

WHO GLOBAL PRINCIPLES FOR THE CONTAINMENT OF ANTIMICROBIAL RESISTANCE IN ANIMALS INTENDED FOR FOOD

Report of a WHO Consultation
with the participation of the Food and Agriculture Organization of the
United Nations and the Office International des Epizooties

Geneva, Switzerland
5-9 June 2000



DEPARTMEN
T OF
COMMUNICA
BLE DISEASE
SURVEILLAN
CE AND
RESPONSE

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Preamble

The WHO Global Principles for the Containment of Antimicrobial Resistance in Animals Intended for Food (Global Principles) provide a framework of recommendations to reduce the overuse and misuse of antimicrobials in food animals for the protection of human health. The Global Principles presented in this report are part of a comprehensive WHO Global Strategy for the Containment of Antimicrobial Resistance (Annex 2).

The development of these Global Principles represents a logical continuation of WHO's activities on health implications of non-human use of antimicrobials¹. They strengthen and endorse earlier WHO recommendations such as the need to terminate the use of antimicrobial growth promoters pending comprehensive human health safety evaluations, and the need to establish surveillance systems on antimicrobial consumption.

Emergence of antimicrobial resistance is a multifactorial problem and thus requires a multifaceted solution. This involves all stakeholders concerned with the use of antimicrobials in both food animals and humans. WHO has therefore always sought the active participation of many national and international associations and federations associated with human and public health in the development of the Global Principles. In addition, other international organizations and associations, such as the Food and Agriculture Organization of the United Nations and the Office International des Epizooties have been active participants as was COMISA (World Federation of the Animal Pharmaceutical Industry). Many of these bodies have now begun to implement activities and projects complementary to the WHO Global Principles.

The process by which the WHO Global Principles were developed and eventually adopted took into account the need for a broad partnership amongst all stakeholders. From the start WHO consulted with a wide spectrum of interested groups. Collaboration between these and the other organizations has been considered vital to identify complementary activities, to avoid duplication, and to coordinate efforts towards successful development and implementation of the Global Principles.

As a first step in the development of the Global Principles, fifteen experts met in Geneva from 13-15 January 2000 to develop a draft document (<http://www.who.int/emc/diseases/zoo/drafting.html>). During April and May 2000, this draft was the subject of a web-based electronic discussion group open to all (<http://www.who.int/emc/diseases/zoo/edg/home.html>) in which WHO received 243 comments. The draft document and electronic discussion group drew from existing international efforts to develop guidelines on prudent use of antimicrobials in animals (Annex 3). However, the scope of the WHO Global Principles focuses primarily on human health and includes not only interventions to reduce overuse and misuse of antimicrobials on farms, but also other important areas of intervention such as registration, distribution/sales, advertising, surveillance and education and training.

¹ Use of Quinolones in Food Animals and Potential Impact on Human Health: Report and Proceedings of a WHO Meeting, Geneva, Switzerland, 2-5 June 1998, WHO/EMC/ZDI/98.12
The Medical Impact of the Use of Antimicrobials in Food Animals: Report and Proceedings of a WHO Meeting, Berlin, Germany, 13-17 October 1997, WHO/EMC/ZOO/97.4
<http://www.who.int/emc/diseases/zoo/antimicrobial.html>

The final step in the development of the Global Principles was a WHO Consultation to obtain consensual agreement among all participants on general, overarching principles to reduce misuse and overuse of antimicrobials in animals intended for food.

This Consultation was undertaken in Geneva from 5-9 June 2000 (Annex 5). It focused on the public and human health aspects of antimicrobial use in animals intended for food while recognizing the ongoing need for antimicrobial treatment of diseased animals.

Key WHO staff involved in this consultation were Dr David Heymann (Executive Director, Communicable Diseases), Dr Rosamund Williams (Team Coordinator, Anti-infective Drug Resistance Surveillance and Containment), Dr Klaus Stöhr (Senior Scientist, Animal and Food Related Public Health Risks) who also served as the Secretary of the meeting, and Dr Henrik Wegener (Scientist, Animal and Food Related Public Health Risks). Other participants included experts from human and veterinary medicine, communicable disease surveillance, food safety, registration of medical and veterinary pharmaceuticals, marketing and sales of veterinary antimicrobials, and food animal production (Annex 4).

