

RESPONSIBLE USE OF MEDICINES IN AGRICULTURE ALLIANCE

ruma

GUIDELINES

**Responsible use of
antimicrobials
in poultry
production**

Produced by the Poultry Working
Group of the
RUMA Alliance

May 1999
Revised September 2005

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RUMA is made up of the following organisations:

Agricultural Industries Confederation (AIC)
Animal Health Distributors Association (AHDA)
British Poultry Council (BPC)
British Retail Consortium (BRC)
British Veterinary Association (BVA)
Linking Environment and Farming (LEAF)
Meat and Livestock Commission (MLC)
National Beef Association (NBA)
National Consumer Council (NCC)
National Farmers Union (NFU)
National Office of Animal Health (NOAH)
National Pig Association (NPA)
National Proficiency Test Council (NPTC)
National Sheep Association (NSA)
The Royal Association of British Dairy Farmers (RABDF)
Royal Pharmaceutical Society of Great Britain (RPSGB)
Royal Society for the Prevention of Cruelty to Animals (RSPCA)

September 2005

Dear Reader,

It is with much pride and pleasure that I, on behalf of RUMA (the Responsible Use of Medicines in Agriculture Alliance), would personally like to welcome you to this second edition of the Guidelines. We trust that you will find them of benefit in the continual quest to maintain animals in maximum fitness and health and thereby provide food of the highest standard for the consumer.

This document is the result of the labours of many people and shows the benefit of an organisation such as RUMA which can call upon the knowledge and expertise of a large number of individuals in the different organisations that make up the Alliance.

This Guideline is a working document and is updated periodically as new information becomes available. The aim of these extended guidelines is to provide practical advice to advisers, be they veterinary surgeons or others, farm managers and interested farmers and stockpeople. Inevitably such a Guideline is lengthy and for many working at farm level they may find the shortened version. This can be found on the RUMA Website www.ruma.org.uk

We are always interested in comments on how to best improve the Guidelines and any such suggestions will be welcome.

Peter Allen, MBE,
Chairman, RUMA

FACTS ABOUT RUMA (RESPONSIBLE USE OF MEDICINES IN AGRICULTURE ALLIANCE)

What is RUMA?

It was set up in November 1997 to promote the highest standards of food safety, animal health and animal welfare in the British livestock industry. It is a unique independent non-profit group involving organisations that represent all the stages of the food chain from stable to table (allowing accountability and transparency) and from table to stable (allowing traceability). The aims, work and benefits of RUMA are recognised by members of the Veterinary Medicines Directorate, Food Standards Agency and DEFRA.

What are the Aims of RUMA?

The main aims of RUMA are to:-

- a) Identify issues of scientific and public concern in the areas of Public Health, Animal Health, Animal Welfare and the Environment.
- b) Provide an informed consensus view on the identified issues which will be developed by discussion and consultation.
- c) Establish and communicate guidelines which describe "best practice" in the use of medicines.
- d) Advise industry in the implementation of "best practice", especially in the development of Codes of Practice and Assurance Schemes.
- e) Communicate and to consult:
 - i) To change the way medicines are used.
 - ii) To influence the regulation of livestock production and use of medicines.
 - iii) To change the way farming is perceived.
- f) Promote the appropriate use of authorised medicines for disease prevention and control.
- g) Liaise with National Authorities.
- h) Identify practical strategies to sustain responsible use of medicines.

How Does RUMA Achieve its Aims?

The most obvious way is the publication of the Guidelines for the responsible use of antimicrobials for all the major food producing species such as dairy and beef cattle, sheep, pigs, poultry and fish. These are all working documents and built up from the contributions from member organisations. They are always open to alterations in the light of new developments

RUMA is a policy making organisation rather than a political one. It aims to produce a co-ordinated and integrated approach to best practice. It has an established network with government departments and many non-governmental organisations. This allows a spread of information to be undertaken and responses to be obtained. There has also been considerable interest in Europe in RUMA's activities and discussions have taken place within the European Union and with other Member State's organisations.

Classification of Animal Medicines

These Guidelines were drawn up at a time when the Veterinary Medicines Regulations 2005 are in draft format. The distribution categories will be changing: it is understood they will be:-

POM-V (Veterinarian)

Medicines that may be prescribed by a registered veterinary surgeon following a diagnosis. The prescription may be dispensed by any registered veterinary surgeon or registered pharmacist.

To include: Current POM and some P products for food producing and pet animals together with current MFS products.

POM – VPS (Veterinarian, Pharmacist, SQP)

Medicines which can be prescribed and supplied by a Registered Qualified Person (RQP) i.e. a registered veterinary surgeon, a registered pharmacist or a registered suitably qualified person (SQP) or it may be supplied separately by a RQP in accordance with a written prescription from another RQP.

Prior diagnosis is not a pre-requisite for a prescription for this category but the prescribing RQP must be satisfied that the person administering the medicine has the competence to do so safely and that the use is necessary for the routine control or treatment of endemic disease.

The RQP should take into account available Flock/Herd Health Plans when prescribing.

To include: Some current P, current PML products and MFSX products for food producing animals.

NFA/VPS (Non Food Animal – Veterinarian, Pharmacist, SQP)

Medicines which can be supplied without a prescription by a Registered Qualified Person (RQP) i.e. a registered veterinary surgeon, a registered pharmacist or a suitably qualified person (SQP).

