



Annual Report on Surveillance for  
Veterinary Residues in Food  
in the UK, 2002





## Establishment of the Committee

The Veterinary Residues Committee was established in January 2001 to ensure that there is independent scrutiny in the surveillance for veterinary residues in the UK. The Committee provide a source of advice for the Chief Executives of the Veterinary Medicines Directorate and Food Standards Agency on the residues surveillance programmes, and the significance of the results for consumer safety.

## Terms of Reference

The VRC's terms of reference are:

- to interpret and advise on the incidence and concentrations of residues of veterinary medicines in samples collected under the Veterinary Medicines Directorate and Food Standards Agency's surveillance programmes
- to assess and advise on the scope and operation of the Veterinary Medicines Directorate statutory surveillance programme within the context of the requirements of European Community legislation
- to advise, with particular reference to food safety, on the Veterinary Medicines Directorate non-statutory and ad-hoc Food Standards Agency residue surveillance programmes and consider the need for further analytical surveys
- to set up Subgroups as necessary to further the work and objectives of the VRC
- to publish results as they become available in the Veterinary Medicines Directorate's Quarterly Medicines Act Veterinary Information Service; to publish a Veterinary Residues Committee Annual Report on Veterinary Residue Surveillance, which will include detailed results in the context of food safety, to report annually to the Veterinary Products Committee and the Food Advisory Committee<sup>1</sup>.

## How can I comment on the work?

The VRC welcomes your comments. You can send them to the Committee either in writing or by e-mail to:

The Veterinary Residues Committee,  
Woodham Lane,  
New Haw,  
Addlestone,  
Surrey, KT15 3LS.

[secretariat@vet-residues-committee.gov.uk](mailto:secretariat@vet-residues-committee.gov.uk)

<sup>1</sup> After the Veterinary Residues Committee was established, the Food Advisory Committee was disbanded.



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# Contents

<b>Establishment of the Committee</b> . . . . .	<b>IFC</b>
<b>Chairman's Introduction</b> . . . . .	<b>3</b>
<b>Key Results and Actions Taken on Residues in the UK in 2002</b> . . . . .	<b>4</b>
<b>The Committee's Year</b> . . . . .	<b>8</b>
<b>Residues Surveillance</b> . . . . .	<b>11</b>
The National Surveillance Scheme . . . . .	11
The Non Statutory Surveillance Scheme . . . . .	14
Who is involved in the VMD's Surveillance for Veterinary Residues? . . . . .	19
<b>Explanation of the Significance of Veterinary Residues</b> . . . . .	<b>20</b>
Maximum Residue Limits (MRLs) and Action Levels . . . . .	20
The UK's Surveillance Schemes as part of the Regulatory Process for Veterinary Medicines . . . . .	22
What happens when a residue above the MRL or Action Level is discovered? . . . . .	24
The Risk Assessment Process . . . . .	25
<b>Results for 2002</b> . . . . .	<b>28</b>
UK National Surveillance Scheme – Residues above the MRL or Action Level . . . . .	28
National Surveillance Scheme – Significant Findings in UK-Produced Foods . . . . .	30
Non-Statutory Surveillance Scheme 2002 – Residues above the MRL or Action Level . . . . .	33
Results from the Retail Surveys in 2002 . . . . .	35
Non-Statutory Surveillance Scheme – Significant Findings . . . . .	36
<b>Work for the VRC in the Coming Year</b> . . . . .	<b>39</b>
<b>Appendix 1. Types of data assessed in setting an Acceptable Daily Intake</b> . . . . .	<b>40</b>
<b>Glossary</b> . . . . .	<b>41</b>
<b>Membership of the Veterinary Residues Committee</b> . . . . .	<b>44</b>
Membership of the VRC's Subgroups . . . . .	IBC



## Chairman's introduction



On behalf of the Veterinary Residues Committee (VRC) I am pleased to present our second Annual Report. The main role of the VRC is to assess the risk to consumers from any residue of an authorised veterinary medicine or of unauthorised or banned substances in the food we eat.

During the year an extra £300,000 was provided by the Government to enhance the work carried out under the Non-Statutory Surveillance Scheme. This money was used to develop the Committee's strategy of carefully targeted surveillance of specific residues in particular food sources. This selection of targets has been based particularly on the expert knowledge of VRC members of food production processes in the UK and elsewhere.

The Committee depends greatly on the support from both the VMD and the FSA and we very much appreciate the hard work and high level of commitment that they provide.

The results from samples of UK produce were broadly in line with last year's results with few residues of concern. These are discussed in the Report. As we anticipated, the change in surveillance strategy to a targeting of specific commodities in the Non-Statutory Scheme resulted in residues being detected in a larger number of food samples from non-EU countries.

Where such residues were detected, they tended to reflect inappropriate food production practices rather than an actual risk to consumer health. Nonetheless, in a few samples, residues were found that might be of potential concern to some individuals. The VRC will continue to target surveillance on imported produce from Non-EU countries in the coming year. The VRC is aware that more money is needed for the Non-Statutory Scheme if we are to provide comprehensive targeted surveillance of the potential problem areas we see as priorities.

The Committee is aware that a number of commercial and other organisations also conduct their own food surveillance programmes. We are seeking close collaboration with these organisations in order to achieve as comprehensive a picture as possible of detectable residues in the diet of UK consumers and the identification of areas where action is needed to make any improvements. So far the response to this request has been disappointing. The VRC intends to contact major retailers and others who have information on veterinary residues and invite them to contribute to our next report.

Further development of dialogue with our stakeholders is a second area where the VRC would like to see more progress. While the website and the new style of Annual Report have been well received, the Committee would welcome other ideas that would aid consumer understanding of the purpose of food residue monitoring and the interpretation of its findings.

We hope you will find this report both readable and informative. If you would like further information on the work of the Veterinary Residues Committee we will do our best to provide it.

Yours sincerely,

A handwritten signature in green ink, appearing to read 'Jim Bridges', is written over a light green background.

Professor Jim Bridges

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# Key Results and Actions Taken on Residues in the UK in 2002

## National Surveillance Scheme for UK produce

Overall, the results of the National Surveillance Scheme indicate that the UK authorised uses of Veterinary Medicinal Products did not result in residues of human health concern. However, the Committee considers the continued occurrences of feed additives, such as nicarbazin and lasalocid in poultry products unacceptable. While advice is that they are not a concern for human health, they could damage consumer confidence and the Committee is concerned that the poultry and feed industries should take all possible steps to eliminate the residues from poultry and eggs.

The number of samples with residues of Veterinary Medicinal Products at concentrations above the relevant Maximum Residue Limit (MRL) or Action Limit (see page 20 for explanation of these terms) increased from 75 in 2001 to 102 in 2002. This increase was caused partly by an increase in antibiotic residues detected – sulphonamides in pig kidneys and tetracyclines in turkey kidneys. A lowering of the trigger concentration for lasalocid in eggs also contributed (see page 21).

Some salbutamol residues were found, which further confirmatory work indicated was caused by the collecting officer using medication containing salbutamol prior to collecting the samples, rather than from an illegal treatment of the animals. Salbutamol is the active ingredient in some inhalers used to treat asthma. The VMD has informed the Meat Hygiene Service of the potential for contamination by sampling officers who use this type of medication. There was no risk to human health from the very low concentrations found in the samples.

The Committee has concerns about unauthorised substances being detected and inadequate medicines records. Adequate medicines records are essential if animals are not to be sent for slaughter before the end of the withdrawal period. The Committee welcomed the penalty imposed on a farmer whose animals had a gross violation of the MRL, and whose medicines records were found to be inadequate.

## Non-Statutory Surveillance Scheme

In the Non-Statutory Scheme, there was an increase from 43 to 217 in the number of analyses revealing residues above the relevant MRL or Action Level. Eighty-nine of the 'positives' were of environmental contaminants - an increase from 13 last year.

The results are not directly comparable with those from previous years. This is because a change was made to target particular foods where intelligence suggested the possible presence of residues of banned substances. The results from imported commodities, such as chicken, honey and warm water prawns, would tend to confirm that this strategy is justified. However, the Committee is still concerned that there are insufficient resources for intensive sampling for all the commodities and residues that it would be desirable to investigate.

Overall, the results of the National Surveillance Scheme indicate that the UK authorised uses of Veterinary Medicinal Products did not result in residues of human health concern.

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With honey, the imports are likely to be the output of several producers blended together. Where one or more producers have residues in their honey, the whole batch may be found to be contaminated, albeit at a lower concentration, which may seem to exaggerate the rate of abuse in the country of origin.

## Residues of potential concern

The residues detected of potential concern were:

### UK Produce

- malachite green and leucomalachite green residues in farmed fish
- carbadox residues in a sample of pig liver
- phenylbutazone residues in a sample of horse serum
- dimetridazole residues in quail eggs

### Imported produce

- chloramphenicol residues in honey, rabbit and warm water prawns
- malachite green and leucomalachite green residues in farmed fish
- nitrofurans residues in raw chicken and in warm water prawns.

### UK Produce

#### *Malachite green and leucomalachite green residues in farmed fish*

Malachite green has never been authorised as a veterinary medicine. Therefore, its safety and that of its metabolite leucomalachite green have never been established. The Committee has expressed its concerns over such residues. There is now an authorised veterinary medicine alternative, Pyceze, to protect the welfare of farmed fish.

The Committee endorses the announcement made by the Department for Environment, Food and Rural Affairs (Defra) in June 2002 that all use of malachite green in the food chain must stop. The Committee was also pleased that the fish farming industry bodies supported this. The Committee remains keen to see continued surveillance for any residues and would support prosecutions where there is sufficient evidence.


#### *Carbadox residues in pig liver*

Carbadox can be used to increase an animal's growth rate and has antimicrobial properties. However, it has been shown to cause cancer in laboratory animals and so is not permitted for use in food-producing animals. In the past there have been a number of cases of abuse of Carbadox, mainly in Northern Ireland. While there was only a single case this year, again in Northern Ireland, the Committee wishes to see continued surveillance for this residue and action taken where any residue is confirmed.

#### *Phenylbutazone residues in a horse*

Phenylbutazone can be used as a painkiller and an anti-inflammatory drug to treat joint problems in horses. It can, in rare cases, cause serious blood disorders in humans, such as aplastic anaemia. In the EU, it is not

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Defra is implementing the EU horse passport scheme in 2004. This will help ensure that horses entering the human food chain do not contain any unacceptable residues.

permitted for use in food-producing animals. In the UK, horses are not usually regarded as such; thus on welfare grounds, phenylbutazone is allowed for treating certain conditions in horses not intended for human consumption. If a horse has been treated with phenylbutazone it cannot legally be sent for human consumption.

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#### *Dimetridazole in quail eggs*

Dimetridazole is not permitted for use in quail in the UK. The EU's Committee on Veterinary Medicinal Products assesses the safety of veterinary medicines. It has previously expressed concerns over the possible mutagenicity of dimetridazole and requested extra data. In the absence of this, it recommended that dimetridazole should not be used for food-producing species.

On welfare grounds, the UK allowed use of dimetridazole for game birds, such as pheasant, based on a withdrawal period that eliminated any detectable residues. However, both last year and this year, there have been residues in quail eggs. These have been traced back to cross-contamination at the feed mill. During 2002, the product containing dimetridazole (Emtryl) was removed from the market. The VRC hopes that this will result in the elimination of such residues in the future. The Committee will continue to monitor the situation.