In addition to the Food and Agriculture Organization of the United Nations and the Office International des Epizooties, 14 other governmental and non-governmental international organizations, federations and associations participated, including several representatives of COMISA (Annex 4).

The Global Principles were adopted consensually by participants and representatives of attending organizations and federations after a long and at times vigorous discussion. The WHO Consultation was characterized by the genuine desire among all participants to develop a set of recommendations which can be used by WHO Member States in their endeavors to minimize the public and human health risks from misuse of antimicrobials in animals intended for food.

The WHO Global Principles for the Containment of Antimicrobial Resistance in Animals Intended for Food is an important component of the general WHO Global Strategy for the Containment of Antimicrobial Resistance (Annex 2). This latter Strategy aims to identify the key factors associated with emerging antimicrobial resistance related to human disease and to develop an effective implementing strategy that will reduce resistance development. Such interventions will involve the general community, prescribers and hospitals and will include the establishment of resistance and antimicrobial consumption surveillance programmes, the reduction of unnecessary animal antimicrobial use, new research and development and the coordination of the work of international organizations.

The real challenge will be to translate the Global Principles into national rules and regulations, codes of practices or standard operating procedures. This will only occur if we succeed in engaging in an open, transparent and collaborative effort at national as well as international level, bringing together all stakeholders in the complex process of reducing health risks from the misuse and overuse of antimicrobials in animals intended for food.

Dr Klaus Stöhr
Dr Rosamund Williams
Dr David Heymann

WHO Global Principles for the Containment of Antimicrobial

Resistance in Animals Intended for Food

Purpose

To minimize the negative public health impact of the use of antimicrobial agents in food-producing animals whilst at the same time providing for their safe and effective use in veterinary medicine.

General

1. National governments should adopt a proactive approach to reduce the need for antimicrobials in animals and their contribution to antimicrobial resistance and to ensure their prudent use (including reducing overuse and misuse), as elements of a national strategy for the containment of antimicrobial resistance.
2. Relevant authorities should develop strategies that reduce the actual and potential risk to public health from antimicrobial-resistant bacteria and resistance genes, prolong the efficacy of veterinary antimicrobial products, ensure the maintenance of animal health, and establish systems for controls and interventions to ensure compliance with the developed strategies and regulations on the use of antimicrobials.

Responsibilities of regulatory and other relevant authorities

A. Pre- and post-approval

3. Decisions concerning the licensing of veterinary antimicrobial substances should consider the impact on human health of antimicrobial resistance developing in food animals in which antimicrobials have been used.
4. No antimicrobial should be administered to animals unless it has been evaluated and authorized for such use by relevant authorities. Exceptionally, where no antimicrobial drug for use in a species or for a specific indication is authorized, or an authorized product is demonstrated to be no longer effective, then a product authorized for another indication or other species may be used under direct supervision of a veterinarian. However, relevant authorities which regulate extra label use of antimicrobials in food animals should consider restricting such use of those drugs deemed highly important in human medicine.
5. The authorization of veterinary antimicrobial products should take account of data on antimicrobial resistance among relevant bacterial strains and should ensure that recommended dosages are optimal for therapy, taking into consideration pharmacokinetics, clinical efficacy, residues, and, if available, other relevant data in order to minimize the development of resistance. Existing product labelling should also be reviewed, when necessary, by regulatory authorities to ensure that the recommended dose and duration of use are consistent with current knowledge of efficacy, antimicrobial resistance, pharmacokinetics, pharmacodynamics and prudent use.
6. A risk-based evaluation of the potential human health effects of all uses of antimicrobial drugs in food producing animals should be conducted, including currently approved products. In the evaluation of currently approved products, priority should be given to those products considered most important in human medicine. Characterization of the risk should include consideration of the importance of the drug or members of the same class of drug to human medicine, the potential exposure to humans from antimicrobial-resistant bacteria and their resistance genes from food animals, as well as other appropriate scientific factors. Those antimicrobials judged to be essential

for human medicine should be restricted and their use in food animals should be justified by culture and susceptibility results.