The RQP must check and be satisfied that the person administering the medicine has the competence to do so safely and that the use is necessary for the routine control or treatment of endemic disease.

Current PML and MFSX products for pet animals (including horses which have been declared as not intended for human consumption).

AVM-GSL (Authorised Veterinary Medicine – General Sales List)

Medicines which may be supplied by any retailer. These may be for non food producing animals or will be included in the exemption list for food producing animals currently being elaborated by the Commission.

All antimicrobial products will be classified POM-V

Background

1. Antimicrobial resistance in bacteria is a natural phenomenon. It can exist in the absence of medication. Particular strains or species of bacteria are naturally resistant to certain antimicrobials. Most discussion, however, focuses on resistance which occurs after exposure of the bacteria to the antimicrobial. This is an inherent risk associated with any use of antimicrobial medication in any species.
2. Opinion is divided on the degree to which any resistance associated with antimicrobial use in animals affects human health. The ability to use antimicrobials provides us with an important tool to reduce disease and animal suffering. However, measures aimed at limiting the development of resistance are important for prolonging the useful life of all antimicrobials in both human and animal medicine. The effectiveness of measures and products needs to be monitored and those which are appropriate today may need to be adjusted in the future in the light of changing resistance patterns.
3. The poultry industry recognises that human health must be the overriding consideration guiding antimicrobial use. With this in mind the EU Council has applied the so-called Precautionary Principle to certain products. Essentially this principle holds that products which might present a risk to human health should not be used until sufficient scientific evidence determines otherwise.
4. The Responsible Use of Medicines in Agriculture Alliance (RUMA) is a coalition of organisations including agricultural, veterinary, pharmaceutical and retail interests. This paper is one of a series of species-specific documents developed by RUMA. Broadly, RUMA's objectives are:
 - To review the use of antimicrobials in poultry production and to produce responsible use guidance for farmers.
 - To establish and communicate practical strategies by which use of antimicrobials might be reduced.
 - Ultimately to enable poultry producers to discontinue routine antimicrobial use without adversely affecting either the welfare of their animals or the viability of their business.
5. This guideline establishes a framework against which future activities in pursuit of these objectives may be evaluated. It also seeks to establish the relative contributions of the different organisations and individuals who have a role in achieving these aims.

Antimicrobials in poultry production

6. Therapeutic antimicrobial products are used by veterinary surgeons in the treatment and control of many types of infection in a wide variety of animal species, including farmed poultry. If a number of animals in a group show signs of disease, both sick and healthy animals may need to be treated with therapeutic levels of an antimicrobial product for the recommended period. This is intended to cure the clinically affected

animals, reduce the spread of disease and prevent clinical signs appearing in the remainder.

7. Antimicrobial substances used for digestive enhancement are administered in small amounts in the feed. Their use has been carefully controlled in the UK for over 30 years, and the principles laid down by the Swann Committee Report of 1969 have now been incorporated in to European regulations. These products are used in livestock production with a view to improving the efficiency of digestion of animal feeds. In addition they have important environmental benefits and may have incidental beneficial effects such as reducing the need to treat clinical disease. In spite of this the EU has implemented a new feed additives regulation (Reg 1831/2003) in the autumn of 2003 which will result in the removal of such products from the European market in January 2006..
8. There is a large body of scientific literature on the use of antimicrobials of different types in poultry. Much of this has been generated by pharmaceutical companies as part of the process of developing new products and achieving their approval by the UK regulatory body, the Veterinary Medicines Directorate, on the basis of safety, quality and efficacy. Antimicrobial use in many other poultry-producing (and some -exporting) countries is much more widespread and less well controlled than in the UK.
9. Table 1 below lists diseases of poultry most commonly requiring medication. While some of these diseases are not caused by bacteria (e.g. coccidiosis) some of the medicines or feed additives used, do have some antimicrobial activity.

Table 1 Examples of poultry diseases requiring medication with compounds with antimicrobial activity

<p>Chicks:</p> <ul style="list-style-type: none"> - First week septicaemia - Mycoplasma infection. <p>Broiler chickens:</p> <ul style="list-style-type: none"> - Septicaemia due to E.coli. - Osteomyelitis/femoral head necrosis. - Necrotic enteritis. - Coccidiosis. 	<p>Broiler chicken breeders:</p> <ul style="list-style-type: none"> - Staphylococcus aureus, joint infections. - Pasteurella. - Mycoplasma. <p>Turkeys:</p> <ul style="list-style-type: none"> - E.coli septicaemia following TRT. - Pasteurella. -
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10. Antimicrobials which are authorised for use in poultry in the UK are detailed in the current editions of either the *NOAH Compendium of Data Sheets for Animal Medicines*, published by NOAH, and/or the *Handbook of Feed Additives*, published by Simon Mounsey Ltd. It must be emphasised that antimicrobial use is not regarded as the prime defence against disease and production losses. A wide range of management techniques (disinfection, eradication, isolation, competitive exclusion) and vaccines are routinely used which prevent or reduce the need for antimicrobials. Some companies have adopted a policy of not using antimicrobials prophylactically

without a well-defined indication. We can summarise the fields of antimicrobial use as follows:

11. Treatment of clinical disease

Coli-septicaemia, either acute or sub-acute, is a common sequel to a number of viral diseases of poultry, especially those caused by viruses of the respiratory system. Many of the products listed as “solubles” in the *Compendium* will be appropriate for this indication. While the sub-group fluoroquinolones are indicated broadly for the treatment of pasteurellosis, mycoplasmosis and colisepticaemia, in practice their use is limited to high-value or very young stock or unusually severe disease because of their high cost compared to other antimicrobials.

