland exported agri-food produce to 175 countries worldwide, with 41% of exports going to the United Kingdom (UK), 31% of exports going elsewhere in the European Union (EU), and 28% exported outside the EU. Ireland is highly dependent on its exports and many products are produced in excess of self-sufficiency (Figure 1) (CSO 2012a & 2012b).

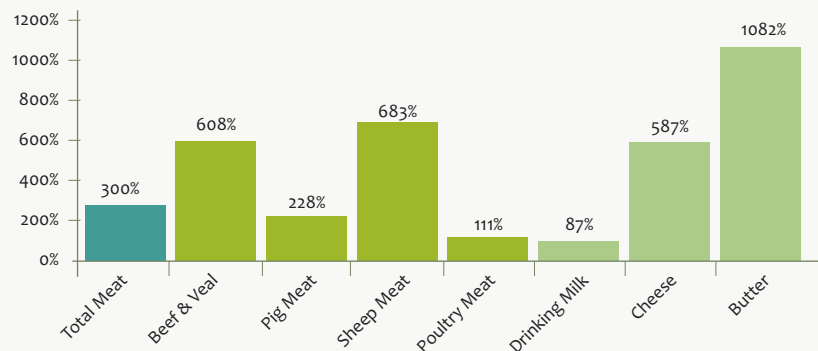


Figure 1: Ireland's self-sufficiency in agricultural produce

Ireland is the largest net exporter of beef [by value/volume or both] in the EU, and the 5th largest in the world (Teagasc, 2014). Ireland produced 0.9% of total world milk production in 2014 (IDF, 2014). Within the EU, Ireland produces 4% of the total EU milk production, and is ranked 7th of 25 countries for which data are available (FADN, 2010). Although small on a global scale for milk production, Ireland exports the majority of its milk and is therefore a significant player in international trade in milk and milk products. Ireland has a track record of producing high quality and high value milk-based products, manufacturing in excess of 11% of the world's baby food formula. This highlights the need for the utmost attention to our animal health status.

The Irish aquaculture industry

Finfish and shellfish are farmed in 14 Irish coastal counties as well as in several freshwater facilities throughout the country. The main species farmed are salmon, rainbow trout, oysters and mussels although other species such as Arctic char, cod, scallops, clams and sea urchins are also grown.

The sector was worth €148 million at the farm gate in 2015. The main purchasers of Irish product are located in Europe and the US, with a growing market in the Far East. The industry sustains approximately 1800 jobs in rural areas – 80% along the western seaboard.

In 2015, the Irish aquaculture industry produced approximately 14,500 tonnes of finfish and 25,500 tonnes of shellfish. Approximately 85% of the salmon produced in Ireland are certified organic. The Irish industry, though small in international terms, is export driven and depends strongly on innovation and quality.

1.2.2 Animal health in Ireland

Ireland has a favourable animal health status and is free of many diseases, some of which were previously endemic. Brucellosis and Aujeszky's Disease have recently been eradicated in cattle and pigs respectively, while considerable progress has been made in the eradication of diseases in cattle including bovine viral diarrhoea (BVD), bovine tuberculosis and bovine spongiform encephalopathy (BSE). The story of BSE in Ireland is a good example of how animal health surveillance contributed to the reduction and control of a disease that has severe economic and public health implications (See Appendix I). The main pathogenic serovars of *Salmonella* in poultry have also been eradicated. Ireland has also been fortunate to have had very few outbreaks of exotic disease, the last being an outbreak of foot-and-mouth disease in a single flock of sheep in 2001. Our animal health status is underpinned by a well developed State Veterinary Service, including the veterinary laboratory services, within DAFM and a network of Private Veterinary Practitioners (PVPs) across the entire country. There is also a well developed animal identification system, particularly for cattle, which allows the tracking of animal movements and traceability of animals and products.

The aquaculture sector in Ireland enjoys high health status in relation to the diseases listed in Council Directive 2006/88/EC, all of which are covered by the national disease surveillance programme (see Section 2.3.3).

However, there are still a number of challenges to be dealt with. *Mycobacterium bovis*, the causative organism of bovine tuberculosis, is endemic in badgers in Ireland. This will present a challenge to our stated aim to eradicate bovine tuberculosis from Ireland by 2030. There are a number of other specific diseases that reduce on-farm productivity. In cattle, these include Johnes disease, infectious bovine rhino-tracheitis (IBR) and pathogens causing mastitis. Programmes are currently being implemented by Animal Health Ireland (AHI) to deal with those diseases.

There remains a concern regarding the risk to the public of exposure to agents present in animals such as the enterocytotoxin-producing strains of *Escherichia coli*, including verocytotoxin producing *E. coli* (VTEC). VTEC represents a challenge for the primary producer, as well as the processor. On-farm conditions, hygiene and management practices, carriage conditions and pre-slaughter conditions of food animals, as well as the contamination of carcasses at meat plants, are likely to be the critical factors in determining the risk of exposure for the final consumer. *Campylobacter* spp. in chickens can also only be controlled by an integrated approach with serial actions and controls required from farm level through to processing under veterinary control in the slaughterhouse. Another challenge is the increase of antimicrobial resistance (AMR) in foodborne pathogens, which is considered a major public health concern. Surveillance is a key component of programmes to effectively deal with all of those challenges.



1.3 International and national drivers of change in animal health

Ireland's animal health status is subject to threats, both external and domestic. Any potential animal health issues must be addressed and managed appropriately to ensure risks are controlled. We must pro-actively plan our approach to maintain our animal health status cognisant of the international and national context within which the Irish livestock industry operates. The absence of a coordinated approach could restrain the industry from realizing the benefits of addressing endemic diseases and mitigating the risks from exotic diseases. The main drivers for change are:

1.3.1 International context

- **Globalisation:** Although afforded some protection from animal diseases as a consequence of our geographical location, Ireland is not immune to the movement of people, animals, goods and disease vectors. As a member of the EU, Ireland is part of an open market with free trade of animals, feed and ancillary animal products into and out of the country. Disease incursions in Europe such as the introduction of bluetongue from Africa, the reporting of Schmallenburg virus infection, the presence of lumpy skin disease in Greece, African swine fever in Eastern Europe and the small hive beetle in Italy raises the risk of an outbreak of an exotic or emerging disease. Chemical residues may arise from recycling of products for use in animal systems.
- **Climate change:** Changes in climate, and the potential presence of new vectors, means we must improve our disease surveillance networks to rapidly detect and control emerging disease.
- **EU policy changes:** Negotiations on a major reform of the Common Agriculture Policy (CAP) 2014-2020 were completed in 2013. In terms of EU agricultural policy, stability can be expected until 2020. The reformed CAP led to the expiry of milk quotas from 2015. Such a major policy change can result in changes in farming practices that can have a knock-on effect on animal health.

The EU developed an animal health strategy for the years 2007-2013 setting out a partnership approach for animal-related threats, disease prevention, surveillance and crisis preparedness. The aim of the strategy, based on the mantra "prevention is better than cure", was to promote preparedness in the event of disease outbreaks and to identify and effectively deal with new and emerging diseases. Overall, the strategy aimed to support the rural economy and agricultural competitiveness to ensure high standards of animal welfare, public health and food safety. Regulation (EU) 429/2016 (the Animal Health Law) implemented the commitments and vision provided for in the Animal Health Strategy including the 'One Health' principle. Surveillance is identified as a key element of disease control and should provide for the early detection and notification of animal diseases enabling the relevant sector and the competent authority to implement timely disease prevention and control measures. The Animal Health Law identifies farmers as key components of an animal health surveillance system as they observe their animals on a regular basis and are best positioned to detect abnormal mortalities or other clinical signs. PVPs are also identified as key link between operators and the competent authority in dealing with challenges to national animal health statuses.

- **Geo-political instability:** In recent years there has been increased political instability in many regions of the world. Such instability results in large migrations of people to the EU (including Ireland), and the resultant increased risk of disease spread to both human and animal populations.

- **New technologies:** Molecular typing of pathogens complements traditional epidemiological surveillance by providing appropriate discriminatory analysis to allow the rapid and early detection of outbreaks and detection and investigation of transmission chains. It could also aid the detection of the emergence of antimicrobial resistance and new and evolving pathogenic strains. Molecular typing can also support studies to trace back the source of an outbreak and identify new risk factors, by linking isolates more accurately to epidemiological and clinical data (ECDC 2007 and 2013). This emerging technology is likely to revolutionise surveillance in the coming years. The European Centre for Disease Control (ECDC) and similar agencies in other countries will be able to link cases of food poisoning to Ireland if they occur in our exports. It is important that we identify any problems and proactively deal with them.
- **Increasing customer demand for evidence of health status:** Trading partners are increasingly demanding that claims in relation to the status of live animals and the safety and quality of food and food products must be based on solid and transparent evidence.

1.3.2 National context

- **Intensification:** Ireland has 128,200 farm holdings with an average size of 32.3 hectares (CSO, 2014). The number of holdings in Ireland is decreasing, while the number of animals per holding is increasing. This is especially evident in the expansion of dairy herds, post-2015, and the integration of pig and poultry operations to benefit from scale. Such intensification can pose animal health challenges.
- **Farm structure and management practices:** The high level of land fragmentation and commonage leads to increased risks of disease spread. Shared labour and machinery and the movements of hauliers and feed trucks have a similar effect.
- **Focus on production:** Modern farming is a business as well as a livelihood, with profit being the deciding factor in many cases. In that context, individual farmers may be more inclined to deal with basic animal health issues themselves resulting in a reduced veterinary presence on-farm. On the other hand, educating the farming community on its role in animal health surveillance may serve to heighten awareness of health risk, and mitigate the effects of a reduced veterinary presence on-farm.
- **Animal mobility:** Movements of animals, directly from farm-to-farm and via markets, are a common feature of livestock production in Ireland. In 2014, approximately 1 million direct farm-to-farm movements occurred while approximately 1.7 million movements occurred via markets (DAFM, 2015). Animal mobility also extends to the movements of animals between fragmented land parcels within the same holdings.

Such frequent movements pose a risk to on-farm biosecurity and the rate at which a newly emerging disease could spread in the absence of rapid detection. Imported animals also pose a considerable risk to the health status of Ireland cognisant of the new and emerging disease incidents in Europe in recent times. The introduction of the single European market in 1992 facilitated the free movement of cattle into Ireland from Europe, and this is believed to have contributed to Johne's disease becoming established in the Irish dairy herd. The importation of exotic pets also poses disease risks for humans and animals alike.

- **FoodWise 2025:** FoodWise 2025 sets out a vision and strategy for the future development of the Irish agri-food sector until 2025. A major challenge is how Irish agriculture can respond to the increased global demand for food following recent surges in world population. Currently, the world population is estimated at 7 billion and it is projected that the population will reach 9 billion by 2050. It is clear that increased agricultural output is required globally to support this expanding population. Ireland seeks to use the opportunities provided by expanding markets by increasing its food exports, particularly into the high value markets.

It is envisaged that consumers, particularly those to which high value products are targeted, will demand products of the highest health and safety standard. To meet this increased global demand, it is necessary for industry to increase production, and to guarantee that high quality food reaches the marketplace. It is necessary for all stakeholders to ensure sustainability. The aim is to market Ireland as a natural food producer and to encourage grass-based, rather than grain-based, production systems. Ireland must focus on developing niche markets for higher priced goods that offer clear transparent assurances of a high quality product. Verified environmental quality in the agri-food sector is the key to smart, green growth.

- Shared responsibility among stakeholders: FoodWise 2025 underlines the importance of the Department of Agriculture, Food and the Marine (DAFM) enjoining industry stakeholders to enhance existing systems for surveillance of animal diseases. This will facilitate early detection of disease and provide a more robust evidence base substantiating Ireland's animal health and welfare status and will support disease control at farm level. Since its establishment, AHI (see section 2.3.3) has provided a framework to facilitate a shift towards cost and responsibility-sharing with industry to deal with a number of non-regulatory diseases.

1.4 The value of animal health surveillance in an Irish context

Endemic disease limits production and imposes an ongoing economic burden on the farmed animal industry. Healthy animals are more efficient at transforming inputs into food outputs, thus maximising profitability, supporting competitiveness and reducing the use of medicinal products, particularly antibiotics. Surveillance is a key factor in improving our animal health status thereby ensuring that farmers can get the maximum economic output from their animals while ensuring high animal welfare standards.

Animal disease can have negative economic consequences on farms, public health and the national economy. Some examples which bear this out are mastitis, BSE and Johne's disease. Mastitis is regarded as the most economically significant disease effecting dairy cattle leading to lower milk production, increased veterinary costs, discarded milk, penalties, increased labour, increased culling and higher mortality. The indirect costs associated with disease such as reduced growth rates, reduced milk yield, poor conception rates, increased culling rates, higher labour inputs and increased veterinary costs can be difficult to enumerate. However, in 2012, AHI estimated that the annual loss to the cattle industry due to BVD is 102 million euro per annum. The emergence of BSE in the 1990s had a disastrous effect on the beef industry. Ireland lost valuable exports markets and consumer confidence when it was shown that BSE was linked to variant CJD in humans. Ireland is only now beginning to regain access to markets lost through the BSE crisis. Johne's disease has been flagged as another disease that could have potentially negative effects on our dairy industry. Studies have shown a significant negative association between clinical Johne's disease infection status and milk yield, somatic cell count and the culling price of cows in herds. While these direct effects have a negative impact on the economic performance of dairy farms, it is the public health implications of the disease that could be of greatest significance to the dairy industry. In the future, the ability to claim either Johne's free or Johne's low risk status may provide a major competitive advantage to the Irish dairy industry.

The drivers of change for animal health (see Section 1.3) highlight the importance of rapid detection and early warning systems to ensure that new and emerging diseases are identified and dealt with as swiftly as possible. Exotic animal diseases pose a significant threat to the Irish agri-food sector. The direct costs of an outbreak of an exotic disease such as foot-and-mouth disease, highly pathogenic avian influenza, or classical swine fever, while considerable, are exacerbated by the costs of losing international market access, which can far outweigh the direct disease control costs. The outbreak of foot-and-mouth disease in Ireland in 2001 is estimated to have cost the agricultural sector somewhere in the region of 1%-5.4% of GDP in lost exports.

It is also estimated that the cost in lost tourist revenue was approximately €200 million while exchequer finances were reduced by €100 million due to the cost of combating the outbreak. It is axiomatic that the sooner an outbreak of an exotic disease is detected, the easier it is to control and the sooner market access can be regained. An effective animal health surveillance system is a crucial factor in early detection of exotic disease outbreaks, and their timely resolution.

A properly functioning surveillance system provides a realistic understanding of our national animal health status and informs decision making among stakeholders. Such an understanding allows for benchmarking against international competitors and prioritisation of areas requiring action e.g. if trading partners are moving towards freedom from IBR then live exports from Ireland will need to respond to that change.

Ensuring a favourable animal health status is the key to gaining and maintaining access to the global marketplace. The animal health and welfare status of our national herd is central to providing quality assurances for our agri-food products in the global market. Although the framework for sanitary and phytosanitary trade standards is well defined by the World Trade Organisation (WTO), the level of confidence of existing and prospective trade partners in the stated animal health status of a country has a major influence on opening up trade access. By having an effective animal health surveillance system, Ireland will improve the confidence trading partners have in the quality of our agri-food outputs, facilitating increased access to markets.



For certain animal diseases which are important for international trade, it is necessary to provide proof of disease freedom. Surveillance is the only mechanism for establishing disease status and confirming freedom from disease. All of this supports continued access to international markets. In Ireland, there are several surveillance programmes in place to support its disease-free status including bovine brucellosis, enzootic bovine leucosis, *Echinococcus multilocularis*, and Aujeszky's disease.

By demonstrating that Ireland can draw reliable conclusions about its animal health status and can detect novel or unexpected disease events, surveillance can increase the level of consumer confidence in Irish agri-food outputs. This increases the willingness of consumers to purchase Irish products thereby giving a competitive edge.

The agri-food industry requires a large level of ongoing investment to support its outputs, but these investments can be put at risk by animal disease events which can inhibit export trade and threaten the source of raw materials. By demonstrating that Ireland has an effective capacity to determine its animal health status, and to rapidly detect unusual disease events, a more positive business environment is created which improves business confidence in agri-food investment.

Currently, surveillance of wildlife is mainly confined to badgers and deer for *M. Bovis* and foxes for *Echinococcus*. Increased surveillance in this area could potentially allow pathogens of importance for livestock and of zoonotic potential to be identified at an early stage. The same applies to the surveillance of pet animals particularly dogs and cats.

Many infectious diseases are zoonotic, i.e. they may be transmitted from animals to humans. A new disease emerges, on average, every eight months (Jones et al., 2008). Emerging diseases are dominated by zoonoses (60.3%) and the majority of these (71.8%) originate in wildlife (Jones et al., 2008). Some important recently emerging examples are SARS, MERS-coronavirus and Ebola. According to the World Health Organisation, an estimated 600 million people fall ill, and 420,000 people die, after eating contaminated food every year. Children under five years of age carry forty percent of the foodborne disease burden, with 125,000 deaths every year (WHO, 2016). An effective surveillance system is crucial for the early detection of zoonotic diseases and for minimising the impact on public health.

The rise in AMR is now recognised worldwide as one of the greatest potential threats to human and animal health, with possible serious consequences for public health, animal welfare and the agri-food sectors. AMR was identified as a national risk by the Irish Government in national risk assessments carried out in 2014 and 2015 (NRA 2014, NRA 2015). To manage the risk of AMR in the food chain, the Food Safety Authority of Ireland (FSAI) recommended that both the use of antimicrobial agents in food production, and the occurrence of AMR in bacteria from food animals and food be monitored in Ireland (FSAI 2015).