7. Decisions regarding registration of antimicrobials for use in food animals should be based on scientific data and, unless otherwise justified, should include the potential rate and extent of resistance in relevant bacteria associated with the proposed use in food animals in the pre-approval evaluation.
8. Post-approval surveillance is indispensable and surveillance of resistance to antimicrobials belonging to classes considered important in human medicine should be closely monitored so as to be able to detect emergence of antimicrobial resistance in time to allow corrective strategies to be implemented as part of an efficient post-licensing review.
9. Post-approval surveillance of antimicrobial resistance should include identification of the appropriate bacteria and methods of collection. Relevant antimicrobials to be included in such post-approval surveillance programmes should be guided by a risk-based priority list under the direction of the relevant authority. The methods and data should be made publicly available. Such surveillance may be carried out with the participation of the veterinary pharmaceutical industry.
10. Epidemiological and/or experimental investigations to identify risk factors may be needed if resistance increases above levels of concern, and proportionally incremental mitigation strategies*, such as education, infection control, labelling changes, changes in dosing and duration of use, should then be implemented. If, and when the ongoing assessment of the risk demonstrates it to be unacceptable, withdrawal of an antimicrobial for veterinary use from the market should be considered.
11. Relevant authorities should ensure that all antimicrobials for disease control in animals are classified as prescription-only medicines unless, under exceptional circumstances, veterinary advice is not available and alternative means of disease control must be facilitated. Under such exceptional circumstances, relevant authorities should take steps to ensure that veterinary advice becomes available in the future.

B. Quality/Manufacturing

12. Antimicrobial products, including generic products, should be manufactured in accordance with the current good manufacturing practices (GMP) and following the specifications laid out in the licensing application by the relevant authorities. Relevant authorities that lack the necessary resources to evaluate product applications should provide for alternative mechanisms, such as third party certification, to ensure safe, effective and quality products are licensed for use.

C. Distribution/Sales/Marketing

13. Enforcement policies should be designed to ensure compliance with laws and regulations pertaining to the authorization, distribution and sale, and use of antimicrobials. They should aim at preventing the illicit manufacture, importation, and sale of antimicrobials, and at controlling their distribution and use.
14. Special attention should be paid to the distribution and sale of counterfeit, sub-potent and misbranded veterinary antimicrobials. Enforcement action should be taken to stop such distribution and sale by relevant authorities, in coordination with the exporting country, if appropriate.
15. Relevant authorities should ensure that all antimicrobials for animal use should be supplied only through authorized outlets, such as pharmacies on veterinary prescription, veterinary practices and feed mills, in the case of materials used in animal feeding stuffs.

* increasingly strict measures proportional to the risk identified

16. If sufficient evidence exists that profit from the sale of antimicrobials negatively impacts on prescribing practices, appropriate countermeasures should be taken to ensure prudent use.
17. The advertising and promotion of animal health products should comply with national guidelines and codes of practice. Commercial promotion of prescription-only antimicrobial products should be directed only to veterinary professionals.

D. Antimicrobial growth promoters

18. Use of antimicrobial growth promoters that belong to classes of antimicrobial agents used (or submitted for approval) in humans and animals should be terminated or rapidly phased-out in the absence of risk-based evaluations. The termination or phasing-out should be accomplished preferably by voluntary programmes of food animal producers, but by legislation if necessary.
19. Risk-based evaluations of all antimicrobial growth promoters should be continued. Characterization of the risk may include consideration of the present and potential future importance of the drug to human medicine, its selection of resistance, the potential exposure to humans from resistant bacteria from food animals, as well as other appropriate scientific factors.

Surveillance of antimicrobial resistance and antimicrobial usage

20. Data generated from the surveillance of antimicrobial resistance and antimicrobial usage should play a key role in the development of national policies for the containment of antimicrobial resistance. These data are also essential in the pre- and post-licensing process and in the development of treatment guidelines for veterinary use.

A. Surveillance of antimicrobial resistance

21. Programmes to monitor antimicrobial resistance in animal pathogens, zoonotic agents (for example, *Salmonella* spp. and *Campylobacter* spp.), and bacteria known to be indicators of antimicrobial resistance (for example, *Escherichia coli* and *Enterococcus faecium*) should be implemented on bacteria from animals, food of animal origin and humans. Veterinarians, medical doctors, authorities and other stakeholders should be kept regularly informed about the surveillance results and trends. Antimicrobial susceptibility testing should be performed according to standardized methods using appropriate quality control, and be reported quantitatively to allow comparison of results.