12. Salmonella in poultry in the UK does not usually require medication. Specific *Salmonella* serotypes with a special tendency to develop antimicrobial resistance (i.e. *S.typhimurium* DT104) clearly need special control measures, and treatment decisions relating to other diseases need to take into account incidental exposure of such organisms to medication. In particular it is vital that accurate information on changing patterns of antimicrobial susceptibility in pathogens monitored under government programmes is rapidly made available to those prescribing the products so that appropriate changes in control measures are made. Samples of ill or dead birds are routinely subjected to PM examination to confirm the diagnosis and, commonly, to isolate and sensitivity-test the pathogen.

13. Prevention of clinical and sub-clinical disease

Some bacterial infections are best dealt with by treatment before the clinical signs. Many such infections have been eliminated from the majority of the poultry population by means of eradication (e.g. *Mycoplasma gallisepticum*, *M. meleagridis*, *M. synoviae*). However there is a reservoir of these infections in “back-yard” flocks, game birds and, possibly, wild birds. “Breaks” can be expected, and, in this circumstance it will be common to treat the affected parent flock and the progeny with an appropriate product.

14. Programmes will vary widely according to the particular infection, the pathogenicity of the strain, the types of problems encountered and intercurrent infections. Some years ago it was common for all starter feed to be medicated up to 10-20 days of age with a view to controlling non-specific infections. This is now much less common. Where routine medication is used it is more likely to be short term (3-5 days) in drinking water, and may be targeted at particular “at-risk” populations (such as the progeny of very young or old parent flocks).

15. Modification of intestinal bacterial flora

Digestive enhancing or “growth promoting” antimicrobials were routinely used in many poultry-producing countries to moderate the balance of intestinal bacteria. It has been estimated that intestinal bacteria may utilise up to 10% of the energy in a typical diet. Their main effect was not really to enhance growth (commercial broilers rarely are grown anywhere close to their genetic potential), rather to improve production efficiency by better feed conversion - hence the more accurate term “digestive enhancer”.

16. A significant benefit for animal welfare resulted from the improvement in the utilisation of nutrients and the reduction in the volume or moisture of undigested material deposited in the animal's environment. There were also beneficial effects for the overall environment with reduced feed meaning fewer lorry journeys, lower water use and reduced arable land required to be planted in cereals.

17. In addition to their direct economic effects, digestive enhancers also had benefits in the control of sub-clinical and clinical disease. This group of products played a role in controlling the adverse effects of non-specific enteritis (of nutritional or viral origin) and in reducing the risk of necrotic enteritis and cholangiohepatitis. To address medical and public concerns about the use of these compounds FEFANA (the European Federation of Feed Additive Manufacturers) funded (in 1998-2001) a detailed survey on resistance patterns in intestinal bacteria from the major food species in a number of European countries.

18. **Anticoccidials**
 Ionophore anticoccidials are not used specifically for the control of bacterial infections. They have, however, an important, though narrow-spectrum, efficacy against some intestinal bacteria, and could therefore affect bacterial sensitivity. Their use is vital for the prevention of severe suffering and economic losses (clinical coccidiosis will occur in untreated chickens). It must be understood that other anticoccidials have no anti-bacterial effects, and it is necessary to have and use these other products in order to conserve the efficacy of the ionophores. For this reason ionophore anticoccidials cannot be seen as a replacement for antimicrobial digestive enhancers.

20. **Route of application**
 Digestive enhancers were only approved for incorporation in feed in accordance with a European approval system (under Directive 70/524 and subsequently Reg 1831/2003). Although no prescription was required for this, such compounds could only be used strictly in accordance with their EU approval up to December 2005. Therapeutic antimicrobials may be used in the drinking water, though some are approved for in-feed administration. In general, in-water administration is more likely to be effective where there is already significant disease, because water consumption is less affected by disease than feed consumption. The attending veterinary surgeon may choose other routes of application of medicine if they are known to be more effective for the particular condition being treated.

21. **Responsible use**
 The use of animal medicines carries with it responsibilities. Under UK legislation most antimicrobial use in poultry is under the direct responsibility of veterinary surgeons. Farmers have, however, a very considerable role to play in ensuring that the directions of the veterinary surgeon are properly carried out, and also in developing and applying disease control measures which minimise the need for antimicrobial medication.

22. Veterinary surgeon responsibilities

Besides meeting regulatory requirements, poultry veterinary surgeons are guided by a specific Code of Practice on Responsible Use issued by the British Veterinary Poultry Association. Antimicrobials may only be prescribed and used under the direction of a veterinary surgeon when:

- a. the veterinary surgeon has been given responsibility for the health of the animal or flock in question by the owner or the owner's agent; and
- b. the care of the animal or flock by the veterinary surgeon is real and not merely nominal

23. In general, a veterinary surgeon is expected to see the affected animal prior to prescribing medication. However, in poultry medicine, best practice in the control of infectious disease (biosecurity rules) often dictates alternative approaches. There should be formal routes of communication laid down between the veterinary surgeon and the farmer to ensure that reliable and accurate information is provided to enable the veterinary surgeon to make an informed decision regarding treatment of a flock. All such information should be documented, including signed written instructions countersigned by the farmer.