### **Imported produce**

#### *Chloramphenicol residues*

Chloramphenicol residues were detected in imported honey, warm water prawns and rabbit. This substance is banned in the EU for food producing animals. Chloramphenicol can, in very rare cases, cause aplastic anaemia, a very serious disorder. The VRC is concerned that all necessary actions continue to be taken. The Food Standards Agency was informed of the findings.

#### *Malachite green and leucomalachite green residues*

As detailed above, malachite green has not been fully evaluated for safety and it is not permitted for use in food producing animals in the European Union.

#### *Nitrofurans residues*

Nitrofurans residues were detected both in imported chicken and imported warm water prawns. In all cases, the Chief Veterinary Officer of Defra wrote to the authorities in the country concerned and asked for an investigation into the causes and for steps to be taken to prevent recurrence.

The nitrofurans residues indicate the use of veterinary medicines that are no longer permitted in the European Union for use in food producing animals. This is because of concerns about the possibility of an increased risk of cancer with long-term exposure. The Food Standards Agency published advice on its website that consumers should be reassured that any increased risk is negligible. This is based on the expected very low frequency of exposure to such residues, as well as the low concentrations found.

## Protective measures under Commission Decisions

An extra layer of protection is afforded to consumers via EU-wide measures introduced by the European Commission. These range from complete bans on certain products to compulsory testing of consignments of particular commodities from specific countries.

The Commission monitors the frequency and pattern of occurrence of unauthorised substances in specific commodities from third countries reported by Member States via the Rapid Alert system. The EU Food and Veterinary Office then investigate potential problems and measures can be introduced to protect consumers where necessary. Examples of such measures include a ban on the importation of a wide range of products of animal origin from China, introduced in 2002, and specific testing requirements for nitrofurans in poultry originating from Brazil and Thailand. Consignments testing positive under these measures are destroyed.



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## The Committee's Year

The full Committee met three times in 2002. As well as the VRC members and the Secretariat, provided by the VMD, a number of advisors have attended the meetings. The advisors, while not members of the VRC, were able to provide input to the Committee's discussions on a range of subjects. Organisations that provided advisors during the year were:

- Central Science Laboratory (CSL)
- Department of Agriculture and Rural Development of Northern Ireland (DARD)
- Food Standards Agency (FSA)
- State Veterinary Service (SVS) of Defra
- Veterinary Medicines Directorate (VMD).

The Committee addressed a number of issues during the year:

### Reviewing the results

At each of the three full VRC meetings, the Committee reviewed the latest results of the UK surveillance schemes and asked detailed questions of the advisors, requesting extra information where necessary on causes and follow-up actions. The Committee then advised the VMD and the FSA on the actions they may wish to take.

### Communicating the work of the Committee

The Committee has a Subgroup to oversee the communication of its work. The VRC wants people to understand the work of the Committee and the surveillance schemes. The Committee see it as crucial for the public to have confidence in the system that the information that they want is available in language that they understand.

In 2002, the Subgroup considered the VRC's 2001 Annual Report and the VRC website. For the Annual Report, the Subgroup considered draft text, to see if it was in the style it wanted and that it used straightforward language. The Subgroup also recommended that additional information to help consumers understand the regulatory process and the significance of any residues be included.

For the VRC website, the Subgroup recommended that a search function and a glossary be included and a 'Frequently Asked Questions' section be developed. An e-mail address, direct to the Secretariat, was included on the website to allow people to ask questions and comment on the Committee's work. This feature is now working and the Committee welcomes views on their work.

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## Planning the National Surveillance Scheme

VRC members have been actively involved in advising VMD on planning the surveillance programmes for 2003. In September 2002, two members attended the National Surveillance Scheme planning meeting to help finalise the 2003 plan. The VRC previously decided that the plan should not be publicised in detail, to prevent potential transgressors from changing to substances not included in the plan. The National Surveillance Scheme is described in detail on page 11.

## Review of the Non-Statutory Surveillance Scheme

A Subgroup has been considering the strategy and operation of the VMD's second and smaller surveillance scheme. This review is now complete and is reported in the section on the Non-Statutory Surveillance Scheme.

## Extra funding for the Non-Statutory Surveillance Scheme

The Committee was concerned about the VMD's Non-Statutory Surveillance Scheme in two respects: first that the scheme was seriously under-funded, and second that these funds were spread too thinly across the wide range of products that should be under surveillance.

The £750,000 allocated to the Non-Statutory Scheme has remained the same for a number of years and, in the Committee's opinion, falls far short of the sum required to undertake surveillance of imported and processed foods. The Committee, therefore, very much welcomed the £300,000 extra funding the Government made available to support the 2002 programme.

The Committee takes the view, however, that even such an increase in funding will not be enough to enable the surveillance of all the products every year. The Committee has, therefore, decided that the programme should be targeted to those substances that could pose the greatest risk to human health. This targeting should take into account, both the toxicological hazard, as well as the potential exposure, based on the types and amounts of foods eaten in the general population and the foods eaten by the most vulnerable groups in the population.

## Residues originating from Feed Additives (such as nicarbazin)

The Feed Additives Subgroup's purpose is to recommend strategies to reduce the residues of nicarbazin and lasalocid that sometimes occur in poultry products and in what should be unmedicated animal feed. The Subgroup did not formally meet in 2002. However, its members continued to lobby industry groups behind the scenes to spread 'best demonstrated practice'.

The FSA held a stakeholders meeting on 16 January 2002 on residues originating from certain animal feed additives. The VRC's Professor Jim Bridges chaired a session on informing stakeholders of the results of surveillance; Dr Paul Brantom chaired the session on a joint 'VRC and Industry Action Plan' to reduce residues in poultry and Dr Brian Vernon spoke to explain the plan. Mrs Dorothy Craig spoke on the VRC's views on the surveillance programmes and how to present results in the future.

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The Committee wishes to see the continued testing of both imported and domestically produced farmed fish for residues of malachite green and its metabolite, leucomalachite green.

The VRC's Dr Brian Vernon, with Dr Glenn Kennedy of DARD, also gave a paper at the Society of Feed Technologists to highlight the possible sources of residues.

### Malachite Green

In its 2001 report, the Committee expressed concern over the continued presence of leucomalachite green in farmed fish. This was because it is not authorised as a veterinary medicine, so its safety has not been established. In June 2002, Defra announced that use of malachite green must stop. The Committee welcomed this move, which was supported by fish farming industry associations. An alternative to malachite green, Pyceze, based on bronopol, received a provisional marketing authorisation for use on fish eggs in early 2002.

The Committee wishes to see the continued testing of both imported and domestically produced farmed fish for residues of malachite green and its metabolite, leucomalachite green. One reason was to check that the ban on the use of malachite green was being observed. But it was also important to monitor the concentrations of residues resulting from previous use. The Committee would support the VMD in bringing prosecutions where there is sufficient evidence of illegal use of malachite green.

# Residues Surveillance



## The National Surveillance Scheme

### How does the National Surveillance Scheme Work in Great Britain?

#### 1. The basis for the scheme is European Directive, 96/23/EC.

All EU Member States must carry out surveillance to see that their home-produced foods of animal origin are safe. In the UK, the National Surveillance Scheme covers: red meat, poultry meat, wild and farmed game, farmed fish, milk, honey and egg industries. Annexes to this Directive set down the number of samples that Member States must take in these industries, based on forecast production. The Directive also lays down broad parameters on the groups of substances to be sought.

#### 2. Planning the programme

The VMD get together interested parties in September to discuss the particular substances in each group to be included. The parties also discuss how many samples should be taken. Parties involved in considering the draft plan include:

- Veterinary Residues Committee
- Laboratory of the Government Chemist
- Food Standards Agency (FSA)
- Meat Hygiene Service (MHS) of the FSA
- State Veterinary Service (SVS)
- Department for Environment, Food and Rural Affairs
- Department of Agriculture and Rural Development (DARD) of Northern Ireland.

The VRC approved the plan for 2002 at the Committee's November 2001 meeting.

#### 3. The plan must be approved in Brussels

Officials from the European Commission (DG-SANCO) and all the Member States examine the plan in Residue Working Group meetings to ensure that it complies with Directive 96/23/EC.

#### 4. The VMD puts the plan into action

The plan is entered onto the 'Residues in Meat' (RIM) database. This is the key database that allows the VMD to track the progress of samples and have an audit trail to identify the producers. The database is used to generate individually numbered sample requests. This is done in a way so that all registered abattoirs should have some samples taken each year. Samples are also targeted by officers in the field and by specific requests from the VMD identifying producers who have had 'positives' in the past and/or where particular problems are suspected.

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A follow-up investigation is carried out into every sample with a residue above the relevant MRL or Action Level.

## **5. Samples are collected**

Authorised officers of the different government agencies collect the samples on behalf of the VMD (a full list of agencies is given on page 19). For example, the MHS have officers at all abattoirs for meat hygiene checks; they also devote a significant amount of time to take samples when requested, or if they have suspicions about an animal. Defra's SVS officers visit farms for collecting samples and inspecting medicines records and may also carry out other checks at the same time. So producers are not aware when a sample or samples are to be taken from their animals or premises. Each sample is secured with a tamper proof seal and labelled to allow it to be traced back to its origin. In 2002, some 32,500 samples were collected and 35,800 analyses performed.

## **6. What constitutes a sample?**

A sample will vary depending on the residue sought and species, also whether the sample is to be collected from live animals on farms or from abattoirs. It will often mean a portion of liver or kidney of an animal, but could involve collecting blood, urine, faeces or the retinas of animals. Usually, the sample is selected as the most sensitive for finding the particular residue.

## **7. Samples are sent to the laboratory**

The sealed samples are sent to the analytical laboratory, the Laboratory of the Government Chemist, where they are entered onto the computer system. This ensures that the progress of the samples can be monitored and there is an audit trail back to the producer. Samples are stored deep-frozen to avoid deterioration.

## **8. The samples are analysed**

The laboratory will normally perform a screening test to see if the particular residue or residues are present. If a potential residue is detected, the sample will then be subject to a confirmatory analysis to definitively identify the residue and usually measure the concentration. Similar samples are also usually analysed in batches, which can delay individual samples, but reduces the costs of analysis, by not having to set up the analytical equipment for single samples only.

## **9. The results are assessed**

The results are presented at the VRC meetings during the year. This allows members to comment and ask questions. VMD toxicologists can give a scientific opinion of the significance of any residues for human health. All the results that are above the relevant MRL or Action Level are also seen by the FSA.

## **10. Follow-up investigations**

A follow-up investigation is carried out into every sample with a residue above the relevant MRL or Action Level. This tries to find the cause of the residue and gives advice to the farmer to avoid residues in the future.

If there is suspicion that the farmer has used a banned substance, or if a particularly high concentration of an authorised medicine has been found, an Investigation Officer from Defra's Legal Department performs the visit. A veterinarian or Fish Health Officer may accompany them to give expert advice. Where there is sufficient evidence, a prosecution is considered.

## 11. Results are available to everyone

Papers to the Committee are published on the VRC website. You can also find the results in the VMD's quarterly 'MAVIS' newsletter and they are regularly updated on their website in 'MAVIS-on-line' and an annual summary of the results is available from both the VRC and VMD websites.