FoodWise 2025 recognises that a significant increase in food production cannot be considered in isolation from its environmental impact, in particular regarding concerns associated with the depletion of natural resources and the potential impact on climate change. To address this, future food production systems must be as focused on managing and sustaining our natural resources as they are on increasing production. Again, elevated animal health, facilitated by high quality surveillance, is a key factor in achieving environmental sustainability.

1.5 An animal health surveillance strategy

In support of those factors described above (see Section 1.4), Ireland must develop an animal health surveillance strategy to optimise the health status of our national herd. Prioritisation of animal-related risk is necessary to determine the optimal use of finite resources. Collation, analysis and reporting of animal health surveillance data collected by the state veterinary service, DAFM Laboratories, animal health agencies, PVPs, slaughterhouses, private laboratories and other bodies is necessary to deliver a unified animal health surveillance strategy. The animal health surveillance strategy must aim to improve existing structures, focus on areas where deficiencies are identified, and be flexible enough to cope with changing needs.

A single portal, providing information on all animal health surveillance activities is required in order to understand the breadth of surveillance undertaken in Ireland and the contribution of animal health surveillance to the economy. While recognising the contributions of the different organisations involved in animal health surveillance in Ireland, DAFM will take a leadership role in developing and coordinating these activities and in ensuring that a high-quality surveillance programme is in place. This strategy document will seek to set out the steps to be taken to develop a surveillance system that is recognised as a world leader and that is capable of fully supporting Ireland's agri-food industry and protecting public health.

1.6 Approach to the development of the animal health surveillance strategy

A Working Group was set up within DAFM to develop an animal health surveillance strategy for the period 2016-2021³. The terms of reference of the Working Group were to:

- Review international best practice in animal health surveillance strategies;
- Tabulate the current surveillance programmes implemented in Ireland;
- Develop a national strategic plan for Ireland.

The working group was aware that a large number of other countries had already implemented animal health surveillance strategies as part of their overall disease control programmes. It was decided that as part of the background work for this document, a review of the various approaches to animal health surveillance in these countries should be undertaken. Reviews were carried out on surveillance literature from Australia (AHA, 2010), Canada (NFAHWC, 2011), Denmark (DVFA, 2012), England and Wales (DEFRA, 2012), The Netherlands (GDAH, 2015), New Zealand (MAF, 2008 and 2009), Scotland (ScotGov, 2011), and Switzerland (FVO, 2010) (See Appendix II for further information). This review gave the working group an insight into international best practices, technologies being utilised, the allocation of resources and also some of the problems that can be encountered when launching an animal health surveillance programme. A review of the EU animal health strategy and animal health Law was also conducted.

In preparing the strategy, the Working Group consulted with the divisions in DAFM responsible for developing and implementing specific surveillance programmes. Meetings were also held with a number of individual external stakeholders (see Appendix III) during which feedback was obtained on the draft strategy. A one-day forum on animal health surveillance was held on April 28, 2016 (See Appendix IV). Stakeholders were invited to the forum and more than 120 people attended. At the forum, a number of animal health experts, from Ireland and abroad, delivered a series of presentations on the topic of disease surveillance and its importance to the Ireland's agri food industry. The keynote address was delivered by Dirk Pfeiffer, Professor of Veterinary Epidemiology at the Royal Veterinary College, London who is recognised as a world leader in this area. A presentation was made on the draft animal health surveillance strategy. This was followed by an interactive session in the afternoon, where the attendees provided feedback on animal health surveillance in Ireland. Following these consultations with internal and external stakeholders, the animal health surveillance strategy was adopted by the Animal Health Surveillance Steering Group on the 8th of October 2016.

The strategy that has been developed is overarching in nature and is relevant to all aspects of animal health surveillance carried out in Ireland. It deals principally with livestock but the scope also includes aquatic animals, wildlife and pets. It deals with biological hazards but it could also be relevant to chemical hazards. The strategy also encompasses microbial and other hazards present in animals that may have an impact on public health. The scope of the strategy extends to all stakeholders involved in animal health surveillance in Ireland and is not exclusively focused on DAFM. It examines how linkages could be developed with other agencies involved in animal health surveillance in Ireland with a view to ensuring a well-coordinated, high-quality system of animal health surveillance.

With a view to ensuring consistency, the terminology used throughout this document is consistent with that used by Hoinville *et al.* (2013), (see Appendix V).

³ The members of the Working Group were Micheal Casey, Sally Gaynor, John Griffin, Dermot Murphy, Declan Murray, Jarlath O'Connor, David Quinn, Eoin Ryan and Laura Walsh



Surveillance in Ireland today

2

In Ireland, animal health surveillance comprises a combination of activities within the public and private sectors. There are a large number of activities being undertaken and a large number of stakeholders involved.

With so many contributors engaged in disparate surveillance activities, it is challenging to ensure unity of effort to support Ireland's agri-food industry. In this chapter, we describe the different animal health surveillance activities that are currently being carried out in Ireland, who is carrying them out, and for what purpose. We examine the strengths and weaknesses of the current system and thereby set the scene for our vision for animal health surveillance into the future as introduced in Chapter 3

2.1 Active surveillance

There are a large number of active surveillance programmes carried out in Ireland in a wide range of species. These are mainly carried out by DAFM but other organisations, including AHI and the Marine Institute are also involved. Other organisations, such as the private laboratories, the Centre for Veterinary Epidemiology and Risk Analysis (CVERA) and the Irish Cattle Breeding Federation (ICBF) provide support in areas such as data collection, data analysis and general epidemiological support. A full list of active surveillance programmes carried out in Ireland in 2015 is given in Table 1.

Table 1 Active surveillance programmes for biological hazards undertaken in Ireland in 2015

Species	Disease Name	Notifiable	Organisation Responsible	Purpose of Surveillance
Bovine	Bovine spongiform encephalopathy (BSE)	Yes	DAFM	Eradication
	Bluetongue	Yes	DAFM	Exotic disease surveillance
	Enzootic bovine leucosis (EBL)	Yes	Commercial enterprises (supervised by DAFM)	Declaration of freedom
	Infectious bovine rhinotracheitis (IBR)	Yes	Commercial enterprises (supervised by DAFM)	Control of disease
	Tuberculosis (TB)	Yes	DAFM	Eradication
	<i>Campylobacter fetus subsp. venerealis</i>	No	Commercial enterprises (supervised by DAFM)	Control of disease
	Bovine viral diarrhoea (BVD)	Yes	Animal Health Ireland	Eradication
	Johne's disease	Yes	Animal Health Ireland	Control of disease
	Schmallenberg virus	No	DAFM	Monitoring of disease surveillance
	<i>Trichomonas sp.</i>	No	Commercial enterprises (supervised by DAFM)	Declaration of freedom
	<i>Brucella abortus</i>	Yes	DAFM	Declaration of freedom
Ovine	<i>Brucella melitensis</i>	Yes	DAFM	Declaration of freedom
	<i>Brucella ovis</i>	Yes	DAFM	Declaration of freedom
	Scrapie	Yes	DAFM	Control of disease
Swine	Aujeszky's disease	Yes	DAFM	Declaration of Freedom
	<i>Brucella suis</i>	Yes	DAFM	Declaration of Freedom
	Classical swine fever (CSF)	Yes	DAFM	Exotic disease surveillance
	Porcine reproductive respiratory syndrome (PRRS)	Yes	Commercial enterprises (supervised by DAFM)	Control of disease
	<i>Trichinella spiralis</i> (breeding boars)	Yes	DAFM	Declaration of freedom
Equine	<i>Trichinella spiralis</i>	Yes	DAFM	Control of disease
Avian	Avian influenza	Yes	DAFM	Declaration of freedom
	Mycoplasmosis	Yes	DAFM	Control of disease
	<i>Salmonella</i> spp (layers, broiler breeders, broilers, turkeys)	Yes	DAFM	Declaration of freedom
Fish	Infection with <i>Bonamia ostreae</i>	Yes	The Marine Institute	Declaration of freedom
Wildlife (foxes, badgers, bees, wild birds)	<i>Echinococcus multilocularis</i>	Yes	DAFM	Declaration of freedom

Council Directive 96/23/EC requires Member States to monitor animals and primary animal products to detect residues of unauthorised or banned substances, e.g. hormones, steroids and residues of permitted veterinary drugs in excess of the maximum permitted levels, e.g. antibiotics and coccidiostats. The annual National Residues Control Programme for Ireland is developed by DAFM in consultation with the FSAI, the Sea Fisheries Protection Agency (SFPA), Meat Industry Ireland (MII) and the local authorities (https://www.fsai.ie/news_centre/national_control_plan.html).

2.2 Enhanced passive surveillance programmes

Enhanced passive surveillance is an observer-initiated provision of animal health data, with active investigator involvement {e.g. by actively encouraging producers to report certain types of disease or by active follow-up of suspect disease reports (Hoinville et al., 2013)}. The main role of enhanced passive surveillance is in the reporting of suspect new, re-emerging or exotic diseases to the Competent Authority by individuals that are in close contact with livestock, aquatic species, wildlife and pets. These include livestock keepers, PVPs, operators of fish farms and members of the general public. DAFM and other organisations are actively creating awareness among stakeholders of the need to notify DAFM about any suspicion of an exotic disease.

2.3 Stakeholders in animal health surveillance in Ireland

Many different groups and organisations have a role in animal health surveillance ranging from those that manage or support active surveillance programmes (See Section 2.4) to those that contribute to passive surveillance. Consequently, there is a wide range of potential stakeholders. Some of the non-government groups, such as farmers and PVPs are represented by organisations that can provide a valuable input into the development of animal health surveillance in Ireland. A list of the main stakeholders is provided in Table 2.

Table 2 Stakeholders in animal health surveillance in Ireland

Stakeholders in animal health surveillance in Ireland

Primary Producers representative associations:

Irish Farmers Association, Irish Creamery Milk Suppliers Association, Irish Cattle and Sheep Farmers' Association,

Veterinary representative association

Veterinary Ireland

Government Bodies

DAFM, Local Authority Veterinary Services, The Marine Institute, The Food Safety Authority of Ireland (FSAI), National Parks and Wildlife Services, Health Protection Surveillance Centre, The State Laboratory, SFPA

Educational institutions and related bodies

UCD Faculty of Veterinary Medicine, CVERA, third level educational institutions, Teagasc.

Other stakeholders:

AHI, ICBF, Private laboratories including The Irish Equine Centre, MII, Federation of Irish Renderers, Dairy co-operatives, fallen animal collection services, general public, farming media

2.4 Stakeholders who deliver animal health surveillance in Ireland

2.4.1 The role of DAFM

2.4.1.1 The role of central divisions and regional veterinary offices

The active surveillance programmes in Ireland, as listed in Section 2.1, have evolved over decades. Many of them are designed and coordinated by central divisions within DAFM. There are five central veterinary divisions in DAFM which work together with relevant administrative divisions in drawing up active surveillance programmes. The surveillance programmes are then implemented by veterinary, technical and administrative staff based in 16 Regional Veterinary Offices (RVOs). Active surveillance at RVO level includes the implementation of the bovine TB eradication scheme and the Transmissible Spongiform Encephalopathy (TSE) eradication and monitoring schemes. Samples are also taken from fallen animals in knackeries for TSE testing, and a range of samples are taken from live animals under the National Residue Control Plan to detect chemical hazards.

National Disease Control Centre's Veterinary International Division has a particularly important role among the central veterinary divisions, in that it is responsible for policy development and for coordinating activities in relation to exotic diseases. The investigation of notifications of exotic disease is the responsibility of staff members from the RVOs.

In 2013, the need for co-ordination of surveillance activities resulted in the Chief Veterinary Officer (CVO) setting up an Animal Health Surveillance Steering Group. The role of the Steering Group is to develop general policy in the area of animal health surveillance, to coordinate surveillance activities and to monitor implementation. This approach is consistent with the leadership role of DAFM which is set out in its mission statement, i.e. "to lead the sustainable development of the agri-food, forestry and marine sector and to optimise its contribution to national economic development and the natural environment". It is also consistent with the major role that DAFM has played in the area of animal health surveillance and the close working relationship that it has had with many of the stakeholders over a prolonged period. The Animal Health Surveillance Steering Group is supported by a dedicated team in the Surveillance Animal by Products and TSE (SAT) Division of DAFM. While SAT Division has a prominent role as far as policy, co-ordination and monitoring are concerned, it does not usually have a role in the implementation of surveillance programmes. Further details of the structure and the role of the Steering Group and the other components can be found in Chapter 4 and Appendix VI.

2.4.1.2 The role of the DAFM laboratory services

Laboratory support for active surveillance programmes and surveillance in general is provided by the DAFM laboratory services. DAFM's main laboratory complex is located at the Backweston Campus, Celbridge, Co. Kildare. The Central Veterinary Research Laboratory (CVRL), the Dublin Regional Veterinary Laboratory and the Veterinary Public Health Regulatory Laboratory are located at this site. The other veterinary laboratories are the Blood Testing Laboratory (BTL) in Cork and five Regional Veterinary Laboratories (RVL's) located in Cork, Limerick, Kilkenny, Sligo and Athlone. Agriculture laboratories at Backweston also include the Pesticide Laboratory, the Central Plant Laboratory (comprising the Seed Testing Laboratory and the Plant Health Laboratory) and the Dairy Science Laboratory (DSL). The DSL has associated regional laboratories in Cork and Limerick.

The veterinary laboratories provide diagnostic clinical pathology and research services to the livestock and poultry industries. They have central and supporting roles in relation to national disease surveillance and control schemes. Clinical diagnosis of, and testing for, exotic and emerging diseases is also a key function and priority of both the CVRL and the RVLs.

Trends in animal health caused by exotic, new and re-emerging diseases are monitored principally by scanning surveillance⁴ carried out by the veterinary laboratories. This type of surveillance is based on the monitoring of diagnostic submissions, including animals submitted for necropsy and samples submitted by PVPs. In addition to providing information on exotic, new and re-emerging disease, scanning surveillance also provides information on trends in endemic diseases. In cases where disease incidents are not identified by carcass/sample submissions, the veterinary laboratory staff members may undertake field investigations, frequently in collaboration with other Divisions at Backweston, and/or with external expertise e.g. University College Dublin (UCD) Veterinary School. Scanning surveillance is mainly carried out by the RVLs. The specialist expertise provided by the pathology, bacteriology and virology divisions at the CVRL is a key component in ensuring a high quality scanning surveillance system. This dynamic response to passive surveillance findings can be described as enhanced passive surveillance (See Appendix V).

The veterinary laboratories, together with the equivalent service hosted by the Agrifood and Biosciences Institute (AFBI) in Northern Ireland, contributes to the All-island Animal Disease Surveillance Report <http://www.agriculture.gov.ie/rvlreport/>. This provides information on numerous endemic diseases of animals such as parasitic, viral and bacterial diseases, and some that may have zoonotic implications, such as salmonellosis. These data also provide a baseline on the frequency and pattern of endemic disease, and provide information on changes in the frequency and impact of endemic disease over time due to the evolution of farming systems and climate change.

This system has evolved since the establishment of the RVLs in the late 1960s. Europe has witnessed the incursion of many novel and exotic pathogens and there is a consensus that both the industry and the food chain, for different reasons, require an early warning system and prompt investigation and intervention for such pathogens. An example of the potential and effectiveness of these types of systems was the virtually simultaneous detection of the incursion of Schmallenberg virus (SBV) in Ireland and Northern Ireland in 2012, when DAFM and AFBI early warning surveillance detected SBV independently and within 48 hours of each other.

The veterinary laboratories fulfill a number of other roles including:

- The provision of data on AMR in clinical isolates from food animals through their analysis of samples from clinical submissions (i.e. live animals on farms) and necropsies.
- Applied collaborative research projects on specific diseases and diagnostic challenges.
- The collection and supply of tissues, isolates and other raw materials to support a range of research projects both within and outside DAFM.
- The provision of technical support to private laboratories in areas such as parasitology, mastitis and BVD.

The BTL in Cork provided the sample handling and testing that underpinned the eradication of brucellosis from the State and remains DAFM's only high volume serology facility. This unit provides serological testing for a range of other programmes and also has a contingency function in the event of the incursion of exotic disease; this unit is earmarked for the rapid high volume testing of low risk samples that would be required to demonstrate freedom from diseases such as foot-and-mouth disease after an outbreak has been brought under control.

The State Laboratory is also located on the Backweston Campus. Its main clients include DAFM, the Office of the Revenue Commissioners, the Coroner's office and the Health Products Regulatory Authority. The State Laboratory supports the work of these client bodies in the areas of agriculture and food (with an emphasis on food safety and quality), compliance with Customs and Excise legislation, the coroner's service and the control of the use of unlicensed medicines.

4. In the context in which it is used in this document, scanning surveillance refers to the monitoring by the Regional Veterinary Laboratories of diagnostic submissions, including carcasses, blood, swabs, milk, faeces, to detect changes in health patterns caused by exotic, new or emerging diseases and to detect trends in endemic diseases.

2.4.1.3 The role of the Veterinary Public Health Inspection Service (VPHIS)

VPHIS supervises high throughput slaughterhouses, meat processing plants, milk pasteurisation and egg product facilities. It operates under a service contract with the FSAI. The VPHIS has a permanent presence in the larger meat and poultry slaughtering plants; other plants are visited and inspected on a risk-assessed basis. Each animal presented for slaughter is subjected to an *ante-mortem* examination by a Veterinary Inspector (VI) in accordance with Regulation (EC) No. 854/2004 to assess its fitness for slaughter for human consumption. Blood sampling is also conducted at abattoirs; these samples are later tested for specific diseases in order to prove freedom, such as Aujeszky's disease and avian influenza. To ensure that the origin of an animal can be established, the owner or person in charge of an abattoir is responsible for checking that each animal is correctly identified and is accompanied by correct documentation. Any irregularities are followed up; animals may be detained and, if the identity and origin cannot be established to the satisfaction of the VI, the animals are seized and destroyed. All slaughtered animals must also be subjected to *post-mortem* inspection to ensure that the meat is fit for human consumption. The VI may detain meat for further inspections and tests. On completion of the *post-mortem* inspection, the meat is either declared fit for human consumption, or unfit for human consumption, in which case, the meat is removed from the food chain.