24. The veterinary surgeon involved should perform a health audit (e.g. post-mortem examinations, serology, farm visits and other relevant laboratory investigation) and have a sound knowledge of the production and management systems employed. The veterinary surgeon must visit the farm prior to treatment if he/she does not have this knowledge. In all uses of antimicrobials the best available information should be used to determine treatment, the most prudent regimes and dosages. The aim is to provide optimal efficacy with minimal risk of resistance developing in either the target organisms, potentially zoonotic organisms, or organisms capable of transmitting resistance to pathogens. The veterinary surgeon will be the normal source of such information for the farmer.

25. Farmer responsibilities

It is the responsibility of the farmer to clearly give their veterinary surgeon responsibility for the health of the animals and to co-operate in ensuring that such responsibility is real.

Specifically, the farmer should:

- a. Regard therapeutic antimicrobial products as complementing good management, vaccination, and site hygiene.
- b. Initiate medication only with formal veterinary approval, provided either by prescription, a verbal direction or an approved treatment programme or protocol. In the case of in-feed medication, this will be provided by a "Medicated Feedingstuff Prescription" (MFSP or MFS prescription).
- c. Ensure that accurate information is given to the veterinary surgeon in order that the correct dosage can be calculated for the birds concerned, and ensure that clear instructions for dosage and administration are obtained and passed on where necessary to the staff responsible.

- d. Always complete the course of treatment at the correct dosage. Ensure that the dosage is carefully administered in an effective manner.
- e. Accurately record the identity of the flock of birds medicated, the batch number, amount and expiry of the medicine used, the withdrawal period required and the date and time the medication was completed.
- f. For in-feed or in-water medication ensure that the end of medication is accurately determined by cleaning the feed-bin or header tank as appropriate.
- g. For any medicines used, appropriate information should be kept on file - for example, the package inserts, product data sheets, or the safety data sheets as available.
- h. Report to their veterinary surgeon any suspicion of an adverse reaction to the medicine in either the treated animals or farm staff having contact with the medicine. This should include any unusual failure to respond to medication. Such reports may also, if desired, be made directly to the Veterinary Medicines Directorate at Woodham Lane, New Haw, Addlestone, Surrey KT15 3BR. A poultry-specific “green form”, available from the VMD should be used where appropriate. A record of the adverse reaction should also be kept on the farm.
- i. Ensure that the appropriate withdrawal period is complied with prior to the sale or collection of the treated birds or eggs for human consumption. In general the withdrawal time required is specified on the MFSP or prescription, or the label of the medicine. Note that if in the professional judgement of the veterinary surgeon, it is necessary for a product to be prescribed for a species for which it is not authorised or at a dosage higher than the authorised dosage, then an appropriate withdrawal period should be specified to ensure that food produced from the treated animals does not contain residues harmful to consumers. In general this should be not less than the following:

Eggs	7 days
Meat from poultry	28 days

- j. Co-operate with QA schemes which monitor antimicrobial usage, medication documentation, and withdrawal period compliance. However, such schemes should not constrain the attending veterinary surgeon from preventing suffering in the animals under their care.
- k. Track antimicrobial usage taking account of the potency of various products. The simplest approach is to record the number of kgs. of animal treated/day as a proportion of the total kgs. of animal at risk for each species and class of stock. Any usage where the mg/kg dosage does not match authorised values would need to be highlighted.
- l. Ensure the different medicines are only given at the same time with the specific approval of the veterinary surgeon because adverse interactions sometimes occur.
- m. Maintain a medicine log book on farm together with copies of relevant regulations and Codes of Practice.

Practical strategies to reduce the need to use antimicrobials on poultry farms

26. Appendix A reviews general and practical approaches which are well documented to improve overall health of poultry. It must be kept in mind, however, that disease problems are not general, they are specific. The principles outlined need to be adapted to the requirements of each production system, company and farm, and will constantly evolve in response to changes in the disease status of the animals and farms, and in the environment.
27. The extent to which the individual topics can influence the need for antimicrobial use will also vary from farm to farm. In general it is necessary to carefully co-ordinate activities under different headings in order to achieve the desired effect.

Enabling poultry producers to discontinue routine antimicrobial use without adversely affecting either the welfare of their animals, or of the viability of their business (post December 2005).

28. Many producers have begun procedures to enable this from 2004 or earlier. Essentially this objective can only be achieved by:
 - a. Improving the distribution of existing information and implementation of “Best Practice” strategies based on it.
 - b. Encouraging farmers to involve their veterinary surgeons in preventative measures.
 - c. Significantly changing the philosophy regulating the approval of medicines to increase the availability of economical and effective alternatives to antimicrobial medication.
 - d. Encouraging a commercial environment in which the very considerable burdens of some of the measures required are shared equitably and that, primarily, UK producers are not placed at an unfair disadvantage with respect to competitors in other EU and non-EU countries.
29. There is a joint responsibility between the veterinary surgeon and the farmer to ensure that antimicrobials are used correctly and for the right reasons. This is essential so that the consumer can be assured that antimicrobial residues will not appear in food, and that the correct use of antimicrobials in animals will not create resistance problems in the human or animal population. It is important always to assess the efficacy of any treatment to ensure there is a cost benefit but treatment may also be justified in order to improve animal welfare.