## Effect of Foot and Mouth Disease in 2002

The SVS resumed sampling for the National Surveillance Scheme in April 2002 following the outbreak in 2001. However, some officers were still working on the clear-up operation to ensure the disease had been eradicated. This resulted in a shortfall in red meat and poultry samples collected from farms. The Meat Hygiene Service was allocated extra samples to collect from slaughterhouses and made up the shortfall.

## Types of Substances Analysed for in the National Surveillance Scheme

Not all substance types were analysed for in every industry sector. For example, examining honey for substances that promote growth in beef cattle or pigs would not be sensible. Below is a table of the types of substances that were sought in the different sectors. Full details of the individual residues that were sought in each sector are listed on the VMD website.

**Table 1. Groups of substances that were looked for in the different industry sectors.**

Type of substance as listed in Directive 96/23/EC	Industry sector						
	Eggs	Farmed fish	Game	Honey	Milk	Poultry	Red meat
Hormones		X	X			X	X
Gestagens							X
$\beta$ -agonists			X			X	X
Annex IV substances	X	X	X		X	X	X
Antimicrobial screen <sup>†</sup>	X	X	X	X	X	X	X
Sulphonamides	X	X			X	X	X
Tetracyclines		X		X	X	X	X
Streptomycin				X			
Thiamphenicol						X	
Quinalones		X			X	X	
Anthelmintics	X	X	X		X	X	X
NSAIDS						X	X
Coccidiostats	X		X			X	X
Thyrostats			X			X	X
Dexamethazone/ Betamethazone							X
Carbadox*							X
Sedatives							X
Pesticides and PCBs	X	X	X	X	X	X	X
Heavy metals		X	X	X	X	X	X
Mycotoxins		X		X	X	X	X
Malachite/ Leucomalachite green		X					

<sup>†</sup> A general screening method to detect antimicrobial substances and supplemented by specific tests for sulphonamides, tetracyclines and streptomycin.

\* Carbadox is not specifically listed under Directive 96/23/EC. But because of concerns about possible use in the past, it is included in the UK's surveillance.



The Subgroup recommended that the Non-Statutory Scheme should concentrate on imported raw produce.

The Subgroup wanted a transparent system for prioritising sampling.

## The Non Statutory Surveillance Scheme

The Non-Statutory Scheme was set up to complement the National Surveillance Scheme. It did this by testing processed foods, such as sausages, bacon and pate, imported produce and some substances not covered in the National Surveillance Scheme. The foods covered in the scheme were originally based on the foods eaten by average consumers and also by susceptible groups (e.g. baby foods). This led to the scheme being wide-ranging, covering many commodities. This breadth caused difficulties with interpretation of the results, as the number of samples for individual commodities could be relatively low.

### Planning Subgroup review of the operation and scope of the scheme

#### Concentrate on imported raw produce

The Subgroup met twice in 2002, in September and November. It discussed changing the scope of the scheme to increase the number of samples taken for the foods analysed and residues sought. To do this the Subgroup recommended that the Non-Statutory Scheme should concentrate on imported raw produce. The reasoning for this was that:

- UK-produced foods are already sampled under the National Surveillance Scheme
- processed foods, such as sausages and burgers are made from raw meats
- samples previously allocated to sausages, bacon and ham could all be amalgamated to give a larger number of samples for imported raw pork
- intelligence from Europe was that there were problems associated with animal-based foods imported from some non-EU countries
- processed foods, such as baby foods, might only contain 10% meat, making detection of veterinary residues more difficult
- raw produce gives a better audit trail back to the country of origin and producer.

#### Prioritising foods and residues

The Subgroup wanted a transparent system for prioritising sampling. A number of criteria were discussed to help determine a prioritised list of foods and residues. What could be achieved within the budget could then be assessed.

The criteria decided by the Subgroup were:

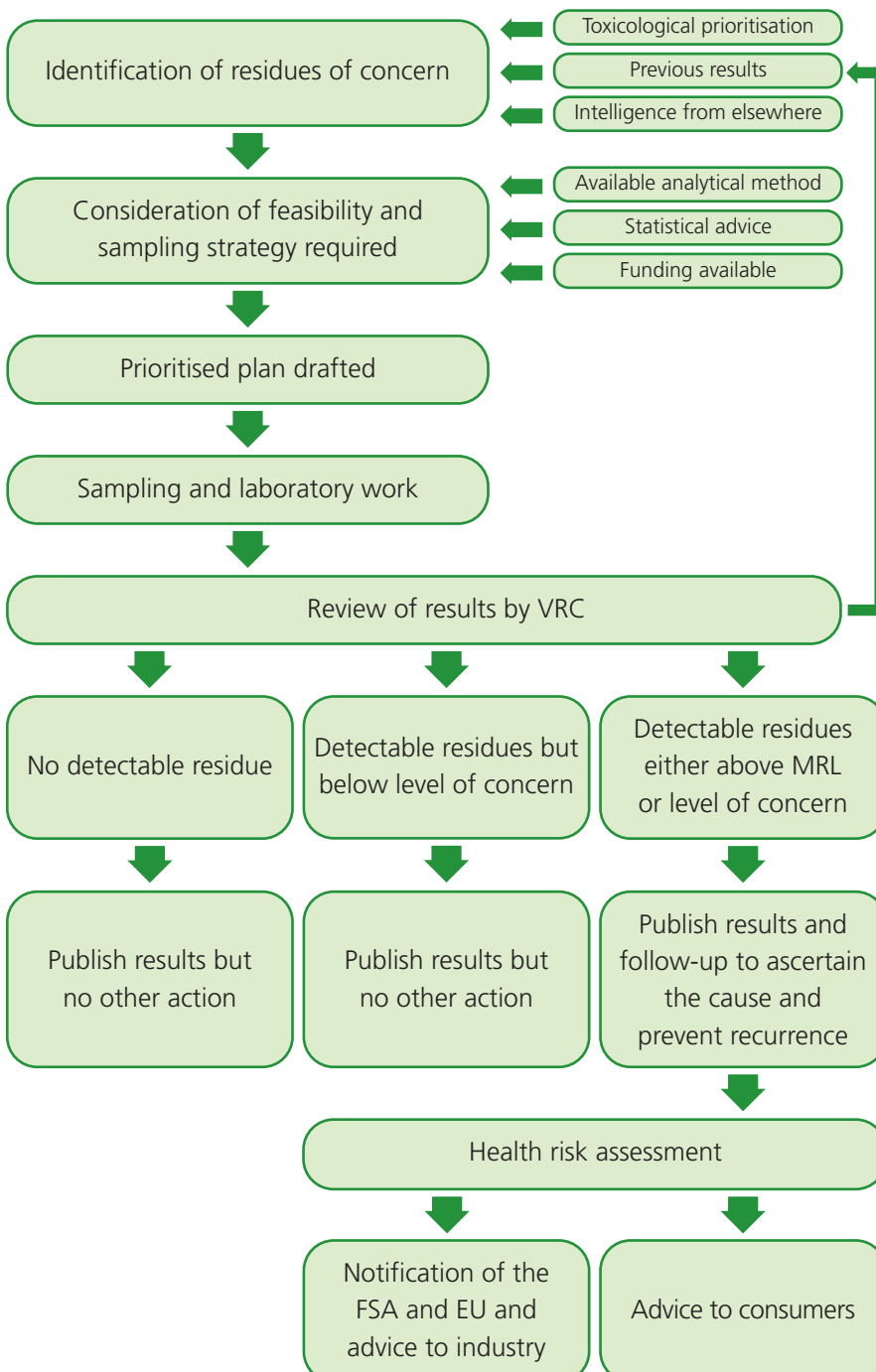
- toxicology of the residue (particular concerns being the nature of adverse effects and estimated margins of safety)
- importance of a food in the diet
- higher risk for a small proportion of the population
- extent of use of a particular veterinary medicine or growth promoter or knowledge of environmental contamination by a chemical of concern
- potential for residues, based on information on the likely persistence of the drug/promoter/contaminant

- findings from previous monitoring results
- other intelligence of likely residues (e.g. probability of significant illegal use and sourcing of imported materials).

The Subgroup has also taken expert statistical advice on the numbers of samples of particular foods to take. This was to see if statistical significance could be applied to the results. The Committee acknowledged that it would have to use a simplistic model to be able to apply statistics and also make assumptions about the distribution of any residues in the samples collected.

The approach of targeting surveillance was partially adopted for 2002 and will be more fully applied for 2003 onwards. A summary diagram and a fuller text description of how the Non-Statutory Scheme will now operate have been included to help explain the process.

### Outline of the Proposed Operation of the Non-Statutory Scheme



## Operation of the Non-Statutory Surveillance Scheme

### 1. Planning the year's programme

At a meeting of the full VRC, the possible foods and residues that could be included were compared against the criteria mentioned earlier, such as toxicological significance and importance in the diet. Taking account of the budget available, a prioritised plan of the foods to be analysed and the residues sought was agreed.

### 2. VMD puts the plan into action

The plan was loaded onto the Non-Statutory database. After consulting the Border Inspection Posts (BIPs) about the samples that they would be able to collect, each BIP was allocated a number of samples for each food and residue for the year, along with a monthly sampling schedule.

The VMD supplied Mintel, a market research company, with a monthly sampling schedule for the foods their 'shoppers' were to buy. They then divided this among 'shoppers' in different parts of the country.

### 3. Samples are collected

Port Health Officers collected the samples of imported foods at a small number of BIPs, such as at Tilbury Docks. The Port Health Officers also collected samples as part of testing programmes under the EU's Veterinary Checks Directive and specific Commission Decisions applied to countries whose produce was suspected of containing residues of substances banned in the EU. Care was taken not to duplicate the sampling under the Commission Decisions when implementing the Non-Statutory sampling. Mintel 'shoppers' collected samples from shops throughout the UK.

Both the Port Health Officers and Mintel staff worked to protocols that instruct them to collect information that would allow the VMD to identify the sample and, where possible, allow its origin to be traced.

### 4. What constitutes a sample?

This depended on what food is being sampled. For imported raw chicken collected at a Border Inspection Post, a sample was 250 g of muscle.

### 5. Samples are sent to the laboratory

Both Mintel and the Port Health Officers send the sealed samples to the Central Science Laboratory for delivery before 11.00 am the next day. On receipt, they were logged onto the computer system. This ensured that the progress of the samples could be monitored and there was an audit trail back to the producer or country of origin. The samples were stored deep-frozen to avoid deterioration.

### 6. The samples are analysed

The laboratory normally performed a screening test to see if the particular residue or residues were present. If they detected a residue, the sample would then be subject to a confirmatory analysis to definitively identify the residue and usually measure the concentration. Samples to be analysed for the same substance were batched, to reduce costs.

## 7. Results are assessed

In common with the National Surveillance Scheme, the Non-Statutory Scheme results were presented at the VRC meetings during the year. This allowed members to comment and ask questions on the results and assess their significance for consumers.

## 8. Follow-up investigations and issuing Rapid Alerts

The VMD told the retailer of any samples bought from their stores with residues above the relevant MRL or Action Level. The VMD also informed the Food Standards Agency (FSA). If the food concerned was imported, the Chief Veterinary Officer of Defra was informed. He wrote to his opposite number in the country concerned and asked them to investigate and report on the cause of the residue and steps taken to avoid recurrence.