Many of the samples taken in slaughterhouses are tested under the National Residues Control Plan (NRCP) which covers a wide range of chemical hazards e.g. lead, dioxins, and residues of therapeutic drugs. This sampling regime can be amended and modified under a strategic surveillance system, to take account of risk factors.

DAFM is currently developing an electronic system to capture all ante and post-mortem findings in beef slaughter plants. The plan is to extend the system to other species when this work is completed. At the moment, the ante-mortem component has been developed and is being used in a small number of plants. There is a revised system in development which also captures animal welfare issues. The system will be incorporated in all beef plants in time. A prototype for the post-mortem component has also been developed and is being trialled in one plant. Input is by touch screen on the kill floor. The electronic collation of this data, held in a central database will provide data on those animals slaughtered annually, which will have significant benefit to the evaluation of animal health of the national herd.

2.4.1.4 The role of the animal identification system

For any surveillance system to function correctly, an appropriate system for animal identification is required. Ireland has a comprehensive animal identification system ensuring that animal movements can be traced for bovines, equines, pig, sheep and goats. DAFM maintains cattle traceability records on a central database known as the Animal Identification and Movement (AIM) system. The AIM system records all birth and movements of sheep and cattle and disposals of cattle in accordance with EU requirements, and traces all bovines from birth to slaughter. The system is validated on farm through the use of the Animal Health Computer System (AHCS) employed during TB testing, through on-farm inspections carried out by DAFM staff and routine inspections by other stakeholders such as An Bord Bia. The traceability system provides assurances to customers and consumers at home and abroad about the origin and traceability of beef, protects animal and human health, and secures and maintains markets for Irish cattle and beef. It also enables the tracking and monitoring of movements which is essential for the purpose of disease control and monitoring. Table 3 shows the animal identification system in place in Ireland.



Table 3 Animal identification system within Ireland

	Avian	Bovine	Equine	Ovine	Porcine
Tagging/Micro chipping	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Herd/Flock Registration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Animal Identification and Movement		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Passports		<input type="checkbox"/>	<input type="checkbox"/>	-	-

As mentioned, all aquaculture production businesses in the country have been authorised under Council Directive 2006/88/EC and all movements of fish or shellfish for further farming are traceable (pre-movement approval from the Marine Institute is required).

Both DAFM and the Central Statistics Office (CSO) maintain up-to-date information on national populations of farmed animals in Ireland. DAFM through its animal identification systems maintains registers at either individual animal or herd/flock level for all farmed animal species in Ireland. The CSO through biannual surveys of livestock (June and December) and census (10 yearly) acquire comprehensive livestock population data. Ireland also has a comprehensive mapping and Geographic Information Systems (GIS) allowing for rapid and accurate identification of all farm holdings.

In the event of the outbreak of an exotic disease, electronic maps based on GIS are used to define control zones, to plan surveillance and slaughter/removal activities, to assess aerial transmission patterns, and to facilitate epidemiological investigations. This system is also used by both DAFM and CVERA when conducting epidemiological studies or investigations of endemic disease. The burial of animals on farm was prohibited by the EU in 2001, which means that farmers must arrange for the collection and disposal of all fallen animals. Under the TSE Subsidy Scheme, DAFM contributes towards the cost of collection and rendering of each bovine over 48 months. The Scheme facilitates the notification of dead animals to relevant databases, thereby ensuring up-to-date herd information.

2.4.1.5 The role of Animal Feedstuffs and Crop Production and Safety Division

Animal feed is regulated by Animal Feedstuffs and Crop Production and Safety Division in DAFM. The Animal Feedstuffs Control Group (AFCG) liaises with customs authorities to ensure identification and control of imported feed. Importers are required to notify the group in advance of importing animal feed. This pre-notification system is to ensure that appropriate controls are carried out on imports especially for residues and meat and bone meal.

2.4.2 The role of Animal Health Ireland (AHI)

AHI is an industry-led, not-for-profit partnership between livestock producers, processors, animal health advisers and government. Its remit includes dealing with certain endemic diseases and conditions of livestock in Ireland, which are not currently subject to regulation or coordinated programmes of control. AHI provides benefits to livestock producers and processors by providing the knowledge, education and coordination required to establish effective control programmes for non-regulated diseases of livestock. To-date, AHI has established specific targeted programmes to eradicate BVD and control Johne's disease, and to assist farmers and their veterinarians and other advisors to improve on-farm control of mastitis, calf health, parasite control and biosecurity.

The presence of trained professionals in abattoirs facilitates passive surveillance. Beef HealthCheck is an AHI led programme which is being developed in collaboration with MII and supported by both MII members and the FBD Trust. The objective of the programme is to develop tools to assist farmers and their PVPs to control losses due to liver fluke and pneumonia through capture, analysis and reporting of abattoir data from post-mortem meat inspection. The programme will also contribute to the development, by ICBF, of economic breeding indexes that incorporate health and disease data. Beef HealthCheck uses touch screen technology to allow Temporary Veterinary Inspectors to record liver and lung pathology findings during the meat inspection process. Reports for farmers on each batch of animals presented to a factory are issued directly from meat factories. Over time, farm level reports, reports for PVPs, and regional reports will be developed and made available through the ICBF website.

2.4.3 The role of the Marine Institute

The Marine Institute is the national agency responsible for marine research, technology development and innovation. It works to assess and realise the economic potential of Ireland's marine resource, promote the sustainable development of the marine industry through strategic funding programmes and essential scientific services, and safeguard our marine environment through research and environmental monitoring.

In addition, the Marine Institute is the Competent Authority for the implementation in Ireland of Council Directive 2006/88/EC, which deals with the health of aquaculture animals and the prevention and control of certain aquatic diseases. The Marine Institute runs a national risk-based health surveillance programme for fin-fish and shellfish in accordance with the Directive. The frequency and nature of the surveillance carried out on aquaculture sites depends on the outcome of a risk assessment which indicates whether a particular operation is high, medium or low risk in relation to contracting and spreading disease. PVPs and the competent authority participate in that scheme at a frequency which is based upon the risk ranking of the farm. Several targeted surveillance programmes have been implemented since the early 90s, the majority of which resulted in declarations of freedom for the entire country. Two targeted surveillance programmes are still in place (for OsHV-1uvar and *Bonamia ostreae*). Bays which have been declared free of these diseases must be tested annually, given that other bays in the country are known to be infected. In addition, surveillance is also carried out by means of a regular on-site inspection programme operated under the risk based surveillance scheme mentioned above and as a result of the obligation on farmers to report unexplained increased mortality or the suspicion of the presence of a listed disease. The Marine Institute has obtained ISO 9001 certification in relation to the implementation of Council Directive 2006/88/EC.

The Marine Institute also operates three National Reference Laboratories – for diseases of fish, molluscs and crustacea. To date, 15 tests are accredited to ISO 17025 standards, which includes all of the diseases covered by the national surveillance programme.

2.4.4 The role of the Sea Fisheries Protection Authority (SFPA)

The SFPA is responsible for the implementation and enforcement of national and EU legislation dealing with health conditions for the production and placing on the market of fish, shellfish and fisheries products. The SFPA carries out official controls in seafood safety on an ongoing basis along the seafood chain up to but excluding the retail stage (on fishing vessels, in shellfish production areas, in establishments handling preparing and processing seafood). The SFPA collects monthly samples for microbiological testing. These samples are sent to local accredited laboratories. Quarterly samples are also collected from the Scombrid population (mackerel, herring and Tuna) for the purpose of bio toxin verification. These samples are sent to the Marine Institute for testing. The Health Service Executive (HSE) has responsibility for official controls in the retail sector (fishmongers, catering establishments).

2.4.5 The role of the Local Authority Veterinary Service (LAVS)

The LAVS is responsible for official controls in low throughput slaughterhouses and various other establishments dealing with meat. It operates under a service level agreement from the FSAI. The demarcation of supervision of establishments between the local authorities and other competent authorities is either defined in legislation or outlined in a guidance document for determining the supervisory authority for food businesses. LAVS also contribute to the NRCP sampling programme.

The Environmental Directorate of Cork County Council operates a Veterinary Food Safety Laboratory (VFSL). The VFSL has been developed to provide microbiological analysis of foodstuffs and other samples of relevance to food safety (water, animal tissues and environmental samples), thus providing a range of services which continually assess the security of the food chain for the protection of public health through both statutory and research surveillance. The Laboratory has been designated by the FSAI as a National Official Control Laboratory providing services for other local authorities and other agencies. The laboratory has developed expertise for emerging pathogens which include *Salmonella spp*, *Listeria monocytogenes*, *E. coli*, *Verocytotoxigenic E. coli* and *Campylobacter spp*.

A study was initiated in the early 1990's to monitor the health and productivity of dairy herds in the Cork harbour basin and surrounding districts as a surrogate of human health and overall environmental quality (EPA, 2013). The study arose as a result of concerns about the possible impact of a cluster of heavy industry in the Cork harbour area. This study is still ongoing. Since 1993, the programme has been coordinated by the Veterinary Department of Cork County Council on behalf of the Environmental Protection Agency and is funded by way of contributions from industrial operators under the terms of their respective Integrated Pollution Prevention & Control licenses.

2.4.6 The role of private laboratories

There are a number of private laboratories operating in Ireland providing disease surveillance information to industry. They play a key role in some of the active surveillance programmes such as BVD, *Salmonella* and TSEs. The laboratories are approved and monitored on an ongoing basis by the DAFM laboratory services and all the data collected is provided to DAFM. The private laboratories also gather information on other diseases such as parasitic infections and mastitis. An example of such a laboratory is the Irish Equine Centre (IEC) which is also a world reference centre for equine herpes virus and equine influenza testing. Private laboratories are also engaged by Industry to undertake a significant amount of residue testing on their behalf.

2.4.7 The role of universities

The School of Veterinary Medicine at UCD produces approximately one hundred professionally trained veterinary graduates every year. These graduates go on to fill roles in, amongst other areas, private practice, laboratories, industry and also in DAFM. Veterinary staff members at UCD carry out research on animal diseases. The faculty also provides a necropsy service and staff members routinely conduct on-farm disease investigation. The findings from these investigations have relevance for DAFM's disease surveillance, as was evidenced by the discovery of the first case of Besnoitiosis in Ireland in 2015 by a UCD on-farm investigation. University staff collaborates with DAFM staff on an on-going basis in areas such as maintaining and sharing expertise, and in carrying out joint research projects.

CVERA, the national resource centre for veterinary epidemiology in Ireland, is located in the School of Veterinary Medicine in UCD. CVERA deals with a wide range of international, national and local animal health matters, including:

- Epidemiological support for the control and eradication of regulatory animal diseases, including programmes for bovine tuberculosis, bovine brucellosis and BSE;
- Epidemiological support for a broad range of other animal health and welfare issues relating to emergency animal disease preparedness and response.
- Work in support of AHI, which is seeking to provide a proactive, coordinated and industry-led approach in Ireland to non-regulatory animal health concerns.

CVERA staff work closely with national policy-makers, both in government and industry. In collaboration with staff from the UCD School of Veterinary Medicine, CVERA staff members also contribute to on-farm animal health investigations throughout Ireland. A broad range of expertise is represented within CVERA, including agriculture and animal sciences, database development and management, geographic information systems, statistics, veterinary medicine and epidemiology.

2.4.8 The role of Teagasc

Teagasc is the agriculture and food development authority in Ireland. Its primary focus is on research and innovation, knowledge transfer and education and training. Teagasc provides research information for animal and food development and innovation. The information that is gathered during this research aids disease surveillance. Research is carried out on production diseases such as mastitis and infertility. Teagasc also work in the provision of technical advice to livestock farmers throughout Ireland. Production data derived from the ICBF is often used by advisers to inform farm specific advice. Such production data could be aggregated for surveillance purposes.

2.5 The strengths of, and challenges to, Ireland's animal health surveillance system

Strengths:

- There is a comprehensive PVP service throughout the country.
- Farmers have a good knowledge of animal disease facilitating disease recognition at farm level. The existence of discussion groups for farmers has helped to increase awareness and knowledge in this area.
- There is a well developed laboratory structure with high levels of expertise for both biological and chemical hazards.
- Good organisational structures are in place to develop policy and implement animal health surveillance programmes for both biological and chemical hazards (See Section 2.4). The organisations involved in animal health surveillance have professional staff with surveillance specific experience.
- DAFM, AHI and the Marine Institute have a proven track record in carrying out animal health surveillance and have successfully designed and implemented several active surveillance programmes aimed at eradicating specific diseases, e.g. BVD, bovine brucellosis and Aujeszky's disease, and for monitoring chemical hazards.
- There are good working relationships between many of the stakeholders involved in animal health surveillance activities. This is evidenced, for example, by the cooperation between farm, business and government representatives in AHI, the involvement of dairy processors in the establishment of a bulk milk tank testing programme, and the involvement of meat plants in the collection of blood and other samples for various purposes related to surveillance, declaration of disease freedom, disease control and eradication.

- DAFM and the other organisations involved in surveillance have the ability, if required, to disseminate information speedily to farmers, PVPs and other groups. For example, DAFM have regular contact with PVPs through the RVO system, participation in eradication schemes and through the RVL system. This allows for the quick and accurate dissemination of disease surveillance related information.
- There are good animal identification and traceability systems in place, particularly for cattle. The use of digital animal and herd records through the interlinked AIM and AHCS systems, coupled with the GIS data from various farmer payment schemes, allows DAFM to quickly trace the movements of all farmed animals.
- Advanced IT technology and the availability of large national databases such as AIM and AHCS systems has the potential to provide considerable amounts of high quality data that could be used for animal health surveillance.
- DAFM has a well established National Residues Control Programme which will be a source of baseline data for the surveillance strategy.
- Legislation is in place to support surveillance activities. Statutory Instrument 130 of 2016 makes it a legal requirement for farmers and vets to report any confirmed or suspected cases of specific listed diseases. There is also provision in the legislation for the payment of compensation to farmers in the event of the occurrence of a notifiable disease.

Challenges:

- While DAFM has established a Surveillance Steering Group to coordinate and provide leadership in the area of surveillance, currently it consists mainly of DAFM personnel. The governance structure for animal health surveillance in Ireland could be further improved through greater consultation with stakeholders.
- The core skills essential to data quality, such as epidemiology, microbiology and pathology, are contained within a small group of people and are vulnerable to depletion unless constantly reinforced.
- The level of trust between stakeholders needs to be improved.
- Systems for ensuring the quality of animal health surveillance programmes need to be further developed.
- The level of reporting by PVP's and private laboratories needs to be increased.
- Reliable baseline prevalences of some of the diseases present in Ireland have not yet been established, particularly for some of the production diseases. Such baseline prevalences need to be established and updated over time so that abnormal trends can be quickly identified. They will also allow for benchmarking of disease control in Ireland as compared to international competitors.
- A great variety of data is potentially available for surveillance purposes. This includes data from abattoirs, knackeries, meat factories marts, and para-veterinary service providers such as pregnancy scanners, foot trimmers, and shearers. More data could be gathered and analysed on farm. Recent advances in home computing technologies have not been exploited. The possibility of a disease reporting app on mobile phones could be explored.
- There is under-utilisation of the animal databases such as the AHCS and the AIM systems. These databases could be used more effectively to monitor unusual disease patterns. Overall, a challenge is to identify key sources of data and to convert these into useful information and to communicate this information effectively.
- There is a need to increase awareness in the area of animal health surveillance and to increase the use of information obtained from surveillance activities, in particular amongst the farming community and PVPs.
- DAFM could better harvest surveillance data by requesting farmers, private labs and other stakeholders to give DAFM access to samples, data and results.
- There is a need to have greater expert risk assessment capability in the context of chemical residues.
- There is a need to promote the concept of responsibility sharing amongst stakeholders
- Animal remedy and drug sales records could be better used as a source of surveillance data especially to monitor on-farm antimicrobial drug usage. However, sales data are often a poor (or imprecise) proxy for usage data. Within the EU, there is a progressive move towards collection of on-farm antimicrobial usage data (either from veterinary prescriptions or directly from farmers). This will become increasingly important to monitor/benchmark on-farm antimicrobial usage.
- While the One Health concept is recognised as having merit, there are very few if any examples of this concept being put into practice.



Our Vision

3.1 Supporting a world class livestock industry with high quality animal health surveillance

The role of surveillance in attesting to Ireland's animal health status is as important today as it has ever been. Ireland's animal health status is the basis upon which we maintain access to international markets and win access to new global markets. For example, in 2015 Ireland was the first EU member state to regain access to the beef markets in the USA. Domestically, information from animal health surveillance provides a realistic understanding of our national animal health status and allows stakeholders to identify risks and weaknesses. With this information, it is possible to benchmark against international competitors and to prioritise areas for action. It is also essential at all times that surveillance information reflects the real animal health status on the ground so that the information we present to our trading partners is objective and timely. The greater the claim the more rigorous the evidence required to substantiate that claim.

The negative economic consequences of animal health incidents on Ireland's international markets could be highly significant, depending on the deleterious agent involved. For this reason, it is essential that there are good controls in place to prevent the entry of exotic diseases or the presence of chemical residues. Surveillance remains vital in ensuring that if an exotic or emerging disease occurs, it is identified as soon as possible. Surveillance will also need to identify chemical hazards that may emerge from environmental or other sources.

Animal health surveillance must be able to adapt and evolve to incorporate the best ways of working to match the challenges and demands of a dynamic livestock industry that is constantly growing and expanding into new markets.

In Chapter One and Chapter Two, we described current animal health surveillance activities in Ireland and we listed the stakeholders involved. We described the strengths of the current system and the challenges. We also listed the reasons why a high quality animal health surveillance system is important for Ireland and we described the drivers of change at national and international level. In this Chapter, we put forward a vision for developing a world class animal health surveillance system. In the subsequent Chapters, we outline how that vision can be achieved.