Acknowledgements

30. Thanks are due to Mr Paul McMullin, MVB, DPMP, MRCVS, from whose draft this paper derives and to Dr Mark Pattison, BVSc, MSc, PhD, DPMP, MRCVS, and International Poultry Practice for permission to include some material from his article included in the list of references.
31. Thanks are also due to the University of Southern California for some of the sections of Appendix A which were taken or adapted from their advisory notes on poultry production. The original information may be accessed through the Internet at <http://agcenter.ucdavis.edu/agcenter/welcome.htm>

References

32. Anon.(1998) Antimicrobial Guidelines, British Veterinary Poultry Association, <http://www.bvpa.freeserve.co.uk/microbia.htm>

Herrick, J.B. (1974) Water Quality for Livestock Veterinary Medicine/Small Animal Clinician April 1974, 469-473.

Listing of UK Market Authorisations for antimicrobials for poultry, <http://www.bvpa.freeserve.co.uk/antimlst.htm>

McMullin, P.F. (1998) Quinolone usage in Poultry Medication in Europe. Proceedings of the WHO Symposium on the Use of Quinolones in Food animals and potential impact on human health, Geneva, June 1998 pp123-132

Pattison, M. (1998) The Responsible use of Antimicrobials International Poultry Production September 98, pp 33-35

Veterinary Medicines Directorate, Code of Practice on the Responsible Use of Animal Medicines on the Farm, April 1999. (<http://www.vmd.gov.uk>)

Appendix A.

Ways to reduce the need for antimicrobial treatment

A1 Introduction

The scientific definition of health in an animal is the "absence of disease". In commercial poultry production this would normally be extended to include freedom from infection of certain potentially pathogenic bacteria and zoonotic organisms. Bacteria-free chickens in isolation under laboratory conditions grow approximately 15% faster than similar chickens in a "conventional" environment. This ideal is economically impossible to achieve under practical farm conditions. The use of immunisation, sanitation, preventive medicine and biosecurity are recommended as the major and primary preventatives for infectious disease. Medication for prevention or treatment is only to be recommended when the other measures are not feasible or are ineffective.

A2 Stockmanship and environment

Probably the single greatest factor impacting on health status of farmed livestock is stockmanship. Some of its effects will be through implementation of the various other measures discussed below. Some will be through adaptation of the management regime (feed, lighting, litter, ventilation, temperature control, humidification) in response to subtle changes in flock well-being. Improved environmental control systems which dampen variations due to season, weather and diurnal variation can also have a positive impact. Mechanical and electronic systems of environmental control need to be routinely checked. Computerised systems should be seen as an adjunct to the good stockman, not a replacement.

A3 High health status stock

Every poultry flock begins as a delivery of day-old birds. The health status on delivery has a very large impact on future health and performance. A formal health specification should be agreed with the supplier. This may include the following categories:

- a. Freedom from specified pathogenic *Mycoplasma* infections such as *M.gallisepticum*, *M.synoviae*, and *M.meleagridis* (turkeys only).
- b. Freedom from specified or all *Salmonella* serotypes
- c. Produced from flocks immunised or antibody positive for specified vertically transmitted infections (such as Avian Encephalomyelitis and Chick Anaemia Virus)
- d. Produced from flocks immunised to provide passive protection (see below) for specified infections that the birds are likely to encounter (e.g. Infectious Bursal or Gumboro Disease).
- e. Immunised at the hatchery using effective and well monitored procedures (e.g. for Marek's disease or Infectious Bronchitis).
- f. Incubated, hatched and transported under optimal environmental conditions for the species, size of egg and age of parent flock.
- g. Incubated, hatched and transported under sanitary conditions as monitored by a routine sanitation-monitoring programme.

- A4 Having listed the above it must be recognised that the day-old chick/poult/duckling is not and can never be absolutely uniform. Biological variability exists, not least according to the age of the parent flock. Effective communication and co-operation between the hatchery and farm can do much to minimise the health effects of such variation.
- A5 **Production planning and system organisation**
Poultry production is among the most complex of agricultural production systems. Its multi-stage nature (grandparent flock, hatchery, parent flock, hatchery, commercial bird, product), combined with a very short "shelf life" of intermediate products (hatching eggs, chicks), means that production planning can have an enormous impact, both for good and for bad, on the health status of a production system. Wherever possible all-in-all-out production should be planned on a site basis. The time required for effective cleaning and disinfection between flocks will depend on many factors such as the type of equipment, surface finish, state of repair and so on. Whatever the planned "turn-around", compliance with the plan should be monitored over time.
- A6 **Cleaning and disinfecting houses and equipment**
When poultry are removed from houses, the buildings and equipment should be carefully cleaned and disinfected before new birds are introduced. Manure (including litter) should be removed from the immediate vicinity of the poultry houses, preferably to an off-site location. A successful cleaning and disinfection protocol should:
- a. Plan to include site specific issues such as required maintenance
 - b. Remove birds, check rodent bait
 - c. Remove mobile equipment
 - d. Remove litter and as much other material as possible
 - e. Wash to remove maximum organic material
 - f. Clean/sanitise water system
 - g. Clean/sanitise all surfaces - record concentration and usage
 - h. Clean/sanitise equipment
 - i. Set up of equipment
 - j. Fog
- A7 The appropriate detergents and disinfectants will vary with the nature of the production system and disease or infection challenge. In all cases, however, effective cleaning, and careful identification and separation of unsanitised and sanitised areas/materials will maximise the efficacy. Always use DEFRA approved products.
- A8 Careful attention should be given to feed bins, watering devices and water lines to be sure that these are free of disease agents. Water lines should be flushed and then a disinfectant solution pumped into the lines. These lines should be closed and allowed to rest for at least 24 hours, and then thoroughly flushed to remove the disinfectant.