If residues of health concern were detected – for instance of banned substances – the FSA could decide to ask local authorities to investigate. The FSA operate the EU's 'Rapid Alert System for Feed and Food' or RASFF in the UK. Under this system, all EU Member States are required to alert the European Commission when foods or feed containing residues of concern are discovered. The Commission can then inform other Member States. This would have happened in all the cases where chloramphenicol or nitrofurans residues were detected.

The Commission could consider what actions were appropriate as a result of RASFFs it received. This could have meant issuing a Commission Decision on extra testing of particular foods of animal origin entering the EU from a specified country. Consignments would then not be allowed to leave the port until samples were taken and analysis showed them not to contain such residues.

## 9. Results are available to everyone

In 2002, 1,194 samples were collected and 8,039 analyses were performed. The papers on the Non-Statutory Scheme updating the Committee on the results are, of course, put on the VRC website. You can also find the results in the VMD's quarterly 'MAVIS' newsletter and they are updated on their website in 'MAVIS-on-line' and an annual summary of the results is available from both the VRC and VMD websites.

## Foods analysed under the Non-Statutory Surveillance Scheme

### Rolling programme

Some foods, such as baby foods have been sampled every year, while others are sampled in some years and different foods are substituted in other years. Sampling was carried out over 9 months from April to December 2002. The foods originally included (see additional funds below) in the 2002 programme were:

- Baby food (chicken based)
- Baby food (lamb based)
- Baby food (pork based)
- Bacon – imported
- Raw beef – imported
- Raw chicken – imported
- Raw lamb – imported
- Raw pork – imported
- Raw turkey – imported
- Salmon – imported
- Trout – imported
- Warm fresh water prawns – imported
- Warm sea water prawns – imported
- Honey – imported
- Quail eggs – domestic
- Rabbit – imported.

Not all foods were analysed for all the substances in the scheme. On grounds of cost, the analyses carried out on a particular food were prioritised.

### Retail Surveys from additional funds allocated

After the plan for 2002 had been agreed, Defra, who pay for the scheme, allocated an extra £300,000 for the year. The Committee agreed to increase the sample numbers for some foods already included and to carry out Retail Surveys on particular foods where intelligence suggested the presence of residues. The surveys carried out were:

- domestically produced and imported farmed fish for malachite green and leucomalachite green
- honey for residues of chloramphenicol, sulphonamides and streptomycin
- breakfast cereals and cereal bars (which can contain up to 10% honey) for chloramphenicol
- imported shellfish for chloramphenicol and nitrofurans<sup>2</sup>.

<sup>2</sup> Commission Decisions require sampling of shellfish from certain countries. Shellfish from countries not covered by these decisions were targeted for the Non-Statutory Surveillance Scheme. This was to avoid duplicating the sampling effort.

Some foods, such as baby foods have been sampled every year, while others are sampled in some years and different foods are substituted in other years.

The Committee agreed to increase the sample numbers for some foods already included and to carry out Retail Surveys on particular foods where intelligence suggested the presence of residues.

## Who is involved in the VMD's Surveillance for Veterinary Residues?



The VMD operates the surveillance programmes and provides the Secretariat for the VRC, but many other organisations have a role:

- Border Inspection Posts (BIPs) – Port Health Officers at the BIPs collect samples of imported foods for the Non-Statutory Scheme
- Central Science Laboratory, York (CSL) – analyses samples collected under the Non-Statutory Scheme
- Centre for Environment, Fisheries and Aquaculture Science (CEFAS) of Defra – collects statutory samples and carries out follow-up investigations on fish farms in England and Wales
- Department for Agriculture and Rural Development (DARD) in Northern Ireland – collects and analyses samples for the National Surveillance Scheme in Northern Ireland on behalf of the VMD. DARD also carries out follow-up investigations in Northern Ireland
- Egg Marketing Inspectorates (EMIs) of Defra and Scottish Executive Environment and Rural Affairs Department – collect statutory samples of eggs from packing stations
- European Commission – in conjunction with the other Member States, examines and approves the National Surveillance Plans
- Fisheries Research Services (FRS) of the Scottish Executive – collect statutory samples and carry out follow-up investigations on fish farms in Scotland
- Food Standards Agency (FSA) – organises local authority investigations, operates the EU Rapid Alert system for the UK and its officials also attend VRC meetings as advisors
- Laboratory of the Government Chemist, Teddington (LGC) – analyses samples collected under the National Surveillance Scheme
- Legal Department of Defra – prepare the national legislation in GB covering the Statutory Surveillance Scheme and has an Investigations Branch to carry out investigations where prosecutions may be necessary
- Meat Hygiene Service (MHS) of the FSA – collects statutory samples from abattoirs, it also has powers to detain animals suspected to have been treated with unauthorised substances or contain residues above the Maximum Residue Limit
- Mintel, a market research company, was contracted to buy samples of foods from shops for the Non-Statutory Surveillance Scheme in 2002
- Royal Pharmaceutical Society (Great Britain) (RPS(GB)) – inspects feed mills that produce medicated feed
- State Veterinary Service (SVS) of Defra – collects statutory samples from stock farms in Great Britain, and carries out follow-up investigations for samples above the MRL or Action level collected from farms or abattoirs. Their staff also attend the VRC meetings as advisors.

# Explanation of the Significance of Veterinary Residues

## Maximum Residue Limits (MRLs) and Action Levels

These terms are used to describe concentrations of residues, which, if present or exceeded, trigger a follow-up investigation on the cause. Any residues above these concentrations will also be assessed for any potential health effects in consumers.

### **Maximum Residue Limit**

– when a medicine is submitted for authorisation, its active ingredient is evaluated for safety. In Europe, the Committee for Veterinary Medicinal Products (CVMP), part of the European Medicines Evaluation Agency, does this. It sets a concentration that it considers, having reviewed all the available evidence, will not represent a health risk to consumers. In doing this it will take account of all foods that might contain residues of the particular substance.

For some substances and foods there is no European MRL. For these there may be MRLs set by the Codex Alimentarius, if so, these are used to guide action on the UK residues programme.

*How the process works and fits into surveillance is described on page 22.*

### **Action Level**

– For many veterinary residues an MRL is not set or may not be relevant for a variety of reasons:

- substances banned from use in food-producing animals, such as growth promoting hormones
- analysis of tissues and substances not normally eaten, such as retina and urine
- substances in the surveillance scheme that are not veterinary medicines, such as mycotoxins and heavy metals
- feed additives, such as lasalocid and nicarbazin, which legislatively are not classed as veterinary medicines.

For such substances the Action Level is usually any confirmed residue. These are based on the limitations of the analytical methodology and may not necessarily imply health concerns if exceeded. Each case is examined individually.

### **Removal of the Differential Action Level (DAL)**

– In the last report there was an explanation of why a ‘DAL’ was introduced for residues from feed additives, such as nicarbazin and lasalocid. These substances are not authorised as veterinary medicines, but under different regulations as feed additives, which do not require MRLs (however, the Codex Alimentarius has set an MRL for nicarbazin in poultry liver of 200µg/kg). Where there is no MRL for a particular residue/tissue, normally every confirmed residue would have a follow-up investigation. The Advisory Group on Veterinary Residues, the forerunner to the VRC, discussed the issue and decided that, as the residues were not a threat to human health, not all ‘positives’ needed to be followed up. They set the ‘Differential Action Level’ allowing the VMD to prioritise its resources on any residues of these feed additives found at concentrations above 100 µg/kg, where an MRL was not set.

The Veterinary Residues Committee has taken a very active interest in reducing these residues since it was set up in 2001 and has recommended that **all** confirmed residues should be investigated. The Committee considers the extra information on the causes will help it to make recommendations on how to reduce the incidence and concentrations found.

**The Veterinary Residues Committee has taken a very active interest in reducing these residues since it was set up in 2001 and has recommended that all confirmed residues should be investigated.**

## The UK's Surveillance Schemes as part of the Regulatory Process for Veterinary Medicines

The UK's surveillance programmes are part of the regulatory process for veterinary medicines. The schemes are a check that veterinary medicines are being used as authorised and that any residues are at acceptable concentrations.

Understanding the regulatory process for veterinary medicines can help us put the results of surveillance in context. Central to the process is that the use of veterinary medicines should not result in any consumer exceeding the Acceptable Daily Intake, or ADI.

### Who Sets Maximum Residue Limits

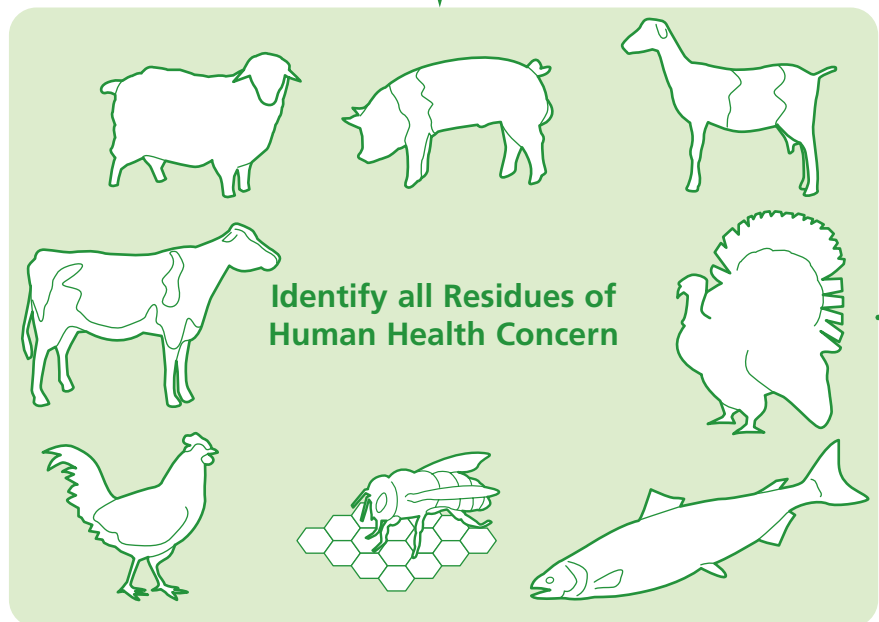
International Committees of scientific experts set MRLs.

In the European Union, the Committee for Veterinary Medicinal Products (CVMP) assess safety data to set MRLs. The CVMP is part of the European Medicines Evaluation Agency.

The Codex Alimentarius is an international Committee that also sets MRLs. It is advised by the Joint Expert Committee on Food Additives (JECFA) - a Committee of scientific experts jointly administered by the Food and Agriculture Organisation of the United Nations and the World Health Organisation.

### Set the Acceptable Daily Intake (ADI) for the Active Substance

the amount we could eat every day without harm



### Set Maximum Residue Limits for Edible Tissue

such that the ADI is not exceeded

### Set Withdrawal Periods for the Medicine

to make sure any residues are below the relevant MRL

### Analyse Samples of Foods

the UK's surveillance schemes check that MRLs are not exceeded – action is taken where they do

### Setting the Acceptable Daily Intake

International regulatory bodies assess data from a wide range of short and long-term studies. From these, they identify a concentration that had no adverse effect in any of the studies – the ‘No Observed Adverse Effect Level’ or NOAEL. This concentration is then divided by a safety factor, typically 100-1000, to allow for possible differences between species and individuals.

This concentration is the Acceptable Daily Intake, or ADI. This is the amount of a residue that is considered safe for a person to eat every day over a lifetime.