In our vision, animal health surveillance plays an integral role in supporting Ireland's livestock industry at all levels, which in turn contributes to the economy, and protects our public health and environmental well-being. This is achieved in a myriad of ways from monitoring exotic, new and emerging diseases, to identifying and monitoring endemic diseases of significant economic importance. Our vision fits into a broader vision for Irish agriculture set out in FoodWise 2025 and in particular, the target of being best in class in terms of the products that we supply. In this context, best in class is defined as producing safe and high quality food that is sustainably produced, while being able to verify those criteria objectively, credibly and most importantly, to the satisfaction of customers both at home and abroad.

In our vision, all the stakeholders will be working together in an integrated surveillance system which utilises resources efficiently, narrows the focus onto agreed surveillance priorities, and effectively responds to new/emerging or existing threats. The programmes will be ambitious but realistic, practical and cost-effective. High quality surveillance will be undertaken using the most up-to-date surveillance tools and technology. There will be timely communication of results and surveillance outputs will be effectively communicated to internal stakeholders and to trading partners. Surveillance will be one of the main pillars in promoting trade. Surveillance activities will be in line with the One Health concept for the protection of public health.

3.2 National animal health surveillance strategy

DAFM is developing a National Animal Health Surveillance Strategy (NAHSS) that will guide Ireland's animal health surveillance until 2021. The NAHSS will focus on improvements that can be made in four main areas, namely, governance, quality, prioritisation and communication. Improvements in those areas will result in the world class animal health surveillance system, towards which we aspire.

3.3 Goals

In order for the NAHSS to be successful, an agreed set of goals will need to be met:

1. Improve governance of national animal health surveillance (including leadership/coordination of roles of stakeholders/prioritising activities) (See Chapter 4)
2. Deliver quality surveillance throughout the system (See Chapter 5)
3. Develop a system for the prioritisation of surveillance activities (See Chapter 6)
4. Ensure effective communication of surveillance information (See Chapter 7)



4.1 Introduction

As we saw in chapter 2, there are many stakeholders involved in animal health surveillance in Ireland. The number and diversity of stakeholders poses a major challenge to the delivery of surveillance in a coordinated and cohesive manner. This also poses a challenge to the adequate representation of the views of stakeholders on the development of policy and on the implementation of surveillance programmes. In order to ensure that all stakeholders contribute to and benefit from good governance, the governance structure needs to reflect the diversity of activities and participants within the surveillance system. Furthermore, the governance structure must assess the performance of surveillance and ensure regular review of strategy.

In this Chapter, we will review the governance structures currently in place and we will examine how governance of animal health surveillance can be further improved. We will also provide a short review of the funding of animal surveillance in Ireland.

4.2 Review of the current governance structure for animal health surveillance

The roles of the different organisations that deliver animal health surveillance in Ireland were set out in Section 2.4. In summary, DAFM is mainly responsible for active surveillance programmes for notifiable diseases and for chemical hazards in livestock. It is also responsible for designing and implementing passive surveillance programmes for the detection of new, re-emerging and exotic diseases in livestock. AHI is responsible for surveillance programmes for production diseases in livestock. The Marine Institute is responsible for surveillance of hazards in fish. Other stakeholders, listed in Section 2.3, participate directly in various surveillance activities, or provide support for surveillance activities, and/or are directly impacted by those activities.

DAFM and other organisations support and participate in surveillance initiatives at international (e.g. OIE, FAO), and EU (e.g. EU Animal Health Law) level and contribute to animal health policies through, amongst other activities, disease surveillance, disease control and contingency planning. This allows the sharing of data and information with partners to improve surveillance for all.

The organisations involved in surveillance have their own structures and operate independently in relation to their area of responsibility. In 2013, DAFM recognised the need for greater leadership and coordination in the area of animal health surveillance and set up an Animal Health Surveillance Steering Group. As mentioned in Section 2.4.1.1 and Appendix VI, the main role of the Steering Group is to develop general policy in the area of animal health surveillance, to coordinate surveillance activities and to monitor implementation. The Steering Group is the main decision maker in DAFM in relation to animal health surveillance issues and is chaired by the Chief Veterinary Officer. Working groups are commissioned by the Steering Group to deal with specific issues relating to surveillance. The SAT Division within DAFM provides technical and administrative support to the Steering Group.

As part of its leadership role, the Steering Group has undertaken a number of initiatives. One of these was the development of a National Animal Health Surveillance Strategy. The aim of the strategy is to provide a clear vision and direction for surveillance. In developing the strategy, the Steering Group consulted with the divisions in DAFM responsible for developing and implementing specific surveillance programmes. Meetings were also held with a number of external stakeholders. Both internal and external stakeholders provided valuable feedback on governance and other issues relating to surveillance. As mentioned in Section 1.6., a one-day forum was held to provide information on developments on animal health surveillance to stakeholders and to elicit views on how animal health surveillance should develop in Ireland. Overall, there has been an extensive consultation with stakeholders representing the first attempt to share a collective vision for the future of animal health surveillance in Ireland. This should provide sufficient stimulus for all stakeholders to assess the contribution that they make to the overall surveillance effort and the better utilisation of resources.

The main feedback from stakeholders in relation to governance was that the current organisational structure for animal health surveillance, as described in Chapter 2, is fit for purpose. The active and passive surveillance programmes undertaken by DAFM Divisions, Animal Health Ireland, the Marine Institute and other organisations are working well. The Steering Group has the potential to coordinate the diversity of animal health surveillance activities. Many stakeholders expressed the view that those structures would assist policy development and would provide a mechanism for coordinating activities in an effective and efficient manner. However, many areas were identified for improvement (see Section 2.5) and are addressed in the recommendations set out in the strategy document.

4.3 Further development of the governance structure

To achieve high standards in governance of animal health surveillance, the Steering Group should maintain a leadership role, and act as a focal point for co-ordinating and providing direction for the national surveillance system. This will include the following:

- Facilitating the active involvement and participation of stakeholders, including the provision of a framework for consultation and collaboration between stakeholders;
- Provision of a vision and strategic direction for surveillance;
- Establishing priorities;
- Identifying gaps in surveillance information;
- Setting national standards on surveillance data quality;
- Maintenance of oversight and evaluation of progress;
- Developing policy on funding mechanisms;
- Playing a pivotal role in communicating information about the national surveillance system both to internal and external stakeholders.

The governance structure must seek to provide an environment within which expertise is harvested and directed to agreed national priorities. This will avoid duplication of effort and allow the development of potential synergies. A key element in developing collaboration is to provide an enabling environment within which participation and information flow is optimised. It is essential that individual efforts are coordinated and channeled in an agreed direction. A culture of planning and working together must be developed. The relationship between industry and government should be considered as a business partnership and not as a delivery of client services. In particular, the degree of participation of farmers and PVPs can greatly affect disease reporting rates. This must be nurtured through a culture of inclusiveness, service, accountability and good communication on the part of the organisations delivering animal health surveillance programmes. Objectives can best be achieved through collaboration and continuous engagement with stakeholders, thereby ensuring that the work programmes are aligned with the requirements of the stakeholders.

In order to collaborate effectively, the role of participants within the national surveillance framework needs to be understood and agreed. One of the objectives of the NAHSS was to identify the stakeholders involved in surveillance, and to define their roles. In addition, it is necessary to provide a mechanism for all stakeholders to discuss and identify surveillance needs, priorities, and actions. The Forum held in April 2015 was an important first step in this regard. The Forum will need to be followed up by ongoing consultation with stakeholders which will develop in time in line with the wishes of participants. Collaboration and partnership in animal health surveillance will only flourish where stakeholders play an active role in decision making and understand the criteria used during decision making.

A joined up approach to surveillance at national level provides the possibilities for more efficient use of resources and better outcomes in the event of exotic disease emergence. There are also possibilities to drive research and education based on agreed priorities. DAFM would lead the coordination of such opportunities. DAFM should provide leadership within the national surveillance system by continuing to identify emerging risks to animal health within Ireland, and by recommending the use of appropriate tools to deal with emerging risks.

While stakeholders generally agreed that the current governance structure is fit for purpose, the need for modifications of the structure may evolve over time. This should be considered during the ongoing consultation between stakeholders. The governance structure should be modified as necessary.

4.4 Funding of animal health surveillance and the need for a cost-benefit evaluation

DAFM's surveillance programme has many different strands. As a result, it is financed through different streams, e.g. central funds, farming community and industry. Farmers contribute by paying for TB tests, BVD tests and any submissions that they send for testing to private or regional laboratories, although the latter is heavily subsidised by DAFM. Direct costs for farmers in the TB programme are in the region of €25m/annum in testing costs and €5m/annum in disease levies, while the BVD programme costs €9m annually in sampling and testing costs. Farmers also contribute to the costs of surveillance through the levies that they pay on their animals at the time of slaughter, and on milk production. Industry funds surveillance by contributing to the cost of certain schemes such as the bulk tank milk testing scheme and meat inspection. Industry also funds surveillance through support for bodies such as AHI. However, the coordination and implementation of the majority of surveillance activities is under the direct control of DAFM and this is financed from central funds.

Ireland's animal health status is very valuable in providing access to export markets. Therefore, there is a need for greater focus on the delivery of animal health, which provides both private and public goods and provides a rationale for public intervention through public/private partnerships. The public or private good component of future surveillance activities, especially for non-regulatory disease, and the enhancement of public health/food safety should be assessed in order to determine the proportion of funding to be contributed from government or industry. The funding model for the surveillance strategy should reflect the mix of public and private goods generated by specific programmes.

In view of the close scrutiny of expenditure at government and industry level, it is vital that the economic aspects of particular surveillance activities be assessed, and that the benefits are clearly demonstrable. For example, in a study commissioned by AHI and carried out by the Scottish Agricultural College, it was estimated that the annual losses due to BVD in the Irish cattle industry were in the region of €102 million. This research provided a sound basis for the setting up of the BVD Eradication programme and greatly encouraged the participation of industry, including farmers. A similar approach should be taken in relation to other animal health surveillance programmes.

4.5 Governance recommendations

Recommendation 1

As part of its leadership role, DAFM should ensure active participation of stakeholders in the development of policy and in the implementation of animal health surveillance programmes.

Recommendation 2

The governance structure of animal health surveillance in Ireland should be reviewed on an ongoing basis and updated, as necessary.

Recommendation 3

Funding mechanisms for animal health surveillance should be explored in line with principles set out in the Animal Health Strategy produced by DAFM. DAFM should promote a clearer understanding of the private and public benefits accruing from animal health surveillance programmes and this should be reflected in the funding of those programmes.

Recommendation 4

An economic assessment should be an integral component in the development of any new animal health surveillance programme.



Delivering a high quality animal health surveillance system

5.1 Introduction

Quality surveillance encompasses many aspects ranging from pre-requisites, such as availability of facilities and expertise, to specific requirements for particular surveillance activities, such as sample size requirements and statistical methods for analysis of data. The purpose of this chapter is to look at the attributes of a high quality surveillance system and to propose how this could be achieved in an Irish context.

5.2 Attributes of a high quality animal health surveillance system

While the attributes will depend on the type of surveillance being undertaken, in general, they include the following:

- A centralised governance structure;
- A system for prioritising surveillance requirements based on clearly defined goals;
- Selection of the most appropriate mix of surveillance activities to ensure that the surveillance programmes meet their specified objectives;
- Good awareness raising, high level of participation and good communication with stakeholders, e.g. to encourage reporting of diseases;
- Support, cooperation and buy-in from stakeholders, particularly farmers and PVPs;
- Availability of a range of experts with the required level of training, including policy makers, economists and veterinary specialists such as epidemiologists, species-specific clinicians, microbiologists, pathologists;
- Use of the best available technologies and sampling methodologies;
- Standardised protocols to collect, validate and analyse data;
- Most efficient and effective use of resources;
- Timely production of results and communication of information back to the relevant stakeholders;
- Performance standards based on clearly defined overall goals;
- Formal system for the periodical review of surveillance programmes;

5.3 How do we ensure that these attributes are met in an Irish context?

Some of the attributes mentioned above are dealt with in specific chapters of this document and are of a general nature, e.g. governance and prioritisation. In this chapter, we will focus on the attributes that are not dealt with elsewhere. As mentioned in Chapter 1, surveillance has a number of purposes. New, exotic or re-emerging threats are generally identified through early warning surveillance⁵ methods. Proof of freedom and trends in endemic diseases are focused on specific pathogens. The attributes relating to an early warning surveillance system are very different from those relating to the surveillance of a specific hazard, so each will be described separately.

5.3.1 Attributes of a high quality early warning surveillance system

Animal diseases do not stop at national borders. Globalisation has resulted in increased movements of people, animals and goods with much shorter transit times. These coupled with changing global temperatures means that an increase in emerging risks, such as new animal diseases or the introduction of chemical hazards, are to be expected. Early warning surveillance systems play a key role in the prompt detection of such threats. Two major pillars of our early warning surveillance system are enhanced passive surveillance and scanning surveillance. In addition to these, several other surveillance methods contribute to our early warning surveillance system. These include post-import checks on imported animals, activities carried out by vets at abattoirs, specific pathogen surveys and sentinel surveillance.

5.3.1.1 Enhanced passive surveillance

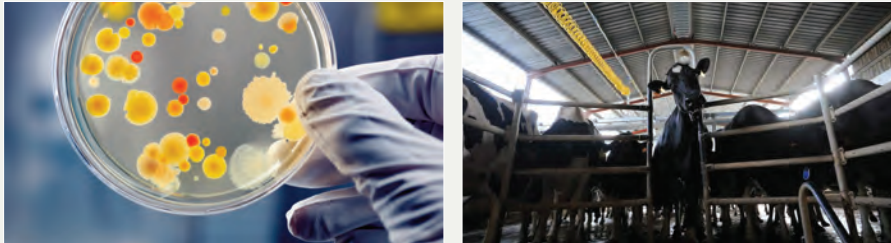
As described in Section 2.2, enhanced passive surveillance is an observer-initiated provision of animal health data with active investigator involvement. This is a particularly important component of surveillance of new, re-emerging and exotic diseases. Livestock keepers and PVPs are best positioned to detect abnormal mortalities or other clinical signs. However, there are a number of basic requirements that must be in place to enhance this passive surveillance. These include creating a high level of public awareness and education and providing a strong incentive for farmers, PVPs and other stakeholders to report unusual cases. In addition, it is essential that laboratory staff members who investigate suspect cases reported through the passive surveillance stream have sufficient expertise and access to high quality facilities.

High level of public awareness and education

Disease awareness amongst those at the animal-human interface is a key component of an early warning surveillance system. Farmers and PVPs should be prioritised for raising awareness levels for livestock diseases. Farmers and PVPs work on a daily basis with animals and their ability to recognize the clinical signs of exotic or newly emerging disease is vital for early detection and containment. Many of the major outbreaks of exotic and emerging diseases in Europe in the last 30 years were initially reported to competent authorities by the herd/flock owner or by a PVP (Appendix VII).

High levels of awareness can be achieved through increased training and workshops, social media, mainstream media campaigns, participation of DAFM at gatherings of the agricultural community, e.g. The Tullamore Show, National Ploughing Championships and The Dublin Horse Show.

⁵ Early warning surveillance is surveillance of health indicators and diseases in defined populations to increase the likelihood of detection of undefined (new) or unexpected (exotic or re-emerging) threats (Hoinville *et al.*, 2013)



Strong incentive to report unusual cases

The volume of information received from farmers, PVPs and members of the public is dependent on their willingness to furnish such information. While it is necessary to make highly pathogenic exotic diseases such as foot-and-mouth disease legally notifiable, an emphasis on voluntary reporting is preferred. It is imperative that there is trust between farmers and the competent authorities. If notification of their suspicion of disease or chemical hazard results in destruction of livestock without compensation, prolonged restrictions or undue damage to their livelihood, then farmers will be less likely to report such suspicions. Ongoing contact between DAFM staff members and stakeholders, particularly DAFM veterinary laboratory staff, is a vital component in ensuring that the necessary trust is built up to ensure a high level of reporting by farmers and PVPs. AHI with its track record of engagement with farmers and farming organisations could assist in this process. Private laboratories also have an important role to play in reporting biological and chemical hazards. Appropriate communication mechanisms need to be developed to facilitate this.

Benefits must accrue to stakeholders from any surveillance system. These benefits need not be limited to direct benefits such as financial savings or more efficient use of resources. Indirect benefits could include improved animal production, improved public health, increased understanding of disease (spread and control), and improved ability to react when faced with a disease outbreak, and maintained or increased international trade. A good example of mutual benefit is the submission of carcasses for necropsy examination at Regional Veterinary Laboratories (RVLs). The farmer and the PVP receive information from the RVLs which will allow them to diagnose and deal with disease problems (i.e. a private good), while DAFM acquires additional surveillance data (i.e. a public good).

High level of expertise, high-quality facilities and equipment at the laboratories

A major attribute of an early warning surveillance system is sufficient expertise to characterise any potential new disease, e.g. pathological characterisation and the availability of high quality ancillary laboratory testing to identify aetiological agents. In this context, it is essential that the staff involved in early warning surveillance activities have a high level of expertise and that they have access to high-quality facilities and equipment. Many staff members in the DAFM veterinary laboratories have obtained additional qualifications, including master degrees, doctorates and international-accredited qualifications in pathology.

Professional competence, specialisation and continuing education address one key aspect of quality delivery, with the other aspect being the ongoing monitoring of the quality of the analytical work performed in the laboratories. The standard benchmark for laboratories all over Europe is ISO 17025 accreditation, and has become both the standard required for regulatory testing by the EU, and is increasingly the standard reached by private laboratories. Because of the sheer breadth and diversity of the testing delivered by DAFM surveillance laboratories, accreditation of all testing is probably unrealistic, but the accreditation of a minimum of one (prioritised, strategically selected) test per laboratory site is a simple way to ensure every DAFM lab has an ISO-approved quality system, and the ability to add further tests by scope expansion as required and as resources allow.