A9 **Site and house biosecurity**

Biosecurity is the utilisation of methods which stop the transfer of infection into or between components of production systems. Major components include:

- a. allow only necessary visitors to production sites - most sites will have a “quarantine period” applied to visitors with access to sites in other production systems, typically of 3-7 days.
- b. restrict movement of workers and equipment between houses, sites and age groups. Here too it may be necessary to implement quarantine.
- c. provide sanitising foot baths, showers and protective clothing at strategic locations;
- d. maintain cleaning and disinfection programs, especially in hatcheries;
- e. reduce microbial load on vehicles and other mobile equipment by washing and disinfecting at critical times;
- f. locate production sites strategically in relation to other production sites and movement of poultry, thus minimising transfer of disease;
- g. restrict contact of workers with other poultry, especially potential carriers of hazardous disease organisms;
- h. appropriately handle waste and dead birds to minimise the transfer of disease between sites;
- i. control rodents and wild birds effectively, since both are potential disease vectors.

A10 **Competitive exclusion**

Day old chicks have a much simpler gut flora (i.e. fewer bacterial species) than the adult bird. Competitive exclusion seeks to establish a complex “normal” gut flora in the chick with the aim of decreasing the opportunities for particular pathogens to colonise the intestine and the caecum. There is a question as to how competitive exclusion products should be categorised, and currently no competitive exclusion products are authorised as medicines in the UK. Nevertheless, in the UK these products are quality controlled and have been widely used without reported adverse effects.

A11 Antimicrobials treatments to control disease will tend to have the side effect of simplifying the “normal flora”. Use of a broad-spectrum competitive exclusion product is a way of balancing this process. The bacteria present in these preparations should have acceptable sensitivity profiles. Their use could, theoretically, help restore sensitive bacterial populations in a flock treated with antimicrobials, or on a farm after removal of a treated flock. If they contain commensal E.coli strains (of low pathogenicity), or other bacteria which compete with pathogenic E.coli, they may have a side effect of reducing the need for antimicrobial treatment of coli-septicaemia.

A12 **Nutrition**

Today's modern poultry breeds have a phenomenal potential to eat feed and produce meat and eggs at very reasonable cost. A combination of improved genetics and better feed has produced a highly efficient bird. Nutrition of the modern bird is a very complex area and it is best to heed the advice of the nutritionist and feed compounder to produce feed with an appropriate balance of nutrients. The nutritional specification

must be married with a suitable feeding programme to supply the growing bird with its daily nutrient requirement.

A13 The two major nutrients which lead to fast growth rates or to high rates of egg production are protein and energy. The balance of amino acids in the protein is used for meat or egg production following digestion. Energy, derived mainly from fats and carbohydrates in the feed, fuels the process of growth and egg production. The correct mineral balance ensures good skeletal development, more important as the broiler is maturing earlier and for high yielding egg layers. Appropriate vitamin levels prevent deficiency problems and stimulate the immune system.

A14 The raw materials used in poultry diets must be of wholesome quality. The feedmill will have a programme of testing to ensure that inferior quality materials are avoided and that the finished feeds meet the nutritional targets required. Choice of an appropriate anticoccidial programme is essential to control the coccidiosis challenge. Anticoccidial use should be reviewed regularly to avoid resistance build-up. Feeds will not normally be medicated with anticoccidials if the birds have been vaccinated against coccidiosis. The feed compounder can use their expertise to combine the raw materials available in the most cost-effective way giving feeds of high nutritional value to grow the modern bird efficiently.

A15 **Feed hygiene**

The protection of human and animal health must always be a prime consideration in the manufacture and distribution of animal feedingstuffs. Feed mills must have a comprehensive and documented system for the production of safe animal feedingstuffs with the requirements of UFAS (the UKASTA Feed Assurance Scheme), which is owned by AIC (Agricultural Industries Confederation), or a proven equivalent. These requirements include a rigorous Hazard Analysis Critical Control Points (HACCP) procedure and adherence to the DEFRA/DARD Codes of Practice for the control of Salmonella.

a. **Feed materials**

Feed materials should be sourced with a view to minimising contamination with poultry and zoonotic pathogens. The origin, transport, storage, processing and handling of feed material must be considered. Store hygiene is particularly important and should be verified by annual inspection or membership of a recognised Assurance Scheme. Source assurance was implemented in 2004. This allows complete product and claim traceability to be demonstrated. In some sectors these are demanding requirements which will need additional resource.

b. Although some feed materials are processed prior to arrival at the feed mill, the majority of feed material will be unprocessed and direct from the farm or intermediate storage. Feed materials may be processed to improve the nutritional quality of the material or to reduce undesirable bacteria, such as salmonella. Some materials will have been exposed to high temperatures, for example, temperatures of 80°C or more for varying periods of time. The decontaminating effect will be reduced if there is contamination between treated

and untreated materials. Any material known to be contaminated with salmonella should be put through a heat or chemical treatment to destroy the micro-organisms before the material is used for animal feedingstuffs.