### Identify Residues of Human Health Concern

Different species of animals may be treated with a particular medicine. Also, each might convert the active substance in the medicine to other substances, called metabolites. The regulatory process takes account of this.

### Setting Maximum Residue Limits (MRLs)

The ADI is divided among all the edible tissues, taking account of:

- how much of a particular food may be eaten each day
- how much of the substance occurs in each food
- how much the substance is changed in the animal’s body
- other possible sources of residues, as some substances are also used as pesticides or human medicines.

MRLs are set so that even if **all** of the foods contain residues at the respective MRLs, the ADI will not be exceeded. In practice, residues are not found in most foods that are tested.

### Setting Withdrawal Periods

The amount of a medicine or its residue in an animal will deplete over time as it is metabolised and excreted. The length of time that must elapse after the end of treatment with a medicine before that animal is slaughtered, or animal product is taken, for human consumption is the Withdrawal Period. It is set for each veterinary medicinal product that contains the active substance so that the residues in each food will be below the relevant MRL.

### Analyse samples of foods – the VMD surveillance programmes

We have seen that the regulatory process sets conditions on the use of medicines. When these are followed, any residues will be at concentrations that are safe to eat every day over a lifetime.

The UK’s surveillance schemes check that any residues are indeed below the MRLs that the regulatory authorities have set. Where a residue at a concentration greater than the relevant MRL is found, the cause is investigated and further action taken where appropriate.

### Acceptable Daily Intake or ADI

– is an estimate of the amount of a substance, expressed on a body-weight basis, that can be ingested daily over a lifetime without appreciable health risk.

### Maximum Residue Limit or MRL

– is the maximum concentration of a residue that is legally permitted or acceptable in or on a food. It is expressed in µg/kg of that food. When determining MRLs, the ADI must not be exceeded after considering intake from all sources.

### No Observed Adverse Effect Level or NOAEL

– is the highest concentration of an active substance that was found to have had no adverse effect in a safety test.

### Veterinary Hypothetical Diet

– in setting MRLs, the amounts of particular foods in our diet are taken into account. The upper quantities of foods that we are assumed to eat are each day are:

- 100g liver
- 20g honey
- 300g muscle (muscle and skin for fish)
- 1.5 litres of milk
- 50g kidney
- 100g of egg
- 50g fat (fat and skin for pork and poultry)

### Withdrawal Period

– is the length of time after the end of treatment with a veterinary medicine that must pass so that any residues in edible tissues will have depleted to below the MRL. The CVMP or the particular national approvals authority can set these, which for the UK is the Veterinary Products Committee.

## What happens when a residue above the MRL or Action Level is discovered?

Where a residue above the MRL is found in the National Surveillance Scheme, the State Veterinary Service would normally send a Veterinary Officer (VO) to investigate the cause and to give advice to the farmer on how to avoid such residues. Among the things they look at are:

- the medicines records, to see if they are being kept appropriately
- what standard of husbandry is employed
- how was the medicine administered – by water, feed or injection etc
- were the withdrawal periods observed
- if administered by feed, where was this mixed
- how are the animals fed – on the floor or in troughs etc
- how is the feed stored – is there the opportunity for cross-contamination.

However, when a gross violation of the MRL or a residue of an unauthorised substance is detected, the case may be allocated to an Investigation Officer (IO) from Defra. Their role is to see if there is sufficient evidence for a prosecution to be considered. On the initial visit to a farm a VO or a fish health officer may accompany the IO to give technical advice.

In early 2002, a sample of pig kidney tested positive for sulphadimidine<sup>3</sup> at a concentration of 4,250 µg/kg. This concentration was many times the MRL of 100 µg/kg. Fortunately such high concentrations are only rarely found. Toxicological advice confirmed that although the MRL had been exceeded, a person would have to consume 700 g of such kidney to exceed the Acceptable Daily Intake for sulphadimidine residues – the amount a person could eat daily over a lifetime without any likelihood of harm. Even an extreme consumer of kidney would be unlikely to exceed this amount.

In this investigation they found inadequate records of the medicines that had been administered to the pigs. There was sufficient evidence for a prosecution. The case was heard in October 2002 at Shrewsbury Magistrates Court. The farmer pleaded guilty to offences under Regulations 32(1)(a), 23(1)(a) and 32(1)(d) of the *Animals and Animal Products (Examination for Residues and Maximum Residue Limits) Regulations 1997* – relating to the keeping of records on medicines administered to animals in his care. He was fined £2000, with £700 costs. This was reported in MAVIS editions 43-45.

The VRC welcome the seriousness with which the magistrates viewed this case. The Committee have in the past stated how important adequate medicines records are to avoid our food containing unacceptable residues.

<sup>3</sup> Sulphadimidine is an antimicrobial substance used in pigs to treat intestinal and respiratory infections.

## The Risk Assessment Process

In this report, residues found above the MRL or the relevant Action Level are listed. What does this mean in terms of any risk to consumers? Whenever such residues are found, their health significance to consumers is assessed using a process of 'Risk Assessment'. This consists of four stages:

### 1. Hazard identification

– identifying the toxicological, pharmacological and microbiological properties of drug residues that may be present in food of animal origin and might be capable of causing adverse health effects to consumers.

### 2. Hazard characterisation

– nearly all substances will cause harm if exposure is sufficiently high. So the amount of a residue that might cause adverse effects has to be determined. The information used is taken from a range of sources such as:

- any experience of exposure in humans, such as use as a human medicine
- studies in laboratory animals
- studies done *in vitro* (such as cell culture techniques).

Most effects have a threshold level and exposure to doses below this will not result in adverse effects. Using the most relevant 'No Observable Adverse Effect Level' (NOAEL) identified in these studies, an acceptable daily intake (ADI) can be determined by applying uncertainty factors to allow for differences in susceptibility between animals and humans, and between individuals. Additional uncertainty factors may be used depending on the nature and severity of the effect and the robustness of the data. Overall these uncertainty factors can typically be 100 – 1000 times. The types of data that might be assessed are given in Appendix 1.

### 3. Exposure assessment

– the surveillance schemes measure the concentrations of any residues of veterinary medicinal products and certain other substances in foods of animal origin. From these data and from estimates of how much of a particular food consumers may eat, how much of a residue consumers might be exposed to is calculated.

### 4. Risk characterisation

– by comparing the exposure and hazard information generated in stages 1 to 3, an estimate of the probability of adverse effects occurring and their severity in consumers exposed to the residue can be determined.

Stages 1 and 2 of this process are carried out before a substance is authorised for use in veterinary medicinal products as part of the regulatory process. However, the risk characterisation stage is repeated in response to the findings of the residues surveillance programmes, and may involve identifying alternative endpoints to the ADI especially if a residue exceeds statutory limits, or if the substance involved is not authorised as a medicine and has no ADI.

## Risk Assessment on an Ivermectin Residue in Cattle Liver

Using a real example can help us understand the process.

Ivermectin is used in humans to treat parasitic diseases and in cattle to control parasites, such as lice, lungworms and intestinal worms. The surveillance programme revealed a sample of cow's liver with residues of ivermectin at a concentration of 350 µg/kg. This exceeded the MRL for bovine liver of 100 µg/kg. The follow-up investigation by the State Veterinary Service had found that the animal had been injured in an accident and had been slaughtered on welfare grounds. This had happened before the end of the withdrawal period for the ivermectin, hence the residue above the MRL.

The carcass had been returned to the farmer for his own use. Although the meat had not been sold to the general public, it was eaten. In this case the Food Standards Agency (FSA) was asked to carry out a risk assessment.

### Hazard identification and Hazard characterisation

The ADI was established from the NOAEL for maternal neurotoxicity in a developmental toxicity study in the CF-1 strain of mouse. This strain lacks a particular protein that helps eliminate some foreign chemicals from the body, and allows them to accumulate in the brain. The dose that was assessed to show no adverse effect (NOAEL) was 100 µg/kg body weight (bw)/day.

The human toxicity studies had shown no evidence of developmental or neurotoxic effects and the CF-1 mouse is now considered to be overly sensitive to the effects of substances such as ivermectin compared to humans. From this JECFA decided that an uncertainty factor of 100 should be applied to the NOAEL, giving an Acceptable Daily Intake (ADI) of 1.0 µg/kg bw. The Codex Alimentarius and the EU's Committee for Veterinary Medicinal Products adopted this ADI.

### Exposure assessment

From the concentration of the ivermectin residues and the amount of liver that a person might eat, we can estimate the exposure to ivermectin residues a person might have had. An initial calculation was made to find the amount of liver containing 350 µg/kg of ivermectin a consumer would have to eat to reach an intake equal to the ADI. Assuming an adult of 60 kg, this suggested that 171 g of liver per day would be safe.

A standard diet, developed by JECFA, is used for MRL and exposure calculations. This assumes that a 60 kg person might eat 100 g of liver per day. But, we know that some people eat more liver than others, so the FSA looked at the National Dietary and Nutrition Survey (NDNS). This shows the amounts that more extreme consumers of liver might eat and the consumption figures for particular groups, such as toddlers.

The exposure to ivermectin was then calculated based on:

- the quantity of liver eaten by the 2.5% of consumers who on average eat the most liver on a day-to-day basis (long-term high level)
- how much liver a high level consumer might eat on a one-off basis (one-off high level)
- the quantities that toddlers might eat either one-off or long-term.

The NDNS estimates that the average weight of adults is 70.1 kg and of toddlers is 14.5 kg.

**Table 2 Amounts of liver eaten and exposure to ivermectin residues (based on residues in liver of 350 µg/kg)**

Diet	Basis	Liver Portion (g)	Exposure (µg)	Exposure (µg/kg bw/day)
<b>JECFA</b>	Standard	100	35	0.58
<b>NDNS</b>	Adult long-term high level	39.9	13.96	0.20
<b>NDNS</b>	Adult one-off high level	206	72.1	1.02
<b>NDNS</b>	Toddler long-term high level	41.5	14.5	1.00
<b>NDNS</b>	Toddler one-off high level	96.9	33.9	2.33

Both the JECFA and NDNS data indicate that the exposure of adults was either very close or below the ADI of 1.0 µg/kg bw. The long-term high level figure for toddlers was also at the ADI. As the ADI represents the amount of a residue that can be eaten each day without appreciable risk, the FSA concluded that these groups would be unlikely to suffer any adverse health effects.

The data do show that for toddlers, the most extreme eaters of liver might be exposed to a one-off dose above the ADI. The FSA concluded that they would not wish to see a situation where consumers would be exposed to such concentrations of ivermectin over a prolonged period. However, the safety margins built into the ADI assessment were such, that as the contaminated liver would be consumed over a relatively short period the exposure was judged to be acceptable.