As mentioned in Section 1.3, molecular typing of pathogens is likely to be a cornerstone in animal health surveillance in the future. To fully utilise the opportunities provided by this technology, it is important that expertise, facilities and databases are developed and that linkages are made with other agencies with an interest in this area, such as ICBF and the Health Protection Surveillance Centre.

5.3.1.2 High quality scanning surveillance

Scanning surveillance consists of the submission of animals for necropsy examination and the analysis of diagnostic samples at the RVLs. The laboratory investigation component of scanning surveillance can be followed up by field investigations where appropriate.

Necropsy examination: Necropsy examination, as part of the diagnostic process, is widely recognised as a core component that underpins animal health surveillance. The data gleaned from necropsy examinations performed on specimens referred by PVPs are of particular importance in early warning surveillance and when investigating trends in endemic diseases. The greater the number of submissions made by farmers and PVPs the greater the amount of data that can be obtained. However, it is recognised that some submitted carcasses are of greater surveillance value than others, and as resources will always be a constraint, getting the most suitable carcasses in the best possible condition is a pre-requisite to optimising the value of the current necropsy service.

An expertly delivered necropsy service has particular strengths for early warning surveillance:

- A definitive cause of death is established, and this may be audited and cross checked because of the amount of data and tissues retained, including histology blocks;
- Ancillary diseases or infections, not directly related to the death may be monitored;
- It will detect the cause of death regardless of what it may be – it will often ‘answer a question you are not asking’ (i.e. detect a disease you are not looking for, not capable of testing for or not expecting);
- It is the ultimate ‘quality control measure’ for purposes of auditing clinical veterinary medicine or indeed resolving the true meaning of signals derived from the adjunct/alternative surveillance methods described below;
- It is readily configurable and the quality of the necropsy service may be refined by training/certification of professionals who provide the pathology & ancillary services, and by accreditation (ISO 17025);

Analysis of clinical samples from livestock farms: PVPs regularly take swabs, blood, milk and faecal samples from livestock. These are sent to both the DAFM laboratories and private labs for testing. The results of laboratory testing can be a useful source of information on exotic, new and re-emerging diseases. Optimum use should be made of these samples and the data associated with them from a surveillance point of view. Private laboratories could be enjoined in collaborative networks with relevant DAFM laboratories, whereby DAFM would use its longstanding laboratory expertise and acknowledged independence to provide services to private laboratories like test validation (proficiency tests, ring trials) and trouble-shooting anomalous results, as well as ‘badging’ participating laboratories in exchange for private laboratory data e.g. DAFM Partner Lab. This has been successfully trialled with BVD (General Virology/Sligo RVL/AHI) and with ovine parasitology (Kilkenny RVL & Sheep Technology Adoption Programme (STAP)) and a new programme is currently being developed (Limerick RVL & AHI CellCheck).

There are a number of other improvements that could be made to scanning surveillance:

Telephone Helpline

In relation to the selection of animals for necropsy examination, it is important that animals are selected carefully to provide the highest possible value for surveillance purposes. This can be done in the first instance through a telephone help desk where a member of the DAFM veterinary laboratories with expertise in clinical diagnosis can discuss problems with a PVP. This would allow PVPs to rapidly report suspect cases whilst also affording DAFM the opportunity to decide if the case warrants further investigation. Based on those discussions, a laboratory clinician can decide on an appropriate course of action, e.g. the advice given to the PVP over the phone is adequate, diagnostic samples should be submitted, one or more animals should be submitted to the RVL for necropsy examination, or a laboratory clinician should undertake a field visit. Therefore, the helpline can function in a number of different ways:

- It may be used as a helpline for assisting diagnoses, with advice offered on sampling/diagnostic strategies;
- It may be used for refining and categorising the value of carcasses submitted to RVLs for necropsy.

Incentivised fee structure

In Ireland, the necropsy service is highly subsidised. However this is done without taking into account the value of the carcasses for surveillance purposes. Selection of carcasses for necropsy examination could be facilitated by having an incentivised fee structure in place. The fee charged could depend on the value of the carcass for surveillance purposes, with the most valuable animals being examined free-of-charge. The value should be decided by the laboratory clinician during the initial contact with the PVP.

Provision of a collection service

One of the most important factors affecting the submission rate of animals for necropsy examination is access to facilities. The submission of fallen animals is facilitated by the wide geographical distribution of the RVLs. These are strategically located to provide a good geographical coverage. However, an analysis of the intake records of the RVLs has shown that most of the necropsy submissions come from within a radius of 60 kilometers, so there is a sizable part of the country from where there is a low submission rate. In other countries, such as the Netherlands, good geographic coverage is obtained by the provisions of a service to transport fallen animals to a centrally located laboratory. A similar system could also be put in place in Ireland. By law, all fallen animals in Ireland must be collected and disposed of by rendering or incineration. Collection is currently via a system of knackeries situated throughout the country. Fallen animals considered to be of high surveillance value could be delivered to an RVL rather than a knacker, thereby increasing the geographical coverage of surveillance.

Specialisation

Further development of staff expertise should include the acquisition of species-specific professional qualifications (e.g. in bovine, ovine, porcine or avian clinical medicine) or discipline-based qualifications (e.g. pathology, clinical microbiology). This could be supported (and the value to DAFM optimised) by the development of specific RVL sites as designated centres of specialist competence in particular species or sectors. As an example, an RVL focusing on dairy health would encourage specialisation in particular areas such as dairy herd health, clinical diagnosis related to dairy animals, and pathology of dairy cattle. The development of expertise would be facilitated by specific training and greater throughput of animals, materials and referrals. Such centres could continue to receive the typical cross-section of diagnostic submissions as currently occurring, but would generate a strong caseload in their designated expertise, and would act as a tertiary referral centre for colleagues and the wider industry. Similar specialisations could be developed at different RVL sites. The establishment of designated centres of specialist competence is likely to evolve as the private laboratory sector increasingly supplies the routine diagnostic needs of the industry, but the need for specialised disease investigation and specific key supports becomes ever more critical, and remains a public good element of DAFM service delivery.

A review of the DAFM laboratories is currently being undertaken by a separate Working Group and a final decision on the future structure of the DAFM laboratories will be taken following the publication of the report being prepared by that group. Regardless of the outcome of that review in terms of the number and location of the surveillance laboratory units deployed, DAFM should establish a principle that its laboratories will be matched in resources and facilities to the role required of them, and that its facilities will meet and surpass the industry standard.

5.3.1.3 More use of other surveillance activities

In addition to the early warning surveillance methods outlined above, there are a wide range of other activities that could contribute to an improved early warning surveillance system. A good early warning surveillance system should seek to exploit the surveillance potential of novel developments in technology. The activities described below would seem to offer prospects of additional ‘real-time’ data on disease morbidity and mortality in food animals. They seek to strengthen and refine scanning surveillance rather than replace it, and to explore additional surveillance modalities that may offer additional potential to detect a real-time signal of a real world animal disease event.

Monitoring of data from animal collection services and knackeries:

Fallen animals in knackeries are another potential source of surveillance data. At present, VI’s from RVO’s regularly visit knackeries to collect samples for BSE and scrapie testing. Samples could be taken from fallen animals and sent to DAFM’s laboratories for pooled PCR or ELISA testing to gather data on a range of pathogens, in particular screening for exotic diseases and zoonoses. In addition, data from fallen animals from the AIM system could be analysed to detect geographical and temporal trends in mortalities. This potential source of surveillance is not well developed at present but it offers considerable potential given that all animal deaths are electronically recorded on the AIM system.

Monitoring milk data: Milk yield can be very sensitive to disease events. The presence of a particular disease could lead to a perceptible decrease in milk yield in a particular herd or across a region. If such a pattern were evident, it could form the basis of an early warning system – where analysis of milk yield data might be used to flag a disease outbreak (and prompt targeted investigation) earlier than might become apparent by conventional reporting mechanisms, provided the change in milk yield could be detected in real-time and distinguished from the normal variability imposed by management & weather. The Schmallenberg virus epidemic has been extensively studied in Ireland, the Netherlands & Belgium, and indications are that the effect on individual milk production of a propagating epidemic, even Schmallenberg virus with a marked impact on yield, will be difficult to distinguish from milk yield variations generated by non-disease impacts (feeding rates, cost of feed, milk price, weather, etc) Nonetheless, this is a readily available data stream, and one that could lend itself to automated monitoring and the issuing of a graded set of alerts.

Monitoring herd management data: The focus on herd health has led to the increased use of electronic aids in herd management. Data are being collected on temperatures, eructations, fertility, weight gain etc. Monitoring of these data could potentially be used to identify adverse disease events.

Monitoring antimicrobial use: Information on antimicrobial use in primary production could provide valuable information on the occurrence of new or re-emerging diseases or changes in trends of endemic diseases. In particular, it could be a valuable tool in efforts to deal with antimicrobial resistance. In a review of the potential for transmission of antimicrobial resistance through the food chain produced by the FSAI, it was concluded that surveillance and analysis of antimicrobial use in the food chain were inadequate. The report recommended that surveillance of antimicrobial use in animals should be based on actual use rather than on sales data and that the antimicrobial use should be categorised by animal species and stage of production.

Abattoir-based surveillance: All food animals that pass through a slaughterhouse receive an ante-mortem inspection carried out by a veterinarian, and a post-mortem inspection carried out either by a veterinarian or under the supervision of a veterinarian. The veterinarian is uniquely positioned to identify changes in animals being produced for food which may indicate the presence of an exotic disease, such as foot-and-mouth disease or a zoonotic disease, such as bovine tuberculosis, tapeworm cyst or BSE. Feedback can be provided on ante-mortem and post-mortem findings for an individual animal or group of animals to the farmer, and can provide information to the PVPs on herd and flock problems. The veterinarian in the slaughterhouse is well placed to detect residues of authorised animal remedies or unauthorised products through evaluation of the Food Chain Information or from evidence gained during ante-mortem inspection or post-mortem inspection. The surveillance activities currently taking place at abattoirs could be further enhanced through the

collection of data that could identify trends at national level. The AIM, AFIT and AHCS systems could be used to record such information which could then be monitored and analysed. As mentioned in Chapter 2, AHI and DAFM are currently setting up systems of data collection in abattoirs. Although designed with food safety in mind, much of the data gathered is likely to be useful for surveillance.

The undertaking of serological surveys is another surveillance activity which can take place in abattoirs. Such surveys are generally used to provide assurance of freedom from disease, but can also be used to detect the introduction and distribution of exotic or re-emerging diseases, so long as samples can be traced to the holding of origin.

Sentinel Herd Surveillance: This involves the repeated collection of information from the same selected sites or groups of animals (e.g. veterinary practices, laboratories, herds or animals) to identify changes in the health status of a specified population over time. These sentinels should act as a proxy for the larger population of interest; they may be selected on the basis of risk, but can also be selected randomly, or on the basis of convenience or compliance. Antibody testing in sentinel herds would provide quicker notification of a disease incursion than awaiting a suspected case to be reported. Faster detection means faster containment.



A number of projects are currently being undertaken in this area in Ireland. The RVLs in Sligo, Athlone and Kilkenny are currently leading a project on sentinel sheep flocks. A sentinel surveillance programme is currently in place in herds in the vicinity of Cork harbour to detect any problems that might arise from the presence of many heavy industries in that area. In addition, a number of sentinel herds could be used to scan for the presence of disease antibodies in the south and south-east of Ireland, particularly vector-borne diseases that may be spreading or emerging from Continental Europe. Certain herds in Ireland regularly have blood and milk samples taken from large numbers of their animals for research reasons, and access to these samples could potentially allow effective sentinel surveillance at a relatively low cost.

The SFPA samples shellfish from 130 estuaries each month. These shellfish could act as sentinel animals in a much wider context than fish diseases. Shellfish filter millions of litres of water and may be a sensitive index of what is running off the land into rivers and sea from farms. Testing of these samples could provide information on pathogens which may be present on farms.

Syndromic Surveillance: This is surveillance that uses health-related information (clinical signs or other data) that might precede or substitute for formal diagnosis. This information may be used to indicate a sufficient probability of a change in the health of the population to deserve further investigation, or to enable a timely assessment of the impact of health threats which may require action. This type of surveillance is not usually focused on a particular disease agent and so can be used to detect a variety of diseases or pathogens including new (emerging) diseases. A pilot syndromic surveillance programme is currently being undertaken by the RVL in Sligo.

Pathogen specific surveys: Surveillance is continuously being carried out on samples to prove freedom from various diseases, such as the testing of cull cows for brucellosis and EBL, or birds tested for avian influenza and Newcastle disease. These schemes can act as early warning indicators for disease. The cow monitoring scheme for brucellosis also offers potential for monitoring other diseases. The recent advancements in the electronic recording of these samples could further facilitate this. The testing of bulls for specific diseases, carried out routinely upon entry to an AI station, could also indicate the presence of certain diseases at an early stage. Knackery samples would also be a potential matrix for surveying for the presence and prevalence of specific pathogens.

Event Based Surveillance: This method of surveillance is carried out by continuously scanning the Internet and other communication media to detect information that might lead to the recognition of emerging threats. It uses unstructured data which must be studied and verified. This surveillance has been utilised to monitor the spread of Bluetongue and Schmallenberg Disease throughout Continental Europe.

Participatory Surveillance: This depends on communities providing information regarding health events, risks, impacts and control opportunities by gathering qualitative health data from defined populations. The analysis of participatory data emphasises the comparison of information obtained from multiple informants; the method uses a variety of techniques to obtain the most likely interpretation of events. The objective is to enhance sensitivity by identifying cases based on a clinical case definition; these may then be evaluated and confirmed using either rapid field tests or laboratory diagnostics. Conventional epidemiological investigation techniques can be used to evaluate and confirm outbreaks detected by participatory surveillance as part of trace-back and trace-forwards activities. The National Biodiversity Data Centre is exploring this area and the concept of citizen science at present.

Field Sampling: Field sampling is used to describe necropsies carried out in facilities that are not defined necropsy centres, e.g. veterinary practices, knackeries or on farm. PVPs could be encouraged by means of CVE points to participate in training courses that would teach them to harvest samples from fallen animals. These could then be stored and forwarded onto the DAFM labs for full analysis. This would be particularly useful in cases where farmers are reluctant to take carcasses to the lab or in the event of an animal dying at the weekend.

5.3.1.4 The surveillance pyramid

The data derived from the various activities described above will vary in reliability from high quality validated laboratory test results to lower quality data derived from syndromic surveillance, participatory surveillance and field sampling. All of the data can be useful in an appropriate context. A system of weighting, with higher quality data getting a higher weighting, is likely to be required to ensure that more reliable data has a bigger influence on decision-making than less reliable data. The value of the different surveillance activities can be expressed as a surveillance pyramid as shown in Figure 2.

If DAFM continue to resource and provide a regional necropsy service, this may be used to refine or validate the findings from the ancillary surveillance streams. The nature of the data from those streams lower on the surveillance pyramid is such that the data will simply be an indication of an adverse event, and targeted sampling or 'case finding' will be required to determine what is the true nature of the event, and what level of risk it poses.

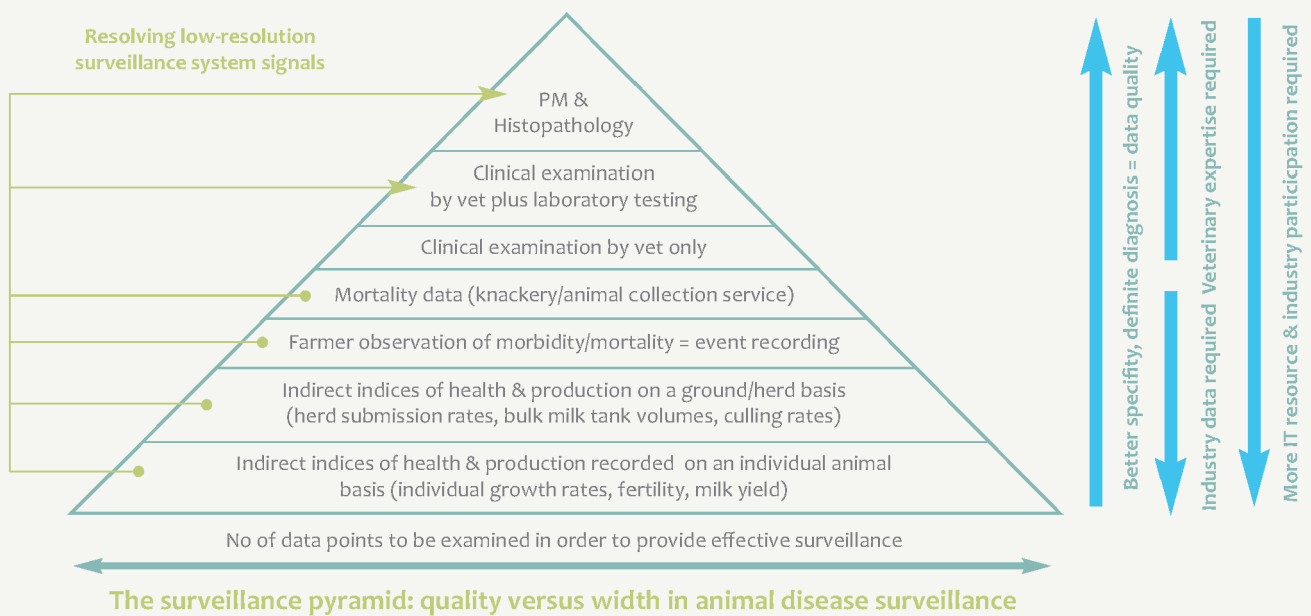


Figure 2 The surveillance pyramid: quality vs. width in animal disease surveillance

In addition to observations on animal health and disease, measurements of other factors which can influence disease levels also need to be accounted for in the analysis of disease patterns, e.g. annual rainfall and silage quality. Data streams relating to some of those factors are already in existence and need to be accessed to ensure all available information is taken into account in interpreting patterns in the occurrence of disease. Other factors may also need to be considered such as commodity prices, e.g. if feed costs spike and milk prices drop, a fall in milk production on monitored farms might simply indicate an economically logical management response rather than an adverse event.