c. **finished feed**

Finished feed may undergo a final decontamination either through a high temperature process or through the use of chemicals such as organic acids. Where they are applied, the principle of separation of treated from untreated feed materials must be applied in order to ensure no re-infection. This can be obtained by limiting personnel access, filtering air to coolers and generally ensuring that finished products are kept well clear of incoming feed material and any air which might contain dust from these materials. Cooling equipment is especially important given the range of temperatures which exist within them (some of which may allow bacterial or mould growth) and their high demand for air.

d. **transport and delivery**

Feed materials or compound feedingstuffs may be readily contaminated if placed in contaminated vehicles. Vehicles used for carrying feed materials and finished feedingstuffs must comply with the AIC Code of Practice for Road Haulage and UFAS or proven equivalent. Particular attention must be paid to vehicle hygiene and cleanliness, correct loading, avoidance of contamination and cross-contamination and delivery to correct farm facilities so that the feedingstuff is received by the correct livestock.

e. Vehicles may be contaminated from the general environment (e.g. road spray), farm environment (when loading or unloading), or from the transport of raw materials (“backloading”). These risks need to be evaluated for the specific feed production system, and they need to be managed with a balanced approach to vehicle dedication, maintenance and cleaning. Vehicle drivers must not enter poultry houses. Where possible, feed should be transferred to bins on site without vehicles having to go within the biosecure area.

f. **farm storage**

Bins can harbour a range of bacteria, moulds and even coccidial oocysts. Bin hygiene may be substantially influenced by the design of the installation to reduce air and dust contamination within the house. Condensation (relating to temperature of delivered feed), and poor weather proofing will also strongly influence conditions for microbial growth in the bins. It should be kept in mind that conditions may support the growth of organisms which have direct relevance to bird or human health (*E.coli* and *Salmonella* respectively). Also mould growth may result in production of mycotoxins which, even if they do not cause typical disease, can have a substantial effect on productivity. Smooth bin surfaces and access for inspection and, if required cleaning, are especially critical at farm-depletion to ensure that bins and augurs are not a source of contaminated material for the next flock.

g. treatments

A number of products, mainly based on mixtures of organic acids and their salts, are commonly used to reduce bacterial numbers and prevent their growth in feed. Complete decontamination of feed using these products alone is difficult. However many of these will continue to act for some time after their application and can, potentially, improve the general hygiene of the feeding system right the way through to the bird feeder. They should not be regarded as a substitute for the hygienic measures noted in the previous sections.

A16 Drinking water hygiene

Drinking water is the largest single input into any poultry production system. It should be potable i.e. of a quality suitable for human consumption. However this alone is not enough. The importance of effective cleaning and sanitising of drinker systems at farm depletion has been emphasised. Nipple drinkers are the preferred type. Particular drinker systems (e.g. “bell type”) are, by their nature, prone to bacterial contamination from the air. All drinker systems are prone to microbial growth when exposed to high environmental temperatures and low flow. These conditions apply especially during the first 1-3 weeks of life of young poultry.

A17 Even if chlorinated public water supplies are used, the residual chlorine will be insufficient to control the risk of contamination. Dosing with approved water sanitisers during the first few weeks, during periods of disease challenge, or even throughout the life of some classes of poultry will help minimise this risk. Care must be taken with dosage to ensure effective doses without reducing water intake. If using chlorine-based treatments, residual levels of 1-5ppm at drinker level have been recommended (Herrick, 1974). Simple colorimetric test kits are available to estimate residual chlorine levels. This is necessary as the amount of chlorine required will be affected by the physical nature of pipework and the degree of accumulation of bio-film or other organic matter on surfaces.

A18 Mild acidification of water lines may be used as an alternative to chlorination (it should certainly not be done at the same time). This is especially useful for cleaning water systems prior to the use of medication or vaccination. It is vital that no water treatments should interfere with vaccines applied in drinking water. Consult your poultry veterinary surgeon and/or vaccine manufacturer for specific advice in this area.

A19 Litter

In deep litter systems, any litter introduced, whether at the beginning of the flock or in re-littering, is a potential source of contamination with disease-producing organisms. In general terms wood shavings are less likely to present a bacteriology hazard than untreated straw. Contamination with spores of mould (usually *Aspergillus fumigatus*) can cause disease in young chickens, and turkeys of any age. It occurs when litter materials have been high in moisture content and exposed to warm temperatures. Even if temperatures subsequently drop and the material dries out, large numbers of spores will persist.

A20 If litter is to undergo a treatment process then similar concerns about separating treated and untreated material apply as for feed and raw materials (see section A15 above). Finally the process of storage, transport and delivery of litter into the poultry house should be reviewed with a view to avoiding re-contamination. The weakest link in this chain is likely to be the actual delivery of litter into the poultry house. The external environment of the farm is likely to have some contamination from the previous flock when this is taking place.

A21 Immunisation

Vaccination against primary viral pathogens helps reduce the need for all types of antimicrobial medication. Facilitation of the licensing of a broad range of cost-effective vaccines, which are safe and effective under field conditions, is the measure open to the regulatory authorities which is most likely to reduce the need for therapeutic antimicrobials, and, hence the risk of resistance development.

A22 The deliberate induction of immunity by vaccination is far more preferable than natural induction following unpredictable exposure to field infection. Numerous infections, sometimes in combination, can kill or debilitate susceptible poultry causing pain and suffering in addition to losses in performance. Immunity is of two broad types: passive or active.