## Results for 2002

### UK National Surveillance Scheme – Residues above the MRL or Action Level

Sample	Analysed for	Number of samples analysed	MRL where set (µg/kg)	Samples above the MRL/ Action Level	Concentration detected where samples were above MRL/Action Level (µg/kg)
Eggs	Lasalocid	255	Not set	18	40, 50, 52, 60, 70, 70, 80, 80, 110, 110, 120, 120, 150, 160, 230, 350, 560, 620
Honey	Streptomycin	20	Not set	1	82
Honey	Tetracyclines Tetracycline oxytetracycline	20	Not set	1	73 37
Salmon muscle	Leucomalachite green	74	Not set	14 <sup>a</sup>	2, 2, 3, 3, 3, 4, 4, 5, 6, 9, 10, 10, 14, 35
Trout muscle	Malachite green	67	Not set	1	12 <sup>b</sup>
	Leucomalachite green	67	Not set	2	2, 460 <sup>b</sup>
Broiler liver	Salbutamol	430	Not set	3 <sup>c</sup>	0.1, 0.5, 0.7
Broiler liver	Monensin	335	Not set	5	1, 2.5, 3, 4, 5
Broiler liver	Lasalocid	312	Not set	2	80, 100
Broiler liver	Nicarbazin	353	200	32	210, 220, 220, 230, 240, 250, 300, 320, 340, 370, 430, 490, 500, 550, 570, 610, 610, 650, 670, 670, 740, 770, 1,000, 1,030, 1,090, 1,300, 1,700, 2,050, 2430, 2,470, 2,590, 2,610
Turkey liver	Salbutamol	94	Not set	1 <sup>c</sup>	0.7
Turkey kidney	Chlortetracycline	609	600	26	640, 650, 660, 660, 680, 690, 700, 710, 720, 750, 750, 820, 820, 850, 850, 860, 960, 1,000, 1,200, 1,300, 1300, 1300, 1,400, 1,500, 1,600, 1,700
Turkey kidney	Sulphonamides	71	100	1	180
Hen liver	Cadmium	11	500	2	650, 670,
Duck liver	Lead	5	500	1	1,130
Cattle bile	Nortestosterone	202	Not set	6	0.5, 0.5, 0.6, 0.8, 0.9, 1
Cattle urine	Nortestosterone	25	Not set	3	2.3, 15, 20
Cattle serum	Progesterone	360	Not set	8	0.8, 0.8, 0.8, 1, 1, 1, 2, 2
Cattle serum	Testosterone	195	Not set	1	7
Cattle urine	Zeranol	60	Not set	2	0.3, 0.38
Cattle bile	Zeranol	178	Not set	1	4
Cattle liver	Salbutamol	627	Not set	1 <sup>c</sup>	0.05
Cattle liver	Doramectin	275	100	1	130
Pig kidney	Chlortetracycline	1,016	600	5	670, 710, 770, 860, 930
Pig kidney	Sulphonamides	1,115	100	7	110, 110, 120, 160, 520, 670, 4,250
Pig liver	Carbadox (QCA)	94	Not set	1	11.9

Sample	Analysed for	Number of samples analysed	MRL where set (µg/kg)	Samples above the MRL/ Action Level	Concentration detected where samples were above MRL/Action Level (µg/kg)
Sheep kidney	Tetracyclines	3,424	600	1	1,060 chlortetracycline
Sheep liver	Monensin	410	Not set	1	56
Sheep liver	Ivermectin	441	15	1	60
Sheep liver	Benzimidazoles	524	500 (fenbendazole & oxfendazole)	1	4,910 total residues of fenbendazole and oxfendazole
Sheep kidney	Cadmium	12	1,000	2	1,400, 2,200
Sheep kidney	Lead	12	500	2	720, 1,280
Horse plasma	Phenylbutazone	50	Not set	1	>50 <sup>d</sup>
Horse kidney	Cadmium	7	No limit set for offal	7	6,600, 7,050, 7,680, 7,900, 10,700, 10,900, 19,300
Partridge muscle	Lead	20	10,000	2	50,000, 83,000

**Key:**

- a = two of the samples were from a follow-up investigation on a farm where a positive sample had previously been collected.
- b = one sample contained both malachite green and leucomalachite green residues.
- c = the salbutamol residue was confirmed to be contamination prior to analysis, rather than illegal use (see page 4).
- d = Phenylbutazone was confirmed as present above the limit of detection of 50 µg/kg, but the actual concentration could not be established.

## National Surveillance Scheme – Significant Findings in UK-Produced Foods

A total of 168 of the some 35,800 analyses revealed a residue above the relevant MRL or Action Level. Some of these, such as cadmium, leucomalachite green and organochlorines are not authorised veterinary medicinal products (VMPs). Overall, it is likely that 102 of these 'positives' resulted from the use of VMPs. The significance of the residues for human health is reported in the Key Results and Actions section at the start of this report.

Residues of unauthorised substances were found. Malachite green was detected in one sample and leucomalachite green was also detected in samples of farmed fish. Also, a pig liver sample was found to contain residues of Carbadox, a substance not allowed for food-producing animals in the EU (see Key Results and Actions).

Residues of streptomycin and very low concentrations of tetracyclines have been found in honey samples; these substances are not authorised for use in bees. Previous advice has been that the streptomycin and tetracycline residues do not pose a threat to human health.

### Eggs

- Residues of lasalocid were found in 18 of 255 (7.1%) egg samples tested.

### Farmed Fish

- No PCBs were detected in samples of UK farmed fish.
- Malachite green residues were found in 1 of 67 trout muscle samples tested. Leucomalachite green residues were found 2 of 67 trout muscle samples tested (one of which also contained malachite green residues). Follow-up sampling on one of the farms found no evidence of the use of malachite green. At the other farm, however, further samples of fish were found to contain residues of malachite green. A restriction order stopping the fish entering the food chain has been served. Defra's Legal department are investigating (see Key Results and Actions).
- Leucomalachite green residues were found in 14 of 74 salmon muscle samples tested. Follow-up investigations concluded that these residues were most likely to have resulted from exposure to malachite green before the fish farming industry was advised in June 2002 that the use of this substance must stop (see Key Results and Actions).

### Game

- No residues of veterinary medicines were detected at concentrations above the relevant MRLs or Action Levels.
- Residues of lead above the MRL were detected in 2 of 20 samples of partridge muscle tested. These were at concentrations of 50,000 and 83,000 µg/kg and were likely to have been caused by contamination of the sample from lead shot.

At the other farm, however, further samples of fish were found to contain residues of malachite green. A restriction order stopping the fish entering the food chain has been served.

## Honey

- Streptomycin residues were found in 1 of 20 honey samples tested at a concentration of 82 µg/kg. Two samples taken during a follow-up investigation were negative. The beekeeper may have bought in honey from other producers and sampling from these has taken place.
- Tetracycline and oxytetracycline residues were found in 1 of 20 honey samples tested at concentrations of 73 and 37 µg/kg respectively. Extra samples have been taken and Defra is investigating these cases.

## Horse meat

- Phenylbutazone residues were confirmed in 1 of 50 samples of horse plasma tested. Phenylbutazone is not permitted for food-producing animals in the EU (see Key Results and Actions). In the follow-up investigation it was suggested that the horse had inadvertently been allowed access to treated food prepared for a pony that was the intended recipient. The horse subsequently went for slaughter for human consumption.
- All seven samples of horse kidney tested contained residues of cadmium above 6000 µg/kg. Horse kidney is removed from the carcass and does not enter the human food chain.

## Milk

- No residues of veterinary medicines above the relevant MRLs or Action Levels were detected.

## Poultry meat

- Salbutamol residues were found in 3 of 430 (0.7%) broiler samples tested and 1 of 94 samples of turkey kidney tested. Salbutamol is the active ingredient in a number of inhalers used by people with asthma. Further confirmatory analysis indicates that the residue was caused by contamination of the sample before analysis, rather than illegal abuse (see page 4).
- Monensin residues were found in 5 of 335 (1.5%) samples of broiler liver tested.
- Chlortetracycline residues above the MRL were detected in 26 of 609 (4.3%) of turkey kidney samples tested.
- Nicarbazine residues above the MRL of 200 µg/kg were found in 32 of 353 (9.1%) samples of broiler liver. State Veterinary Service investigations have found cross-contamination of unmedicated feed from using a single feed bin system was the most likely cause in 13 of the cases. In other cases, contamination at the mill, delivering medicated feed to the wrong storage bin and using feed from another farm were found to be likely causes.

## Red Meat

- Low concentrations of the natural hormones progesterone, testosterone and nortestosterone were found in samples from cattle. The concentrations of these natural hormones will vary according to the animal's age and physiological state. No evidence of abuse was found on the farms during visits by the State Veterinary Service and the Department of Agriculture and Rural Development.
- Zeranol residues were detected in 2 of 60 urine and 1 of 178 (0.56%) bile samples from cattle. Follow-up investigations found no evidence of abuse on the farms. The samples were found to contain the fungal metabolite  $\alpha$ -zeralenol. Some strains of fusarium moulds can produce zeranol. From the findings of the investigations, fungal contamination of the feed was concluded to be the cause.
- Salbutamol residues were found in 1 of 627 (0.16%) samples of cattle liver tested. Salbutamol is the active ingredient in a number of inhalers used by people with asthma. Further confirmatory analysis indicates that the residue was caused by contamination of the sample before analysis, rather than illegal abuse (see page 4).
- Carbadox residues (QCA) were found in 1 of 94 pig liver samples tested. An investigation was carried out into this case. The farmer had bought in piglets and considered that these might be the source of the residue. Feed samples were taken from the holding, all tested negative for Carbadox. Further tracing and investigation into the source of these pigs is on-going. Carbadox is not permitted for use in food-producing animals in the UK, because of health concerns (see Key Results and Actions).
- Sulphonamide residues above the MRL were found in 7 of 1,115 (0.63%) of pig kidney samples. One of the samples was at a concentration of 4,250  $\mu\text{g}/\text{kg}$ . Toxicological advice confirmed that this did not pose a threat to human health; however, it was gross violation. Following an investigation by Defra, the farmer was prosecuted for failure to keep adequate medicines records (see page 24).
- Benzimidazole residues above the MRL were found in 1 of 524 (0.19%) samples of sheep kidney tested. This was at a concentration of 4,910  $\mu\text{g}/\text{kg}$ . This animal had been bought at a market and sent direct to slaughter. It was not possible to trace the farm of origin.