Some of these surveillance activities are already widely used in Ireland while others need to be further developed, probably initially on a pilot basis. In the Irish context, individual activities are carried out by separate Divisions within DAFM e.g. necropsy examinations are carried out by the DAFM laboratories and abattoir surveillance is carried out by VPHIS. Coordination of the different activities is needed with a view to ensuring that an appropriate mix of early warning surveillance activities are implemented in Ireland, and that the information provided by the different activities is analysed in an integrated manner. It is also essential that the resources necessary for this purpose are provided.

5.3.1.5 Data protection

As mentioned above, large quantities of data are potentially available for surveillance purposes. Surveillance requirements must be balanced against the rights of farmers and other citizens to privacy, in compliance with the Data Protection Act. Farmer engagement and trust will be as critical to the surveillance effort, especially in getting farmers and other groups to record and to share their data. A framework addressing the rights to privacy of individuals and of commercial entities will be difficult to achieve but critical to ensuring the continuing flow of surveillance data provided by these private entities.

5.3.1.6 Performance standards laid down based on clearly defined overall goals

Specific performance targets should be laid down for the early warning surveillance system. These could include the following:

- *Targets for awareness activities:* A target should be set for the number of talks, lectures and workshops with farming groups, PVPs, State Veterinarians and veterinary undergraduates.
- *Target for the number of PVPs that make contact annually with the RVLs:* A log of all contacts between PVPs and the RVLs should be kept, with a baseline figure established with the aim of increasing the baseline figure year on year.
- *Targets for the number of animals submitted for necropsy examinations to each RVL:* A baseline figure should be set for the number of carcass submissions to the RVLs with the goal being to have the maximum number of submissions that can be effectively examined in a timely manner with the available resources.
- *Targets for the number of diagnostic samples that are of potential surveillance value:* A baseline figure should be set for the number of samples submitted to the RVLs with the goal being to have the maximum number of submissions that can be effectively analysed in a timely manner with the available resources.
- *Targets for the other surveillance activities:* Targets should be set for the other surveillance activities mentioned above such as the examination of the data available on the AIM system on fallen animals.
- *Targets for the submission of scientific papers:* A target should be set down for the number of scientific papers to be published annually. Applied research and the production of scientific publications have their own inherent value to DAFM, but also serve to refine and develop the expertise and profile of staff, which ensures that DAFM is seen as the epicenter of animal disease surveillance in Ireland. Specialisation by staff involved in surveillance is regarded as a prerequisite to delivering a quality surveillance system, and the validation of that specialisation through the publication of scientific papers is one way to ensure DAFM's role is highly visible in the agricultural sector and the veterinary profession.

5.3.2 Hazard-specific surveillance programmes

Hazards can be targeted in a direct fashion through specific surveillance programmes. The purpose of these hazard-specific surveillance programmes can vary. They can be used to obtain baseline information on diseases that have a significant impact on public health, animal health or production, e.g. *Campylobacter spp.* in poultry. This information, in turn, can be used by Competent Authorities or industry to differentiate between producers with high or low levels of disease and to apply appropriate incentives or penalties. Baseline information can also be useful for individual farmers in determining where they stand among their peers in relation to a specific disease, e.g. grass tetany, and the potential for improving performance in relation to that particular hazard. Hazard-specific surveillance programmes can also be used to determine the level of progress in an eradication programme, e.g. bovine tuberculosis, BSE or BVD, or to document the continued absence of a disease from a country.



Hazard-specific surveillance programmes have specific requirements:

- **Aim of the surveillance:** Why is the surveillance activity being carried out, and what is the expected outcome;
- **Hazard to be targeted:** Once the hazard has been identified, there must be sufficient knowledge of the hazard garnered before any other steps can be taken. This could include information about exposure/disease transmission, mode of spread, disease hosts (including wildlife reservoirs) zoonotic capacity etc;
- **Target Population:** The population that one wishes to target must be identified, e.g. bovine, and then within that target population a subset may need to be chosen e.g. all females over 18 months or all calves born after a certain date;
- **Sampling Strategy:** A geographical area where samples are to be taken must be agreed upon e.g. local, provincial, national or international. The style of sampling must also be chosen e.g. random, census, compulsory etc., along with what constitutes a positive result. The European Food Safety Authority (EFSA) and other organisations have various templates and plans for sampling which could provide us with a guide for sampling;
- **Sample Size:** An appropriate sample size must be selected. The sample size must give good coverage (i.e. the proportion of the target population that is to be included in the surveillance activity). The sample size must also be representative (i.e. the extent to which the features of the target population are reflected in the population included in the surveillance activity). The higher the representativeness of the sample size, the lower the bias of the surveillance activity;
- **Testing methods:** A test must be chosen that can reliably detect the targeted hazard. The higher the sensitivity and specificity of the test the more accurate the detection rate will be;
- **Organisation:** The surveillance activity must be coordinated. This coordination covers areas such as liaising with and agreeing on the terms of the surveillance activity with the stakeholders, agreeing on the basis of participation, facilitating and advising on the introduction of associated legislation and regulations. Maximum use should be made of samples collected for other purposes at bottlenecks such as slaughter plants or where visits are conducted for other purposes, e.g. annual TB test;
- **Information Management:** The collection of the data must be managed. This management activity covers areas such as who is to collect the data, the location of the data collection, the method of collection right up to management and dissemination of data;
- **Economic Efficiency:** The surveillance activity through its cost and impact should deliver a positive cost: benefit ratio. These benefits need not be only monetary. Whilst monetary benefits are directly measurable, benefits such as reduced risk to public health, reduced greenhouse gases, increased international trade, improved animal welfare etc. are also included. The culmination of these benefits plus any monetary benefits should exceed the financial costs of carrying out the surveillance;

In Ireland, most of the requirements mentioned above are set out in legislation. This can be in EU legislation (BSE programme, scrapie programme) or in Irish legislation (TB eradication programme).

5.4 Responsibility for ensuring quality

Within DAFM, the Division responsible for carrying out a particular surveillance activity will be responsible in the first instance for ensuring quality. The Animal Health Surveillance Steering Group will have the overall role of monitoring quality. It is envisaged that this will be done through the ongoing examination of particular surveillance programmes using specific sets of criteria. In that context, a number of surveillance evaluation tools have been developed in recent years which could be very useful in ensuring that surveillance carried out in Ireland is of a high quality. These include a SuRveillance EVAUation framework (SERVAL) produced by the Royal Veterinary College, University of London and the evaluation framework produced by the RISKSUR consortium (<http://www.fp7-risksur.eu/>) as part of an EU funded project on animal health surveillance. The latter consortium has also produced a surveillance design tool.

5.5 Recommendations

Recommendation 5

A working group should be set up to develop an appropriate mix of early warning surveillance activities and to carry out an ongoing review of the information gathered from the different early warning surveillance activities. Key performance indicators should be set for each activity based on clearly defined goals.

Recommendation 6

With regard to scanning surveillance, the possibility of the DAFM Laboratory Services using an alternative integrated approach, along the lines set out below, should be investigated:

- Provision of a dedicated telephone help desk for PVPs, manned by clinical specialists;
- Refinement of the RVL fee structure to attract carcasses and clinical samples of high surveillance value;
- Use of a dedicated animal collection service to ensure that animals of surveillance value from a wide geographical distribution are delivered to an RVL;
- Setting up of designated centres of specialist competence in particular species or sectors;

Recommendation 7

The Animal Health Surveillance Steering Group should monitor surveillance quality through the ongoing examination of particular surveillance programmes using specific sets of criteria and using the evaluation tools available for this purpose.



Prioritisation of surveillance activities

With the increasing importance of ensuring the animal health status of the national herd, the importance of surveillance is growing. However, concomitant resources are not endless, either human or financial. Therefore, it is necessary to focus on those activities that are of priority and de-emphasise those that no longer add value. As we have identified earlier in this document, there are a myriad of surveillance activities undertaken by disparate stakeholders, making prioritisation all the more difficult.

6.1 Challenges

One of the main problems with prioritisation is attributing values. It is difficult to quantify the role of surveillance as a constituent of Ireland's animal health status. It is also difficult to quantify the role of specific surveillance activities within the surveillance system as a whole. Rather than attempting to understand the value of surveillance from the perspective of the value added, it may be more instructive to assess the consequences of animal disease outbreaks in the absence of adequate surveillance activities.

6.2 Effective prioritisation

In order to effectively prioritise surveillance activities, a transparent process needs to be developed based on rational criteria that ensure that surveillance activities carried out are the most effective and add most value. Such criteria must be developed in consultation with all stakeholders so that decisions on future prioritisation of surveillance activities are understandable and consistent for all those involved. Agreed criteria should be flexible and ensure better buy-in from stakeholders, resulting in more consistent decision making.

DAFM's surveillance activities prioritise those diseases that have a legislative basis or pose the greatest economic risk in the event of an outbreak. DAFM is focused on proving freedom from disease so as to ensure that markets for agricultural products remain open. Other stakeholders, such as primary producers, while benefitting from the market access achieved from DAFM's surveillance priorities, are more interested in dealing with non-regulated diseases that have a negative effect on production e.g. the importation of live animals including shellfish and finfish poses a considerable risk to Ireland's health status and should be targeted for additional surveillance. There are also major issues to be dealt with on the public health side e.g. a survey compiled by EFSA showed that Ireland has the fourth highest prevalence of *Campylobacter* spp. in

broiler batches and in broiler carcasses in the EU (EFSA, 2010). As mentioned in Section 1.4, the FSAI has recommended that there should be increased surveillance of AMR in Ireland. A shared understanding by DAFM of the priorities of other stakeholders may allow for coordination of surveillance activities that may be beneficial for all. DAFM may be able to contribute to the coordination of certain surveillance activities even though they are not directly financed by DAFM.

In order to set priorities, DAFM will initially meet with stakeholders to identify shared areas of priority. In 2009, shortly after its establishment, AHI carried out a detailed consultation and prioritisation exercise which included an extensive farmer survey. Consequently, it has developed a strong understanding on issues relating to prioritisation and can contribute to this discussion. In developing priorities, cognisance will be taken of methods that have already been developed in this area. Some of these have been described by Hoinville et al. (2013). The priorities will form the basis of surveillance activities to be carried out as part of the national animal health surveillance programme. Progress in setting priorities will be kept under review and opportunities will be made available to add new priorities or to de-emphasise other areas of activity. The list of priorities should be short and achievable.

6.3 Recommendations

Recommendation 8

DAFM should develop a prioritisation process for animal health surveillance activities and establish criteria by setting up a working group with stakeholders. The priorities should be reviewed annually.





7 Communication

7.1 Why communication is important

Surveillance activities need to be communicated to relevant stakeholders and interested parties in a focused and effective manner. Communication is an important component of a properly functioning surveillance system. It is vital that ongoing, accurate information is provided to all relevant stakeholders on the current health status of Irish livestock. It is particularly important that farmers are aware of signs which could indicate the presence of an exotic or a new disease. They should also be aware of the importance of notifying suspicious disease signs to the veterinary authorities. In most instances, it is the farmer who will be the first person to encounter the symptoms of a disease. The initial reports of avian influenza in the UK in both 2014 and 2015 originated from farmers, as was the case for the foot-and-mouth disease outbreak in the UK in 2007 (see Appendix VII). The support and participation of farmers is vital in the implementation of control and eradication programmes for endemic diseases such as the TB Eradication Programme. It is vital that they are kept fully informed on the progress that is being made. Communication is also important in creating awareness among farmers of the impact of production diseases. This information can be used to improve efficiency and effectiveness in animal health at farm level. AHI ran a very effective campaign of providing information and creating increased awareness among farmers and vets in relation to ruminal fluke in Ireland.

It is important that PVPs are aware of which diseases are notifiable and what they should do in the event of encountering a notifiable disease (who to contact, whether or not a sample should be taken, what procedures to advise the farmer to follow). A possibility exists to expand the role of the PVPs in disease surveillance by gathering information in abattoirs, as described in Chapter 2. PVPs could also be encouraged to increase the submission of samples to laboratories.

It is important that the general public is also included when raising awareness of surveillance. The wider general public must be made aware of the economic and public health impacts that the incursion of disease can have on Ireland. Raising awareness may increase empathy and responsibility amongst this group, and lead to a more civic minded approach particularly when travelling both inside and outside of Ireland. It has been postulated that the outbreak of classical swine fever in the UK in the year 2000 was caused by a member of the public who discarded a sandwich, containing illegally imported meat, into an outdoor pig pen in the Norfolk area (Phillips 2000). Overall, an increased level of awareness and understanding of the importance of agriculture to the Irish economy will underpin the significance of the role played by the different groups in ensuring Ireland's animal health status.

In Chapter 2, we identified the diversity of stakeholders that are involved in animal health surveillance in Ireland. These stakeholders are gatherers and custodians of data and information. In Chapter 4, we addressed the need to coordinate the efforts of stakeholders and this will also extend to the communication of information. In this chapter, we examine the challenges associated with communication and how communication can be improved.

7.2 Challenges

The possible recipients of surveillance information range widely across many areas that are either directly or indirectly involved with animal health, e.g. government bodies, research and academia, primary producers, industry, representative bodies, and other stakeholders. The information received can prove vital in informing decision making for some, but may be of less direct interest for others. For this reason, the communication of surveillance information must be targeted and focused to meet the information needs of the various recipients. In some cases, the benefits of particular surveillance activities are not immediately apparent to stakeholders, or a stakeholder may have concerns that reporting an unusual condition will have deleterious financial or other consequences. Good communication is vital to avoid these problems. Where the purpose is to provide information to stakeholders, it is important that the information is provided in a clear and transparent manner. It is also important that the role of surveillance, and the benefits accruing from particular surveillance programmes, is communicated clearly to policy makers so that surveillance activities are prioritised and receive adequate resourcing.

There is a particular challenge in communicating clearly during times of crises, e.g. during the outbreak of an exotic disease such as foot-and-mouth disease. In those situations, it is vital that there is a high level of awareness among relevant stakeholders and that the steps being taken to deal with the situation by the Competent Authority are communicated in a clear and transparent manner. All stakeholders, including the general public, need to understand the role that they play in outbreaks of exotic disease and how they can contribute information. During such periods, the general public should participate in the surveillance system through targeted messaging to heighten public awareness.

There is an increasing need to raise awareness about chemical risks. Farmers are often unaware of the risks associated with the recycling of chemicals, the dangers of using unauthorised substances such as growth promoters. Communication needs to be improved in this area.

There is a wide variety of communication methods that have developed over recent years, particularly social media that must be embraced and harnessed effectively in communicating animal health surveillance needs and activities.

There is an enormous amount of surveillance data collected annually. The major challenge is to identify and focus on the most important and valuable data and to communicate that information effectively. A considerable amount of information is in the public domain e.g. an annual All-Island Animal Disease Surveillance Report is produced jointly by AFBI and the DAFM veterinary laboratories. This provides valuable information collected by a network of laboratories on diseases of farmed animals in Ireland. However, there is a considerable amount of additional information which is not widely available, and may be utilised only for the sectoral needs of a few rather than contributing to the wider national surveillance picture.

7.3 Improving communication

7.3.1 Raising awareness and timely dissemination of information

There are a variety of methods available that can be utilised to raise awareness and disseminate information to stakeholders, including traditional methods such as workshops, correspondence, press releases and farmer discussion groups. Regular meetings with key stakeholders are a key component of good communication. Information can also be disseminated through the farming organisations and through marts. Surveillance awareness may also be highlighted at gatherings of appropriate stakeholders e.g. the farming community at agricultural shows (National Ploughing Championships, The Tullamore Show, and The Dublin Horse Show). Clinical societies and veterinary conferences are a good mechanism for creating awareness of surveillance among PVPs.

Email, websites and on-line chat forums can be used to provide data in a quick and efficient manner. Agricultural websites such as 'The Farmers Journal' and 'Agriland.ie' are key vectors for communication. Web based methods are very suitable for providing data to:

- International organisations such as governments, the OIE or the World Health Organisation;
- Trading partners requiring information on specific disease programmes in Ireland or our national status for particular diseases;
- Farmers and PVPs who wish to inform themselves about notifiable diseases, disease programmes or legislation;
- Members of the public who wish to inform themselves about notifiable diseases, disease programmes or legislation;
- Members of the public travelling abroad and requiring biosecurity advice on minimising the risks of transporting disease into Ireland upon their return;

DAFM has developed a surveillance website (<http://nahsp.agriculture.gov.ie/>) as a central repository for information on surveillance activities and disease programmes undertaken in Ireland. This repository may provide the type of information that other countries/partners may require when considering trading with Ireland. It could be promoted as a shop-window through which our surveillance system could be appreciated, and also allow potential partners to develop an initial positive appreciation of our system before actively engaging through other channels. However it is vital that the website is kept up-to-date and reflects the current animal health situation in Ireland.

DAFM has a contingency plan to disseminate information to the general public in the event of an outbreak of notifiable diseases. This involves providing disease information packs to PVPs and farmers, along with press releases, TV/radio interviews, TV/radio adverts and the provision of an out-of-hours telephone helpline. The public are increasingly using alternative forms of media to access information. Television and newspapers are no longer the only means for the public to have access to the news. SMS text alert systems and social media such as Facebook and Twitter are an effective way to alert farmers during a period of heightened disease threat.