A23 Passive immunity occurs as antibody in the yolk of developing embryos and derives from the maternal bloodstream and is present until metabolised (for 2-4 weeks) in the blood of newly hatched chicks. Passive immunity is generally effective against viral diseases, but less so or ineffective against bacterial infections, e.g., mycoplasmas or salmonellae.

A24 Active immunity occurs when an antigen is introduced to the bird and processed through the bird's immune system, resulting in various protective responses which will act to protect the bird if it is re-exposed to that antigen. Active immunity can be produced either by living or inactivated antigens, or a combination of the two. Live vaccines can be administered either to individual birds, such as by injection or eyedrop, or to large numbers of birds via the drinking water or by aerosol.

A25 Inactivated vaccines must be given by injection. These usually incorporate potent adjuvants which enhance the local cellular reaction and, therefore, increase the immune response.

A26 Immunity against some infections can be induced by injection of vaccine into the egg shortly before hatching, so that active resistance is developing before any exposure can take place.

A27 Development of immunisation programmes

The development of an immunisation programme should be based on knowledge of the diseases to which birds are likely to be exposed and incorporated into the management system of the flock. It requires knowledge of the presence and level of passive immunity so that immunisation can be properly timed. Timing is also

important so that vaccines do not detract from each other's responses or exacerbate their clinical effects.

A28 Vaccines should not be administered when other stressors are acting on the flock. Immunisation cannot be a substitute for proper sanitation and biosecurity and programmes cannot totally protect birds which are stressed or in unhygienic conditions. Vaccines should be purchased and utilised only after full consultation with a poultry veterinary surgeon. Where monitoring tests are available, e.g., serology, these should be routinely utilised to ensure that vaccine responses have taken place.

A29 Dead bird disposal

Successful methods of dead bird disposal must prevent spread of pathogens to surviving birds, contamination of surface or ground water, and risk to human health. Several methods are acceptable in commercial systems. Strict biosecurity rules need to be applied to any system involving routine collections of dead birds from different sites. This is usually achieved by having a dead bird collection point outside the biosecure zone.

A30 Control of insects, rodents and exposure to wild birds

Rodents, insects and wild birds can harbour many pathogens which will cause disease and infections in poultry. An integrated system of control of the numbers of these organisms (where legally permitted) and limiting contact between them and poultry (where possible) is advised. Monitoring systems should be used to ensure that action is taken in the early stages of a population rise rather than afterwards is key to the success of these programmes. They are particularly important during farm depletion.

A31 Veterinary health plan programming

The previous sections illustrate the multi-faceted nature of disease control measures which are available. The relative importance of each measure, and the way in which it should be applied will vary from company to company, and, to a lesser extent, from farm to farm. The various measures can interact in complex and, sometimes, unexpected, ways. Requirements will also tend to evolve over time and be affected by seasonal influences. Detailed preventative medicine programmes should be documented. These should include all routine medications (including non-prescription medicines such as anticoccidials, digestive enhancers, anthelmintics), competitive exclusion and probiotic treatments and vaccines.

A32 Any prescribing of antimicrobial medication should take into account its possible effects on other aspects of the programme. The programme should also include all routine samplings for infection, disease and/or response to vaccination monitoring. It should be used in conjunction with an agreed protocol of actions with respect to

circumstances in which further samples (e.g. post-mortem submissions) are required. Routine examination of a sample of daily mortality or culled birds is recommended in many circumstances.

- A33 The use of therapeutic antimicrobial products in the absence of clinical disease or specific pathogenic infections and, in particular, long-term administration to prevent disease should not be practised without a clear justification. Prophylactic medication may be appropriate in certain precisely defined circumstances. Each company or farm should work with its veterinary surgeon to develop a written policy or protocol covering the circumstances in which this is appropriate.
- A34 **Programme monitoring and auditing**
A health programme on paper achieves nothing. It must be translated into practical actions which are documented, and audited, and any corrective measures implemented.
- A35 **Sensitivity monitoring and tracking**
In an outbreak of disease, the sensitivity of the causal organism should ideally be ascertained before therapy is started. In disease outbreaks involving high mortality or where there are signs of rapid spread of disease among contact animals, treatment may be started on the direction of the veterinary surgeon on the basis of clinical diagnosis. Even so, the sensitivity of the suspected causal organism should, where possible, be determined so that if treatment fails it can be changed in the light of the results of sensitivity testing. Antimicrobial sensitivity trends should be monitored over time and such monitoring may be used to guide clinical judgement on antimicrobial usage.

The Responsible Use of Medicines in Agriculture Alliance (RUMA) was established in November 1997 to promote the highest standards of food safety, animal health and animal welfare in British livestock farming.

A unique initiative involving organisations representing every stage of the food chain process, RUMA aims to promote a co-ordinated and integrated approach to best practice.

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Agricultural Industries Confederation (AIC)

Animal Health Distributors Association (AHDA)

British Poultry Council (BPC)

British Retail Consortium (BRC)

British Veterinary Association (BVA)

Linking Environment and Farming (LEAF)

Meat and Livestock Commission (MLC)

National Beef Association (NBA)

National Consumer Council (NCC)

National Farmers Union (NFU)

National Office of Animal Health (NOAH)

National Pig Association (NPA)

National Proficiency Test Council (NPTC)

National Sheep Association (NSA)

The Royal Association of British Dairy Farmers (RABDF)

Royal Pharmaceutical Society of Great Britain (RPSGB)

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