# Non-Statutory Surveillance Scheme 2002 – Residues above the MRL or Action Level



## Results from the Rolling Non-Statutory Programme

Food	Analysed for	Number of samples analysed	MRL where set (µg/kg)	Samples above the MRL/ Action Level	Concentration detected where samples were above MRL/Action Level (µg/kg)
Imported chicken	<b>Nitrofurans</b> AOZ AMOZ SC	176	Not set	4	0.8 <sup>c</sup> , 1.2 <sup>c</sup> 1.5, 140 1.3 <sup>c</sup> , 1.7 <sup>c</sup>
Imported honey	Coumafos (organophosphate)	105	100	1	102
	Streptomycin	105	Not set	26	23, 24, 26, 26, 28, 28, 28, 34, 38, 39, 41, 42, 42, 45, 48, 51, 55, 59, 71, 73, 110, 110, 120, 200, 290, 380
	Chloramphenicol	105	Not set	1	0.2 <sup>a b</sup>
	Sulphonamides (antimicrobial screen)	105	Not set	2	44, 11000 <sup>a</sup>
	Cadmium	105	Not set	1	45
Quail eggs	Dimetridazole	40	Not set	6	3 <sup>e</sup> , 5, 5 <sup>h</sup> , 6, 41 <sup>g</sup>
	2-hydroxy dimetridazole				7, 7 <sup>h</sup> , 8 <sup>e</sup> , 11, 13, 88 <sup>g</sup>
	Nicarbazine	40	Not set	14	20, 25 <sup>f</sup> , 25, 40 <sup>e</sup> , 50, 80, 95 <sup>e</sup> , 95 <sup>f</sup> , 120 <sup>f</sup> , 130, 280, 380 <sup>f</sup> , 430 <sup>g</sup> , 490
	Lasalocid	40	Not set	6	41 <sup>f</sup> , 92 <sup>f</sup> , 130 <sup>g</sup> , 430 <sup>f</sup> , 450 <sup>h</sup> , 520 <sup>f</sup>
	Sulphadimethoxine	40	Not set	1	320
Imported rabbit	Chloramphenicol	37	Not set	3	0.2 <sup>b</sup> , 0.2 <sup>b</sup> , 2.9
	Sulphadimethoxine	37	100	2	132, 370
Imported salmon	Leucomalachite green	11	Not set	3	4, 8, 18
	<b>Organochlorines</b> p,p'DDE p,p'DDT p,p'TDE Dieldrin HCB Cis-chlordane	31	Not set	11	2, 4, 18, 28, 30, 36, 53, 54, 65, 78 13, 14, 20, 26, 32 12, 17, 19, 23, 26 18, 24, 25, 26, 29, 33 12, 12, 15, 17, 20 11, 13, 14, 20, 21
	<b>ICES 7 group of PCBs</b> PCB52 PCB101 PCB118 PCB138  PCB153  PCB180	31	Not set	12	10, 11, 12, 13, 16, 10, 11, 13, 17, 17, 22, 24, 24, 26 12, 13, 13, 17, 17 10, 10, 12, 12, 14, 15, 18, 24, 29, 39, 42, 42 10, 10, 12, 13, 16, 18, 20, 29, 29, 40, 43, 44 11, 12, 12
Imported trout	Sulphonamides	32	100	1	1,800

## Results from the Rolling Non-Statutory Programme – continued

Food	Analysed for	Number of samples analysed	MRL where set (µg/kg)	Samples above the MRL/ Action Level	Concentration detected where samples were above MRL/Action Level (µg/kg)
Imported trout	<b>Organochlorines</b> p,p'DDE  p,p'DDT p,p'TDE Cis-chlordane HCB Dieldrin	20	Not set	17	2, 2, 3, 4, 5, 5, 5, 5, 46, 56, 59, 60, 95, 101, 163 3, 4, 8, 10, 12, 13, 14, 17 2, 2, 18, 22, 24, 25 11, 17, 23 2, 2, 2, 12, 15, 20, 25 3, 4, 5, 38, 45, 59
	<b>ICES 7 group of PCBs</b> PCB52 PCB101  PCB118  PCB138  PCB153	20	Not set	20	10, 11, 11, 12, 12, 13 12, 12, 12 13, 13, 13, 14, 15, 16, 18, 19, 20, 20, 20, 21, 22, 22, 24 11, 11, 11, 12, 12, 12, 12, 13, 14, 15, 16, 16, 17, 17, 18, 20, 20, 20 16, 17, 21, 23, 24, 25, 26, 26, 26, 27, 30, 33, 35, 36, 36, 40, 41, 44, 46, 48 16, 18, 21, 23, 24, 25, 26, 27, 27, 28, 34, 36, 36, 36, 37, 40, 43, 45, 47
Warm water prawns	<b>Nitrofurans</b> AOZ  AMOZ SC	113	Not set	15	0.3, 0.8 <sup>c</sup> , 0.85, 1.1, 1.5, 2.4, 2.4 <sup>d</sup> , 17, 23 <sup>c</sup> 0.5 <sup>d</sup> , 2.7 1.4 <sup>c</sup> , 2.4, 3.1, 4.0 <sup>c</sup> , 5.6, 6.2, 6.6
	Chloramphenicol	113	Not set	1	0.8
	<b>ICES 7 group of PCBs</b> PCB28 PCB52 PCB101 PCB118  PCB138  PCB 153  PCB180	93	Not set	28	13, 13, 32, 48 35 12, 12, 13, 48, 48, 88 10, 11, 12, 12, 13, 16, 17, 23, 32, 34, 124 10, 11, 11, 12, 12, 12, 13, 13, 13, 15, 15, 20, 20, 28, 30, 43, 46, 50, 58, 87 10, 10, 10, 10, 11, 11, 12, 12, 12, 12, 13, 14, 15, 15, 15, 16, 21, 23, 31, 34, 44, 50, 56, 56, 75 10, 12, 12, 14, 19, 31, 32

### Key:

- a = Residues of both chloramphenicol and a sulphonamide were detected in one sample of imported honey.
- b = identity confirmed by LC-MS/MS, the concentration is indicative of presence only.
- c = Residues of both 3-amino-2-oxazolidone (AOZ) and semicarbazide hydrochloride (SC) were detected in 2 samples of warm water prawns and also in 2 samples of imported chicken.
- d = Residues of both AOZ and 5-methylmorpholino-3-amino-2-oxazolidone (AMOZ) were detected in 1 sample of warm water prawns.
- e = Residues of both dimetridazole and nicarbazin were detected in 1 sample of quail eggs.
- f = Residues of both lasalocid and nicarbazin were detected in 4 samples of quail eggs.
- g = Residues of dimetridazole, lasalocid and nicarbazin were detected in 1 sample of quail eggs.
- h = Residues of dimetridazole and lasalocid were found in 1 sample of quail eggs.

## Results from the Retail Surveys in 2002

Food	Analysed for	Number of samples analysed	MRL where set (µg/kg)	Samples above the MRL/ Action Level	Concentration detected where samples were above MRL/Action Level (µg/kg)
Imported honey	Chloramphenicol	200	Not set	5	0.3, 0.3, 0.3, 1.4, 1.4
	Streptomycin	200	Not set	13	23, 24, 24, 27, 28, 29, 29, 29, 32, 33, 33, 54, 180
Imported salmon	Malachite green	51	Not set	2	Trace
	Leucomalachite green				10, 11
Domestic salmon	Malachite green	93	Not set	4	
	Leucomalachite green				2.8, 10, 10, 13
Warm water prawns	Nitrofurans – AOZ	189	Not set	18	0.4, 0.4, 0.5, 0.6, 0.6, 0.6, 0.8, 1.0, 1.2, 1.7, 1.9, 1.9, 2.1, 2.8, 4.3, 4.4, 11, 14

## Non-Statutory Surveillance Scheme – Significant Findings

A total of 217 of the 8,039 analyses revealed residues above the relevant MRL or Action Level. This compares to 43 positives in some 7700 analyses in 2001. Of the 217 'positives' 89 were of environmental contaminants such as heavy metals, organochlorines and PCBs, rather than substances used as veterinary medicinal products.

Residues of substances either not authorised for the particular use or banned in the EU were found in some imported foods. These included chloramphenicol, nitrofurans metabolites, streptomycin and malachite green and leucomalachite green. Dimetridazole residues were also found in samples of UK quail eggs. Residues of potential health concern are discussed in the Key Results and Actions at the start of this report.

### Imported chicken

- Nitrofurans metabolites were found in 4 of 176 (2.27%) samples of imported chicken tested. These residues were of concern, as nitrofurans are in Annex IV of Council Regulation 2377/90 (see Key Results and Actions). As such, they are not permitted for use in food-producing species and a similar ban applies to foods exported to the European Union (EU). Three of the samples were from Brazil and the other was from Thailand. The Chief Veterinary Officer (CVO) of Defra has asked the officials in these countries to investigate the residues and report on the steps being taken to ensure such substances are not used in future. The Food Standards Agency (FSA) has been notified of these results and Rapid Alerts have been issued to inform other EU Member States.

### Imported Honey

- Residues of chloramphenicol were detected in 1 of 105 (0.95%) samples of imported honey in the rolling programme. These residues were of concern, as chloramphenicol is in Annex IV of Council Regulation 2377/90 (see Key Results and Actions). Toxicological advice is that it is not possible to identify a 'safe' concentration. The honey had been imported labelled as 'Cyprus Mountain Honey'. Following an investigation, the Cypriot authorities indicated that the honey might have been contaminated with Chinese or New Zealand honey. The Chinese honey had been imported before an EU embargo on Chinese honey came into force.
- Residues of streptomycin were found in 26 of the 105 (24.8%) samples of imported honey tested as part of the rolling programme and in 13 of 200 (6.5%) samples tested with this year's extra funding. Honey in the EU may not legally contain streptomycin. However, advice from the FSA is that its presence is not a food safety issue. The FSA has been notified of these results and Rapid Alerts have been issued to inform other EU Member States.

- Further residues of chloramphenicol were found in 5 of 200 (2.5%) samples from the Retail Survey. Four were from Argentina and one was a blended honey imported from Moldova. The FSA has been notified of these results and Rapid Alerts have been issued to inform other EU Member States. The CVO has asked the countries involved to investigate the reason for the residues and to report on the steps taken to ensure that such substances are not used in future.

### Quail eggs

- Dimetridazole residues were found in 6 of 40 samples of UK quail eggs. The Royal Pharmaceutical Society (Great Britain) (RPS(GB)) was asked to investigate. These residues were of concern, as dimetridazole is in Annex IV of Council Regulation 2377/90 (see Key Results and Actions), as it is not possible to identify a 'safe' concentration. The RPS (GB) reported that the mill concerned operated good procedures to try and avoid cross-contamination of feed. However, they indicated that contamination from a dust collection unit might have been the cause of the residues.

### Imported rabbit

- Residues of chloramphenicol were found in 3 of 37 samples of imported rabbit meat. These residues were of concern, as chloramphenicol is in Annex IV of Council Regulation 2377/90 (see Key Results and Actions). Toxicological advice is that it is not possible to identify a 'safe' concentration. The rabbit had been imported from China. The VMD contacted the retailer who voluntarily removed all remaining stock from sale. The FSA informed other EU Member States through the Rapid Alert system. The FSA also contacted the importer to ensure that all remaining stocks of the rabbit were destroyed.

### Farmed salmon

- Residues of PCB congeners were found in 12 of 31 samples of imported salmon in the rolling programme.
- Residues of leucomalachite green, a metabolite of malachite green were detected in 3 of 11 samples of imported salmon tested under the rolling programme. All three were from Chile. The FSA was informed and issued Rapid Alerts.
- Residues of leucomalachite green were found in 2 of 51 samples of imported salmon tested in the Retail Survey. A trace concentration of malachite green was also found in one of these 2 samples.
- Residues of leucomalachite green were found in 4 of 93 samples of domestically produced salmon tested in the Retail Survey.



### Farmed trout

- Residues of PCB congeners were found in 20 of 20 samples of imported trout tested in the rolling programme.

### Warm water prawns

- Residues of chloramphenicol were found in 1 of 113 (0.88%) samples of warm water prawns tested as part of the rolling programme. Toxicological advice is that no 'safe' concentration can be identified. The retailer was contacted to establish an audit trail to the producer. The information was passed to the FSA for further action. The CVO has written to the Vietnamese authorities to investigate the reason for the residues and to report on the steps taken to ensure that such substances are not used in future.
- Residues of nitrofurans were found in 15 of 113 (13.3%) samples of warm water prawns tested under the rolling programme. Nitrofurans are in Annex IV of Council Regulation 2377/90. As such, their use in food-producing animals is banned. The FSA was notified of these positives to issue Rapid Alerts and the CVO contacted the countries of origin.
- Residues of nitrofurans were also found in 18 of 189 (9.52%) samples of warm water prawns tested in the Retail Survey. Nitrofurans are in Annex IV of Council Regulation 2377/90. As such, their use in food-producing animals is banned. The samples were from Ecuador (11), Thailand/Indonesia (3) and Thailand (4). The FSA was notified of these positives to issue Rapid Alerts and the CVO contacted the countries of origin.