On occasions, there may also be a need for direct dialogue with a specific group of farmers or other stakeholders. For example, following the discovery of the first case of besnoitiosis in Ireland in 2015, it was necessary to communicate directly with the farmers who were linked with the index farm through purchases, geographical contiguity or other ways. In such cases, it may also be necessary to brief relevant stakeholders on the discovery.

There is potential to use mobile phone apps to develop data collection methods. The development of a disease-reporting app for farmers, making use of the latest GPS technology, would greatly facilitate the flow of data from the field, with accurate locations for each disease case as a standard feature of each report on the app.

7.3.2 Management of surveillance information

A key element of effective communication is the management of information gathered from surveillance activities. This information needs to be collected, evaluated and collated in a manner that aids the flow of information to relevant stakeholders. To achieve this level of communication, the following are required:

- The most appropriate methods of data collection, collation and analysis must be used;
- The collection and collation and analysis of data is supported by an appropriate IT infrastructure;
- Expertise is available to ensure that the information collected is interpreted correctly and presented in a manner that stakeholders can understand;

There are excellent IT systems already in place in DAFM and the other organisations involved in carrying out animal health surveillance for the collection and collation of data. These include the AHCS and AIM systems operated by DAFM. The necessary expertise also exists in DAFM and elsewhere for the interpretation and presentation of data. However, much of the data in these databases is currently inaccessible and the data are not being fully utilised for surveillance purposes. Consequently, the full benefits of these data are not available to stakeholders. Systems need to be put in place to allow these data to be fully utilised and resources need to be made available to complete this work.

7.3.3 Strengthening links

The agri-food sector is a key part of the Irish economy. CSO figures for 2014 show that this sector accounted for 8.8% of the total employment in the country and 12.2% of the value of total exports. Strategies such as Harvest 2020 and Foodwise 2025 aim to increase the importance of this sector to the Irish economy. Education will play a key role in the expansion of this sector. This is reflected in the large number of agricultural related courses on offer in Ireland. Between the universities and the institutes of technology there are over 42 third level agricultural courses available, ranging from certificate to PhD level. Allied to this, there are also six designated agricultural colleges that offer advanced certificates to young farmers. Of the degree and certificate level courses, approximately ten of them are primarily focused on animal production. These institutions are an ideal platform to introduce the concept of animal health surveillance. Such courses could act as a conduit for the promotion of surveillance to the next generation of farmers. Applicants to such courses will be at the human animal interface on a daily basis, and the importance of increasing their awareness of both the benefits and responsibilities of good surveillance should not be underestimated.

The School of Veterinary Medicine in UCD runs two veterinary public health modules in year four of the bachelor of veterinary medicine degree programme. There may be a benefit in incorporating a set of lectures on animal health surveillance in these modules. Such lectures might include explanations of the concepts of disease surveillance, outlining its importance, outlining the role the veterinary profession needs to play in relation to surveillance. PVP's have played a key role in the early detection of disease, e.g. in 1986 the first case of BSE was identified by a veterinary pathologist (Wells et al, 1987) and the 2001 foot-and-mouth disease outbreak in Britain was first detected by a veterinarian conducting ante-mortem inspection at a meat plant in Essex.

Links also need to be strengthened with institutions carrying out research relevant to animal health surveillance. Those institutions may be a source of valuable information e.g. methodologies that aid risk management decisions, such as ranking, prioritisation, optimisation and simulation methods; the provision of tools to aid communication of surveillance requirements or outcomes, e.g. data visualisation and data summary techniques. In that context, CVERA in UCD is a valuable resource in providing expertise in areas such as GIS and statistical methods.

As mentioned in Chapter 1, animal health and human health are inextricably linked as highlighted in the One Health concept. Interdisciplinary collaborations and communications on issues common to human and animal health and environment should be further developed with the Department of Health and other

organisations involved in human health surveillance, in particular with the Health Protection Surveillance Centre. FSAI should be notified as early as possible once a new animal health issue with relevance for food safety comes to light. Conversely, the FSAI might be in a position to share some information which could be useful for animal health surveillance with DAFM and other organisations involved in surveillance.

Northern Ireland and the Republic of Ireland have common interests in the area of animal health. The need for a high level animal health and welfare status throughout the island led the North/South Ministerial Council to commission in late 2001 a programme of work to develop closer co-operation and joint strategies for the improvement of animal health on both sides of the border, including animal health surveillance. This cooperation has continued with regular meetings held in relation to surveillance and specific diseases of common interest such as bovine tuberculosis, BSE and scrapie. The results of RVL surveillance along with the analogous results generated by AFBI in Northern Ireland are published annually in the All-island Animal Disease Surveillance Report. An effort should be made to maintain and improve these links in future years.

7.3.4 Translating Information into Policy

Surveillance information also assists decision making by policy makers. For a variety of reasons, information gathered through surveillance does not always inform policy decisions. Good communication is vital to changing this situation. This might be achieved through:

- Presenting surveillance information in simple language that can be understood by policy makers, and all stakeholders involved;
- Encouraging more efficient communications between government departments and research centres;
- Bringing stakeholders together to discuss surveillance findings and finding agreement on actions to be taken, where appropriate;
- Highlighting the economic benefits to stakeholders of any updated surveillance methods;

7.4 Recommendations

Recommendation 9

Based on agreed priorities, DAFM should set up a working group to review what needs to be done to get optimum value in the area of animal health surveillance from its existing databases, particularly the LIMS, AIM, AHCS and AFIT systems. The working group should also develop procedures for making data available to relevant stakeholders.

Recommendation 10

Current systems for disseminating animal health surveillance information to stakeholders, including the general public and policy makers, should be reviewed and updated with a view to ensuring that the most appropriate methods are used and that newly developed technologies are fully utilised.

Recommendation 11

DAFM should continue to develop and maintain the national animal health surveillance website and ensure that it is kept up-to-date.

Recommendation 12

DAFM should continue to develop links with third level institutions with a view to ensuring that animal health surveillance is promoted among students.

Recommendation 13

DAFM should encourage the One Health concept by expanding links with other Departments and agencies involved in animal and human health surveillance and environmental sustainability.



Animal health surveillance is an important and necessary component to ensure optimal animal health and welfare in Ireland. This in turn is necessary to protect public health and to allow access to markets in other countries, upon which Irish agriculture is so dependent. The role of animal health surveillance is likely to further increase in importance in coming years. It has been given a central role in the recently-produced Animal Health Law which contains the principles upon which the EU animal health strategy will be based in the coming years.

Overall, animal health surveillance in Ireland is comprehensive and well organised. Active programmes are undertaken by a number of organisations, including DAFM, Animal Health Ireland and the Marine Institute, to deal with important endemic diseases. Systems and procedures are also in place to facilitate the reporting of new, re-emerging and exotic disease and chemical hazards. There is a good level of awareness among key stakeholders, particularly farmers and PVPs, in relation to exotic diseases and good support for the active programmes for endemic diseases. The necessary infrastructure is in place including laboratory facilities, animal identification systems, IT infrastructure, expertise for organising surveillance programmes, and good communication systems.

However, there are many areas where improvements could be made. In particular, there is a need for greater involvement of stakeholders in the decision-making process and, especially in setting priorities and in providing feedback on the management and operation of surveillance programmes. There is a need to maximise the value of the various sources of surveillance information, particularly those available from the DAFM databases. Considerable amounts of data are being stored in various databases but these are not being fully utilised. These different sources of information need to be integrated into a system that will identify new, re-emerging and exotic hazards in a timely manner. The DAFM laboratories, particularly the RVLS, play a key role. The physical infrastructure of the RVLS needs to be upgraded, the processes for scanning surveillance needs to be improved, and there is a need for better use of the expertise through specialisation. In general, there is a need for the development of quality control systems throughout the surveillance network. There is a need to further develop communication systems which will provide useful information to stakeholders, maximise stakeholder engagement, create awareness and the necessary trust that will result in early reporting of new, re-emerging and exotic diseases and allow full participation in disease control programmes. There is scope for improving the integration and communication of surveillance activities in line with the One Health concept.

The strategy set out in this document describes a vision and a set of goals that will assist Ireland in maintaining its position as a leading producer of high quality agricultural produce. It is hoped that it will focus on the role of animal health surveillance and provide impetus for its further development. It provides a strategic link between animal health surveillance activities and its future development as set out in FoodWise 2025. It identifies the main requirements needed to develop a high quality and fit-for-purpose animal health surveillance system and it contains specific key recommendations for bringing about those changes. Success will depend on all of the stakeholders working together effectively. DAFM can play a pivotal role in providing coordination and leadership. It is hoped that the more inclusive structure set out in this document will stimulate dialogue among stakeholders which may lead to more active engagement and cooperation. The strategy provides the framework upon which to coordinate animal health surveillance activities until 2021, but progress will be dependent on ongoing review of the actions required to operationalise recommendations, and sufficient resources to complete the work.

Implementation of these recommendations will result in a world class surveillance system which will serve Ireland well in ensuring optimal health and welfare for its animals, protection of public health, and continuing access to global markets.



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Appendices

Appendix I BSE in Ireland

Following the diagnosis of BSE for the first time in Ireland in 1989, a number of risk management and surveillance measures were introduced. In 1989 legislation was passed which made it compulsory for veterinary surgeons, farmers and all other persons in charge of bovine animals to notify DAFM if they saw an animal displaying clinical signs consistent with BSE. In 1990 a ban on the feeding of meat-and-bone meal to ruminant animals was introduced. In 1996 and 1997 the BSE control measures in place in Ireland were substantially reinforced following the identification of variant Creutzfeldt-Jakob disease in humans. Since that time a series of cumulative risk management measures have been in place, targeted at:

- (a) Disease surveillance and control measures (removing infected animals);
- (b) Exclusion of specified risk material (SRM) from human food and animal feed chains (removing from all animals, and destroying, the tissues shown to be capable of transmitting the BSE agent);
- (c) Preventing access to MBM by all ruminant animals

BSE surveillance in Ireland

Passive Surveillance

On-Farm

All veterinary surgeons and farmers who observe clinical signs consistent with BSE are obliged to report this to DAFM. When a report of an on-farm suspect animal is received, the animal is examined by a VI from an RVO. Any animal deemed to be an official BSE suspect is euthanised outside the food and feed chains, and the herd in question is immediately placed under official restriction and quarantined. The entire carcass is transported to a Regional Veterinary Laboratory, pending incineration. The brain is removed and dispatched to the TSE National Reference Laboratory in Backweston. Confirmatory testing is done by histopathology, immunohistochemistry and immunoblotting. All those tests are accredited to ISO-17025.

At Slaughter

In abattoirs, all animals are examined ante-mortem for signs of diseases, including BSE, by a veterinarian. If clinical signs consistent with BSE are noticed then the same steps are followed as described for clinical suspects on-farm.

If BSE is diagnosed, the entire carcase of the original animal is destroyed, and a full epidemiological investigation takes place on the farm of origin, including an examination of farm records. A detailed inspection of the farm is carried out to determine if any evidence of potential exposure to meat and bone meal can be found.

All cohort animals and progeny of the case animal are traced, using the DAFM's AHCS, to where they are currently located, then slaughtered in a dedicated slaughter plant where no meat for human consumption is produced, and their entire carcasses are destroyed. Cohort animals are those which would have shared the same farm(s) as the BSE positive animal when both animals were less than a year old, and therefore are at risk of having eaten the same contaminated feed

Active Surveillance

Under the active surveillance programme, all cattle that die on farm which are greater than 48 months of age are tested for BSE. Active surveillance in slaughter plants consists of BSE testing all casualty and emergency slaughter animals over 48 months of age. The targeted surveillance of all healthy slaughter animals over 30 months of age commenced in 2001. In January 2009 the age threshold was raised to 48 months of age. In July 2001, the age threshold was raised to 72 months. Testing of healthy slaughter animals was discontinued in March 2013 in Ireland (along with 15 other EU member states). If an animal is positive on screening and confirmatory testing then an epidemiological investigation is carried on-farm by DAFM.

BSE Controls

SRM is the tissue shown to be capable of transmitting BSE infection, including the brain and spinal cord (see next section). SRM from bovine animals is removed and destroyed at slaughter plants regardless of BSE status, and it is this step which ensures that infection is not transmitted through the food chain.

Exclusion of Specified Risk Material from human food and animal feed chains:

The following portions of animals are designated as SRM and are excluded from the human food and animal feed chains:

- (a) as regards bovine animals:
 - (i) The skull excluding the mandible and including the brain and eyes, and the spinal cord of bovines aged over 12 months;
 - (ii) the vertebral column excluding the vertebrae of the tail, the spinous and transverse processes of the cervical, thoracic and lumbar vertebrae and the median sacral crest and wings of the sacrum, but including the dorsal root ganglia, of bovines aged over 30 months; and
 - (iii) The tonsils, the intestines from the duodenum to the rectum and the mesentery of bovines of all ages. (The tonsils, the last 4 meters of the small intestine, the caecum and the mesentery is what is required under legislation but Ireland removes the entire intestines)
- (b) as regards ovine and caprine animals (sheep and goats)
 - (i) the skull including the brain and eyes, the tonsils and the spinal cord of animals aged over 12 months or which have a permanent incisor erupted through the gum,
 - (ii) The spleen and ileum of animals of all ages.

These materials are isolated on slaughter of the animals, permanently stained with Methylene Blue and removed directly to an approved category 1 rendering plant, where they are destroyed.

Effectiveness of BSE controls:

Clear evidence of the effectiveness of BSE controls is provided by the substantial decline in the prevalence of disease observed over the past decade. The incidence of BSE is expected to continue to decline, as animals born before the introduction of the additional controls in 1996 and 1997 leave the cattle population.

Table 1: BSE cases in Ireland

Year	Passive surveillance	Fallen Stock	Healthy Slaughter	Casualty Slaughter	BSE eradication	Totals
pre 2001	573	7	0	0	16	596
2001	123	81	34	4	4	246
2002	108	183	34	4	4	333
2003	40	106	31	4	1	182
2004	31	75	19	0	1	126
2005	9	47	12	1	0	69
2006	5	29	7	0	0	41
2007	4	15	6	0	0	25
2008	3	16	3	0	1	23
2009	0	5	4	0	0	9
2010	0	1	1	0	0	2
2011	0	3	0	0	0	3
2012	0	3	0	0	0	3
2013	0	1	0	0	0	1
2014	0	0	0	0	0	0
2015	0	1	0	0	0	1
Totals	896	573	151	13	27	1660

Last updated 01/01/2016

Since 2006, the majority of BSE cases have been diagnosed in animals that were over 12 years of age at the time of diagnosis. The underlying trend remains positive and the increasing age profile of animals confirmed with the disease indicates that the enhanced controls introduced in 1996 and early 1997 are proving effective.

OIE Certification:

In May 2008, the OIE (World Organisation for Animal Health or Office International des Epizooties) officially recognised Ireland as a country with a controlled risk for BSE in accordance with the provisions of Article 11.5.4 of the OIE Terrestrial Animal Health Code. This classification was re-affirmed in June 2015. This classification recognises that Ireland's regulatory controls are effective, and Irish beef can be safely traded internationally due to the interlocking safeguards described above.

Conclusion:

Policy with regard to the Irish beef sector is designed to ensure a high standard of public and animal health and to provide the strongest possible guarantees to customers and consumers. A comprehensive series of controls are in place for BSE. Those controls go beyond what is recommended by scientific evidence or by international organisations.

Ireland's cattle production is predominantly grass based and is based on a largely self-contained national herd. All beef comes from animals that are slaughtered in approved premises, which are subject to official veterinary supervision. The story of BSE in Ireland is a good example of how animal health surveillance contributed to the reduction and control of a disease that has severe economic and public health implications.



Appendix II Overview of International models of Surveillance Systems

Country	Management Authority	Sources	Surveillance	Role	Surveillance Goals	Initiatives
United Kingdom ¹	DEFRA (AHVLA) [Government]	VLA SVS SAC	Mandatory Voluntary Scanning Targeted	Statutory obligation to report notifiable disease. Co-ordinated capture of disease information Monitoring for unexpected or changed patterns of disease Surveillance of a specific disease in a relevant population	<ul style="list-style-type: none"> ■ Strengthen collaborations ■ Development risk assessment ■ Cost effective surveillance ■ Develop data sharing 	RADAR Farmfile
New Zealand ²	MAF Biosecurity New Zealand [Government]	Ministry for Primary Industries Primary production Industry sector Local government Research sector	Targeted Pathway Passive	Monitoring specific organisms in specified hosts/ regions e.g. Arbovirus programmes. Target surveillance at high risk sites e.g. targeted serological surveys Investigating disease notifications and monitoring trends e.g. Veterinary Diagnostic Laboratory Surveillance	<ul style="list-style-type: none"> ■ Prevent entry of harmful organisms from abroad ■ Reduce endemic disease v Inform and involve citizens in biosecurity 	VetPAD Disease Hotline Incursion Investigators
Australia ³	Animal Health Australia (AHA) [Public-private not-for profit company]	NAHIS AHA National Surveillance plan State and territory surveillance plan Veterinary Surveillance Network	Mandatory Targeted Passive Sentinel	Emergency Animal Disease Response Agreement -respond to, emergency animal disease incursions National Significant Disease Investigation Programs e.g. Arbovirus Monitoring Program Field surveillance of emerging, endemic and significant animal disease. Specific disease surveillance programmes	<ul style="list-style-type: none"> ■ Improve coordination ■ Secure resources ■ Disease preparedness ■ Maintain market access ■ Improve disease surveillance ■ Explore new opportunities ■ Improve AHA systems. 	BOSS system
Netherlands ⁴	GD Animal Health Services [Private company]	Vets, farmers and agricultural bodies CVI RIVM	Reactive Data Proactive Data	Data from farmers and veterinary practitioners e.g. Veterinary Monitoring Poultry Programme Information gathering to identify trends and new developments e.g. BVD and IBR prevalence studies	<p>Detecting outbreaks of known diseases</p> <ul style="list-style-type: none"> ■ Detect unknown diseases ■ Analyse trends 	National Cattle Health Surveillance Disease Hotline - GD 'Veekijker'

- 1 "A Review of the implementation of the Veterinary Surveillance Strategy (VSS)" Available: <http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/vetsurveillance/documents/vssreview-feb2011.pdf>
- 2 Biosecurity surveillance strategy 2020. MAF Biosecurity New Zealand, 2008.
- 3 Strategic Plan 2010-2015 'Working together for animal health' Animal Health Australia 2011 Available: <http://www.animalhealthaustralia.com.au/wp-content/uploads/2011/05/AHASstrategic-Plan-2010-2015.pdf>
- 4 "Monitoring & Surveillance in the Netherlands"GD Animal Health Available: <http://www.gdanimalhealth.com/about-us/monitoring>
- 5 Dufour, B., & La Vieille, S. (2000). Epidemiological surveillance of infectious diseases in France. *Veterinary research*, 31(2), 169-185.

Appendix III List of external stakeholders consulted in the preparation of the animal health surveillance strategy

- Animal Health Ireland (AHI) <http://animalhealthireland.ie/>
- Bord Bia www.bordbia.ie
- Cork County Council <http://www.corkcoco.ie/co/web/Global%20Nav/Home>
- Food Safety Authority of Ireland (FSAI) <https://www.fsai.ie/>
- Irish Cattle Breeding Federation (ICBF) <http://www.icbf.com/>
- Irish Creamery Milk Suppliers Association (ICMSA) <http://icmsa.ie/>
- Irish Equine Centre (IEC) <http://www.irishequinecentre.ie/>
- Irish Farmers Association (IFA) <http://www.ifa.ie/>
- Local Authority Veterinary Service (LAVS)
- Meat Industry Ireland (MII) <http://www.fdiie.ie/Sectors/FDII/FDII.nsf/vPages/Meat~meat-industry-ireland?OpenDocument>
- National Parks and Wildlife (NPWA) <http://www.npws.ie/>
- Sea-Fisheries Protection Authority (SFPA) <http://www.sfpa.ie/>
- Teagasc www.teagasc.ie
- The Irish Cattle and Sheep Farmers Association (ICSA) <https://icsaireland.ie/>
- The Marine Institute <http://www.marine.ie/Home/>
- University College Dublin School of Veterinary Medicine <http://www.ucd.ie/vetmed/>
- Veterinary Ireland <http://www.veterinaryireland.ie/>

Appendix IV Surveillance forum agenda April 28th 2016

**Animal Health Surveillance Forum
Backweston Campus
28th April 2016
Agenda**

9.30	Registration Chairperson: Paula Barry Walsh, DCVO	
10.00	Martin Blake Chief Veterinary Officer	Welcome
10.15	Aidan O' Driscoll Secretary General, Department of Agriculture, Food & Marine	Opening Address
10.30	Aidan Cotter CEO Bord Bia	Animal Health and Agrifood Exports
11.00	Coffee break	
11.20	Prof Dirk Pfeiffer Royal Vet College London	International Perspectives on Animal Health Surveillance
12.00	Prof Simon More UCD School of Veterinary Medicine	Challenges Facing Animal Health Surveillance in Ireland
12.30	Dr John Griffin SSVI SAT Division DAFM	Overview of National Animal Health Surveillance Strategy
13.00	Lunch	
14.00	Chairperson: Michael Sheridan Dr Donal Sammin Director of Laboratories DAFM	Role of DAFM Labs in Animal Health Surveillance
14.25	Prof Paddy Wall UCD School of Public Health	Importance of Animal Health Surveillance for Human Health
14.55	Joe O' Flaherty CEO Animal Health Ireland	A Partnership Approach to Animal Health Surveillance
15.20	Jarlath O' Connor SVI SAT Division DAFM	Introduction to Animal Surveillance Website
15.30	Coffee Break	
15.45	Prof Patrick Wall UCD School of Public Health	Open discussion
16.45	Martin Blake Chief Veterinary Officer	Wrap up
17.00	Close	

Appendix V Animal surveillance definitions and terminology

Definition of animal-health surveillance, monitoring, and different types of surveillance. (A complete list of the definitions of types of surveillance agreed in discussions at a workshop held prior to the ICAHS conference is included in the final workshop report, Hoinville, 2011.)

Type of surveillance	Definition
Early-warning surveillance	Surveillance of health indicators and diseases in defined populations to increase the likelihood of timely detection of undefined (new) or unexpected (exotic or re-emerging) threats. These are surveillance systems for the early detection of these threats.
Enhanced passive surveillance	Observer-initiated provision of animal-health data with active investigator involvement (e.g. by actively encouraging producers to report certain types of disease or by active follow up of suspect disease reports).
Monitoring	The systematic (continuous or repeated) measurement, collection, collation, analysis, and interpretation of animal-health and -welfare data in defined populations when these activities are not associated with a pre-defined risk-mitigation plan (although extreme changes are likely to lead to action).
Participatory surveillance	Participatory surveillance explores traditional information networks using participatory rural-appraisal methods (such as ranking, scoring, and visualisation techniques) to conduct risk-based, hazard-specific surveillance. The approach uses semi-structured interviews with key informants. This enables communities to provide their knowledge regarding health events, risks, impacts, and control opportunities by gathering qualitative health data from defined populations. The analysis of participatory data emphasises the comparison of information obtained from multiple informants; the method uses a variety of techniques to obtain the most likely interpretation of events. The objective is to enhance sensitivity by identifying cases based on a clinical case definition; these may then be evaluated and confirmed using either rapid tests in the field or laboratory diagnostics. Conventional epidemiological investigation techniques can be used to evaluate and confirm outbreaks detected by participatory surveillance as part of trace-back and trace-forwards activities.
Risk-based analysis	Use of prior or additional information about the probability of hazard occurrence ³ (including contextual information and prior likelihood of disease), to revise conclusions about disease status.
Risk-based prioritisation	Determining which hazards should be selected (for surveillance) based on information about the probability and the extent of (biologic and/or economic) consequences of their occurrence. ³
Risk-based requirement	Use of prior or additional information about the probability of hazard occurrence ³ to revise the surveillance intensity required to achieve the stated surveillance purpose.
Risk-based sampling	Designing a sampling strategy to reduce the cost or enhance the accuracy of surveillance by preferentially sampling strata (e.g. age groups or geographical areas) within the target population that are more likely to be exposed, affected, detected, become affected, transmit infection, or cause other consequences (e.g. large economic losses or trade restrictions).
Risk-based surveillance	Use of information about the probability of occurrence ³ and the magnitude of the (biological and/or economic) consequence of health hazards to plan, design, and/or interpret the results obtained from surveillance systems. Risk-based surveillance can include one or several of the following four approaches (defined above) Risk-based prioritisation Risk-based requirement Risk-based sampling Risk-based analysis
Surveillance	The systematic (continuous or repeated) measurement, collection, collation, analysis, interpretation, and timely dissemination of animal-health and -welfare data from defined populations. These data are essential for describing health-hazard occurrence ³ and to contribute to the planning, implementation, and evaluation of risk-mitigation actions.
Syndromic surveillance	Surveillance that uses health-related information (clinical signs or other data) that might precede (or may substitute for) formal diagnosis. This information may be used to indicate a sufficient probability of a change in the health of the population either to deserve further investigation or to enable a timely assessment of the impact of health threats which may require action. This type of surveillance is not usually focused on a particular hazard, so can be used to detect a variety of diseases or pathogens-including new (emerging) diseases. This type of surveillance is particularly applicable for early-warning surveillance.

³ The term 'occurrence' is used here to mean the prevalence or incidence of health hazard, whether prevalence or incidence is appropriate will depend on the purpose of the surveillance.

This table is taken from 'Proposed terms and concepts for describing and evaluating animal-health surveillance systems by L.J. Hoinville, L. Alban, J.A. Drewe, J.C. Gibbens, L. Gustafson, B., Häslér, C., Stärk C. Saegerman, M. Salman, K.D published in Preventive Veterinary Medicine: 112 (2013) 1– 12 (Table 1, page 4).

Appendix VI Animal health surveillance steering group and associated structures

Animal Health Surveillance Steering Group

Membership

Martin Blake CVO (Chairperson), Prof Simon More UCD, Micheál Casey (DAFM) and John Griffin (DAFM).

Role

- To develop policy in the area of animal health surveillance;
- To set up the necessary structures, including Working Groups, to implement the agreed policy;
- To monitor implementation in the area of animal health surveillance, including the approval of reports produced by Working Groups;
- To develop a strategic plan for animal health surveillance in Ireland and to direct the implementation of that plan including policy formulation and priority setting;
- To approve the animal health surveillance component of the annual work plan drawn up by Animal Health Surveillance, Animal By-Products and TSE (SAT) Division and to monitor progress in the implementation of that work plan;
- To ensure resources are provided as appropriate.

Where cross cutting issues arise, the Steering Group will refer issues to MAC through the CVO/ASG Laboratories.

Working Groups

Structure

Working Groups are established to address specific issues or undertake projects e.g. establish a website portal. Each Working Group is set up by the Steering Group following an application by a DAFM Division or on the initiative of the Steering Group itself. The application contains, at a minimum, a rationale for carrying out the work, clear Terms of Reference (TORs) and a deadline for completing the work. The Steering Group has the final say in relation to the TORs and deadlines.

Role

To address a specific issue relating to animal health surveillance within specific terms of reference and with a specified deadline. The output will normally be in the form of reports but could also include other types of outputs, e.g. websites. The Working Group should consult, as necessary, other relevant Divisions in relation to the specific task that they have been assigned to do

Membership

A Working Group should consist of people with suitable skills and expertise for the specific task being undertaken. It can have members from a range of divisions, including Surveillance Animal by Products and TSEs (SAT) Division, and from outside DAFM (e.g. CVERA). It is envisaged that SAT Division will coordinate the activities of each Working Group. Members of each working Group will be appointed by the Steering Group who would also designate a Chairperson.

SAT Division

Role

a) Participation in and support of Working Groups

b) Provision of scientific advice and evaluation of surveillance programmes

- To provide scientific advice on animal health surveillance programmes (including design where appropriate) to other DAFM Divisions involved in animal health surveillance activities. Decision support tools for the design of cost-effective, risk-based surveillance systems that integrate the most recent advances in epidemiological methods will be used, where appropriate;
- To carry out ongoing evaluation of surveillance programmes
- To produce information on animal health surveillance for the Steering Group and the CVO as required;

c) Prioritisation

- Provide advice to the Steering Group on the prioritisation of surveillance activities

d) Coordination

- To coordinate animal health surveillance activities at the national level with a view to ensuring that the various Divisions within DAFM and the Agencies outside of DAFM involved in animal health surveillance activities are working together effectively. Examples of coordinating activities could include facilitating the use of common sample material, facilitating the involvement of more than one Division/Agency in a particular surveillance programme;
- To facilitate the exchange of information with stakeholders and ensure that stakeholders have an input into the development of the strategic plan for animal health surveillance in Ireland;
- Provide an initial single contact point in relation to animal health surveillance. Responsibility for liaising on a specific animal health surveillance activity will be passed on to the relevant division/Agency dealing with that activity;

e) Horizon scanning

- To undertake horizon scanning for animal disease with a view to detecting emerging risks;

f) Communications in relation to Ireland's National Animal Health Surveillance Programme

- To prepare, maintain and update tools of communication in relation to Ireland's animal health surveillance programme

g) Education and Training

- Educate key players on the importance of surveillance, e.g. run a series of workshops for stakeholders on the issue of surveillance;

h) Participate in development of animal health surveillance policy and legislations and scientific methods at international level

- Promote adoption of scientific principles on animal health surveillance at international level and, in particular, at EU level.

It is not be the role of SAT Division to take responsibility for specific surveillance programmes or initiatives. Implementation, including related activities such as data compilation, analysis, presentation of results, and liaison with stakeholders for such programmes, will remain the responsibility of existing divisions of DAFM and outside agencies such as AHI, the IEC and the Marine Institute.

Appendix VII Examples of disease surveillance in other countries

I. Foot and Mouth Disease UK 2001:

The index case was detected during ante-mortem inspection of pigs at Cheale Meats, an abattoir in Little Warley, Essex, on the 19th of February 2001. On 23 February, a case was detected on a farm in Heddon-on-the-Wall, Northumberland, with the farm later confirmed as the source of the outbreak, and the owner was convicted of failing to inform the authorities of a notifiable disease, and of feeding his pigs with "untreated waste".

II. Foot and Mouth Disease UK 2007:

On the 29th of July 2007 a farmer in Normandy, Surrey, noticed one of his cattle was ill. By the 2nd of August several more animals were ill, lame and drooling. The farmer's PVP examined the animals and instructed the farmer to contact DEFRA. On the 3rd of August a DEFRA vet examined the animals and took samples. The samples tested positive for foot-and-mouth disease. The outbreak was later traced to a burst pipe in the drainage system of a facility shared by the Institute of Animal Health and a Pharmaceutical Company.

III. Classical Swine Fever Netherlands (CSF) 1997:

Atypical symptoms were observed among finishing pigs in mid-January 1997. Diagnosed as pneumonia by the PVP, an antibiotic treatment was prescribed. However, the treatment had no beneficial effect causing the practitioner to presume PRRS was the cause of the disease problems. Two finishing pigs (one dead, one alive) of 20 weeks of age were sent to the necropsy laboratory of the Animal Health Service in Boxtel on the 21st of January 1997. Examination did not indicate a suspicion of CSF; both pigs had a necrotising pleuropneumonia. As part of a routine surveillance system, tonsils from one of these pigs were sent to the CSF reference laboratory of the Institute for Animal Science and Health (ID-DLO) in Lelystad. The results were negative in the IFA. On 30 January, the practitioner visited the herd again but no conclusive diagnosis was reached. To support a further diagnosis, one dead finishing pig (18 weeks of age) was again sent for necropsy examination. At that point approximately 60 finishing pigs had died. The necropsy again revealed no sign of CSF. Two more pigs were sent for the necropsy on the 1st of February. Again in accordance with regulations, tonsils and tissue material from the spleen, ileum and the kidney were sent to the reference lab in Lelystad. The diagnostic results were not completely conclusive, because the material was autolysed. Five clinically sick animals from the suspect herd were euthanized on the 3rd of February. This material tested positive for CSF in the IFA on the 4th of February 1997. The source of the outbreak was presumed to be from a batch of pigs transported from Germany.

IV. Classical Swine fever UK 2000:

On August 4, 2000, a suspected case of CSF in a pig herd was reported to the British Ministry of Agriculture, Fisheries, and Food Animal Health Divisional Office in Suffolk. The pigs had been ill since July 11, when weaned pigs had been introduced from a breeding/multiplier unit. The infection had spread to four houses and as of August 4, a total of 1,110 pigs were ill and about 200 had died. A MAFF veterinary officer visited the premises the same day and, after examining the pigs on site, placed the holding under official movement restrictions and took blood samples to test the pigs for classical and African swine fever. On August 7, two cases of suspected classical swine fever were reported on other farms. One case was in a herd of rearing pigs. The second was in a breeding herd that had supplied weaned pigs to the other two infected farms. Both herds were immediately placed under quarantine and blood samples were sent for laboratory examination. An outbreak of classical swine fever was declared on August 8, 2000.

During the next few months, classical swine fever was found on several more farms. Before the first farm had been placed under quarantine, it had sent infected pigs to four other premises. The disease also spread to two contiguous outdoor pig farms. From one of those, classical swine fever spread to another contiguous holding and then, through the movement of pigs, to two additional premises. Two more outbreaks occurred in pig units owned by haulage operators. A total of 16 infected sites were confirmed in Great Britain between the 4th of August and the 3rd of November. The authorities were able to trace the initial outbreak back to the breeding farm. However the origin of the virus and its route of infection have never been confirmed. It has been postulated that a member of the public discarded a sandwich, containing illegally imported contaminated meat, into one of the outdoor pens of the farm.

V. Avian Influenza UK 2014:

An outbreak of avian influenza was confirmed in York in November 2014. The farm workers had noticed clinical signs about one week before the outbreak was confirmed, including a drop-off in egg production and slightly higher mortality rates. This alerted them to initiate some testing. Laboratory testing of poultry found dead on the farm was undertaken at the Central Veterinary laboratory in Weybridge, UK. The samples were shown to contain the highly pathogenic Asian strain of the H5N8 avian influenza.

VI. BSE UK 1986:

The first confirmed case of the disease was in 1986. A dairy farmer noticed one of his cows behaving in an abnormal manner. He contacted his local PVP. After several other cows began to display similar symptoms the PVP sent a carcass for necropsy at the Central Veterinary Lab. There pathologists noticed tiny vacuoles in the stained brain sample that were very similar to scrapie

VII. Equine Influenza Australia 2007:

On 24 August 2007, a veterinarian reported to NSW Department of Primary Industries that he had observed sick horses at Centennial Park in Sydney. The report followed an outbreak of equine influenza (EI) in Japan, the import of breeding stallions from Japan into quarantine and reports that some of these stallions at the Eastern Creek Quarantine Station were showing signs of EI. NSW Department of Primary Industries and Rural Lands Protection Board veterinary staff began an immediate investigation and later the same day, laboratory testing at the NSW DPI veterinary laboratory confirmed that the horses at Centennial Park were infected with EI. The outbreak was the most serious emergency animal disease Australia has experienced in recent history. At its peak, 47,000 horses were infected in NSW on 5,943 properties, and horse owners and industry workers were facing dark times with major impacts on their livelihood and lifestyle. The campaign led by NSW DPI to eradicate the disease was the largest of its type ever undertaken in Australia, using the latest laboratory, vaccine, surveillance, mapping and communication technologies. The disease was eradicated within six months well ahead of predictions and by July 2008 horse industry operations had returned to normal.



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