## Work for the VRC in the Coming Year



The VRC will continue to advise over the planning of the VMD's surveillance schemes and advising on the results. In particular, the Committee will want to closely monitor the position over the unauthorised uses that are described in this report and any others that come to the VRC's attention. The Committee wish to see close scrutiny for malachite green residues to show that its use in fish farming has stopped.

The VRC Subgroup on residues from feed additives will continue its work to reduce the incidence of residues of nicarbazin and lasalocid. The Food Standards Agency has advised that the concentrations of nicarbazin and lasalocid residues found are not of human health concern. However, the incidence of these residues indicates that some farms or feed mills are not following best practice. The Subgroup will analyse questionnaires and reports from cases where residues have been confirmed and use the information from The Royal Pharmaceutical Society (Great Britain) to encourage best practice.

The Non-Statutory Planning Subgroup will continue to make recommendations to ensure that the scheme makes the best use of the available resources. The Subgroup has made its recommendations on restructuring the programme and it will turn its attention to making recommendations on how brand-naming might be applied fairly and in the interests of consumers.

The extra money that was available for this year's programme gave the Committee important insights into the pattern of use of substances in non-EU countries. The Committee will use this intelligence in producing its risk assessment to support a bid for permanent extra funding to improve surveillance of imported foods.

**The Committee will want to closely monitor the position over the unauthorised uses that are described in this report and any others that come to the VRC's attention.**

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A vertical green bar on the left side of the page features a microscopic image of several cells, likely from a biological specimen, showing various organelles and structures.

## Appendix 1. Types of data assessed in setting an Acceptable Daily Intake (ADI)

### 1. Pharmacodynamics

– potential adverse pharmacological effects on the normal functions of the body.

### 2. Pharmacokinetics

– data on the absorption, distribution, metabolism and excretion of the substance in animals (and humans).

### 3. Acute (single dose) toxicity

– short-term adverse effects resulting from single, high dose exposure to the substance.

### 4. Repeated dose toxicity

– adverse effects resulting from daily exposure to lower levels of the substance usually over periods from 90 days to one year.

### 5. Genotoxicity

– in this case, a general term covering the adverse effects of a substance on genetic material (DNA).

### 6. Reproductive and developmental toxicity

– adverse effects on reproduction, fertility, the developing embryo and foetus, and neonatal organism.

### 7. Carcinogenicity

– long term feeding studies to investigate the potential of the substance to cause tumours.

### 8. Neurotoxicity

– adverse effects on the central nervous system (brain and spinal cord and peripheral nerves).

### 9. Immunotoxicity

– adverse effects on the immune system.

### 10. Antimicrobial activity

– adverse effects on the normal microflora of the intestinal tract.

### 11. Human data

– this may be available from clinical trials, volunteer studies or reports of accidental or deliberate ingestion of the substance.

## Glossary



**ACTION LEVEL** – This is the concentration of a residue in an animal product that will spark a follow-up investigation. Where a Maximum Residue Limit is set, this is the concentration used. Where no MRL has been set, the Limit of Quantification (LOQ) is used. But, if a substance has been entered into Annex IV of Council Regulation (EEC) No. 2377/90, any confirmed residue will be reported as in excess of the Action Level.

**AGVR** – The Advisory Group on Veterinary Residues was the Committee that advised the VMD on its surveillance programmes before the Veterinary Residues Committee was formed.

**ANALYTE** – A substance in a test sample, the presence of which has to be detected and/or quantified.

**ANNEX IV** – the active ingredients of veterinary medicines used in food producing species must be assessed for safety and allocated to one of Council Regulation 2377/90 EC's annexes. Annex IV indicates that on safety grounds, no MRL can be set. Substances in Annex IV may not be administered to food-producing animals.

**ANTHELMINTICS** – Anthelmintics kill and control internal parasites such as liver fluke, tapeworms and roundworms and are used to treat disease caused by parasitic worm infestations.

**ANTIMICROBIALS, INCLUDING ANTIBIOTICS** – are substances, which, at low concentrations, exhibit selective toxicity towards micro-organisms. Antimicrobials are used on farms to treat and prevent diseases, such as mastitis and foot rot, caused by micro-organisms.

**β-AGONISTS** – A group of veterinary medicines that, as muscle relaxants, can be used in animals to aid calving and in humans to treat asthma. β-agonists, such as clenbuterol and salbutamol, have been used illegally at much higher concentrations as growth promoters, where they result in a higher proportion of lean meat. These illegal higher concentrations can in some people result in increased pulse rate, palpitations or flu-like symptoms.

**BRAND-NAMING** – Where a sample of a food is shown to contain a residue at a concentration above the relevant MRL or Action Level, the brand on the packet or name of the shop where it was bought is published.

**COCCIDIOSTATS** – Products that control coccidiosis, a protozoal disease that can cause diarrhoea and dysentery. Control of this infection is particularly important in the poultry industry where the prophylactic use of coccidiostats prevents the disease from developing.

**DAL** – Differential Action Level: Level agreed by the AGVR as a guideline below which there is no toxicological risk to the consumer. In 1997 the VMD set up an ad-hoc group of consumer, industry and retail representatives to consider the incidence and concentration of nicarbazine residues in eggs and to try to develop strategies to reduce them. The group agreed that the concept of a "Differential Action Level" should be recommended to the AGVR. This was so that the VMD would not

automatically follow-up a number of “positive” results which did not pose a toxicological risk to the consumer. In 1998 the AGVR endorsed the proposed DAL for nicarbazin in eggs at 100 µg/kg as a guideline, subject to annual review. In 1999, the AGVR agreed that the DAL would also apply to lasalocid (see page 20).

**DDT, DDE etc.** – DDT was an Organochlorine insecticide that was very widely used from the 1940's. DDE and TDE are breakdown products of DDT. DDT use was banned in most developed countries because both it and some of its breakdown products did not break down readily in the environment.

**Defra** – Defra. The parent department for organisations such as the VMD and Centre for Environment, Fisheries and Aquaculture Science.

**DETECTION LIMIT** – see Limit of Quantification.

**DG-SANCO** – the European Commission body responsible for health and consumer protection.

**ENDPOINT** – the final result of a test that is used to assess the biological process as part of, for example, a clinical trial.

**GESTAGENS** – see hormones.

**HEAVY METALS** – Cadmium and lead are not veterinary medicines. They are found in the environment and can accumulate in animals' body tissues. European law requires them to be analysed for in the National Surveillance Scheme.

**HORMONES** – Hormones include both naturally occurring and synthetic substances. The use of all hormones to increase growth rate in food producing animals is banned in the EU. Natural hormones are produced by endocrine glands such as the ovaries, testes, thyroid, adrenal or pituitary and released into the blood stream to be carried to a particular organ or tissue, where they produce a specific response. Synthetic hormones include stilbenes, gestagens and thyrostats. Gestagens can be used to control animals' breeding cycles and treat threatened abortion.

**INVESTIGATION OFFICER** – a member of the Legal Department from the Department for Environment Food and Rural Affairs. Usually these are ex-police officers and are trained in taking statements.

**IN VITRO** – literally means 'in glass'. It is used to describe experiments performed on biological processes outside the living organism, such as cell culture techniques.

**LC-MS/MS** – Liquid chromatography- mass spectrometry/mass spectrometry, is a chemical analytical technique used to definitively identify residues in the surveillance programmes.

**LOD** – Limit of Determination (see LOQ)

**LOQ** – Limit of Quantification: the smallest analyte concentration for which a method has been validated with specified accuracy and precision. Also known as Limit of Determination or Detection Limit.

**MATRIX** – The sample of, for example, liver, kidney or animal feed, analysed for the presence of a residue.

**METABOLITE** – Substances entering the body are usually converted into other chemicals, which are known as metabolites.

**MYCOTOXINS** – are toxic metabolites produced by some species of fungi – especially strains of *Aspergillus flavus*. These fungi grow on many plant-based foods, such as peanuts. When such mouldy foods are fed to animals, residues of the mycotoxins may later be detected in tissues of the animal.

**NSAIDS** – are non-steroidal anti-inflammatory drugs. Capone and Flunixin are examples sought in the National Surveillance Scheme; Aspirin is the most well known example used to treat humans.

**ORGANOCHLORINES** – substances such as DDT, were previously used as insecticides. They degrade very slowly in the environment and can be ingested by animals and accumulate in their tissues.

**OPs** – Organophosphorus compounds which are used as veterinary medicines to control ticks and mites and are currently used in sheep dips. They are also widely used as insecticides.

**PCBs** – Polychlorinated biphenyls were produced in the UK and other western countries until the 1970's mainly for use in electrical equipment. PCBs are resistant to degradation by normal environmental processes. They are ubiquitous in the environment and generally present in low concentrations in foods.

**“POSITIVE”** – A “positive” sample is a sample which on confirmatory analysis confirms a concentration of an authorised substance above the MRL or Action Level, or where this has not been set for the substance or the matrix concerned, in excess of the Limit of Quantification (LOQ) or the presence of an unauthorised substance – see also DAL, above.

**RAPID ALERT SYSTEM FOR FOOD AND FEED, or RASFF** – This is a European Union-wide system for alerting Member States when a residue of potential concern has been detected in home-produced or imported produce.

**RESIDUE** – That portion of the administered dose of a veterinary medicine or other substance present in the tissues, body fluids, products or excreta of an animal arising from treatment of the animal. The total residue includes the parent compound plus any metabolites.

**STATUTORY SURVEILLANCE** – the National Surveillance Scheme has a legal status. The VMD and the other agencies have powers under the legislation to take samples and to prosecute where results indicate that it is warranted.

**VETERINARY MEDICINAL PRODUCT, or VMP** – in this report, this technical term refers to both veterinary medicines, such as chlortetracycline and also to feed additives, such as nicarbazin, which are defined as zootechnical feed additives.

**VPC** – Veterinary Products Committee: an independent body of UK experts that advises Ministers on the safety, quality and efficacy of veterinary medicines.

## Membership of the Veterinary Residues Committee

The members were drawn from: consumers, the farming community, academia, local authorities and industries associated with farming and food. Members having a wide range of expertise were chosen to represent different groups who would have an interest in residues surveillance. The members and the expertise they were appointed to bring to the Committee were:

Professor Jim Bridges	Chairman/Toxicology
Mrs Dorothy Craig MBE	Deputy Chair/Consumer
Mr John Ambrose	Local Authority
Professor Keith Anderson	Food Industry
Professor Alan Boobis OBE	Toxicology
Dr Paul Brantom <sup>4</sup>	Toxicology/Food Safety
Mr Martin Cooke <sup>5</sup>	Retail Industry
Mr Neil Cutler	Farming
Professor Julie Fitzpatrick	Veterinary
Dr Keith Lawrence	Pharmaceutical Industry
Dr W John McCaughey	Analytical Chemistry
Mrs Freida Stack	Consumer
Dr Brian Vernon	Feed Industry

Short biographies of the members are on the VRC website

<sup>4</sup> Dr Brantom was nominated by the Food Standards Agency to advise on food safety and risk assessment.

<sup>5</sup> Mr Cooke has resigned from the Committee in , following a change of duties away from those that were of relevance to the work of the Committee.





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