B. Surveillance of antimicrobial usage

22. Relevant authorities should establish systems to determine the amounts of antimicrobials given to food animals.
23. Information on the amounts of antimicrobials given to food animals should be made publicly available at regular intervals, be compared to data from surveillance programmes on antimicrobial resistance, and be structured to permit further epidemiological analyses.

Prudent use of antimicrobials

A. Guidelines on prudent use

24. The strategic aim of policies expressed in guidelines should be to provide advice on optimal therapeutic effect and/or protection of animals at risk and on the control of antimicrobial resistance in animal and zoonotic bacteria.
25. Guidelines on the prudent use of antimicrobials in animals should be readily accessible, developed with multidisciplinary involvement, subject to peer review, compatible with existing regulations, and should be evaluated and revised at regular intervals.
26. Locally-derived species-specific treatment guidelines should include a list of antimicrobials for conditions commonly presenting in clinical practice and offer a rational treatment choice based on

scientific data and knowledge, the disease and resistance situation, practical experience and human health concerns. If several antimicrobials can be used, guidelines should make recommendations on different antimicrobials to be used. However, the clinical experience and judgement of the practitioner should determine the final choice.

B. Responsibilities of veterinarians and/or producers

27. For each treated animal or group of animals a health record should be kept to support the choice of empirical therapy. The record should include:
 - data on antimicrobial use;
 - previous antimicrobial susceptibility test results; and/or
 - previous treatment outcomes.
28. Veterinarians should continuously evaluate their prescribing practices. This would be based on information such as the main indications and types of antimicrobials used in different animal species and be evaluated in relation to available data on antimicrobial resistance and current use guidelines.
29. Veterinarians should prescribe antimicrobials only for animals under their direct care. Veterinarians are expected to have examined clinically affected animals, or to be familiar with production practices on the farm and to have developed a written treatment protocol, prior to prescribing medication.
30. Antimicrobials should be prescribed only when indicated, using antibiotics directed against the causative agent/s, given in optimal dosage, dosage intervals and length of treatment to ensure maximum concordance with the treatment regimen.
31. It is the responsibility of the producers to ensure that production systems promote animal health and welfare. Antimicrobial usage, if necessary, should always be a part of, not a replacement for, an integrated animal health programme. Such a programme is likely to involve hygiene and disinfection procedures, bio-security measures, management alterations, changes in stocking rate, vaccination and other relevant components.
32. Veterinarians together with producers should be jointly responsible for the health of animals on the farm. Veterinarians and producers should agree on policies and protocols on preventive strategies, health and treatment programmes and veterinary involvement in ongoing animal health management. These policies and protocols should comply with prudent use principles, good farming practice, and quality assurance programmes.

Prophylactic use of antimicrobials

33. Use of antimicrobials for prevention of disease can only be justified where it can be shown that a particular disease is present on the premises or is likely to occur. The routine prophylactic use of antimicrobials should never be a substitute for good animal health management.
34. Prophylactic use of antimicrobials in control programmes should be regularly assessed for effectiveness and whether use can be reduced or stopped. Efforts to prevent disease should continuously be in place aimed at reducing the need for the prophylactic use of antimicrobials.

Education and training

35. Veterinary undergraduate, postgraduate and continuing education should be evaluated to ensure that preventive medicine, prudent antimicrobial use and antimicrobial resistance are given high priority.

36. Ongoing education strategies should be developed by entities such as professional associations, relevant authorities, appropriate international organizations and/or educational institutions to provide relevant professional bodies and stakeholders with appropriately targeted information about infections, the role and benefits of prudent antimicrobial use and the risks of inappropriate use. All relevant stakeholders including the veterinary pharmaceutical industry and public health sectors should be encouraged to support this effort.
37. Continuous evaluation of the effectiveness of educational strategies for prudent use should be conducted.
38. Education strategies emphasizing the importance and benefits of prudent use principles must be developed and implemented to provide relevant information on antimicrobial resistance for producers and stakeholders. Emphasis must also be given to the importance of optimizing animal health through implementation of disease prevention programmes and good management practices.
39. The public should be informed of the human health aspects of antimicrobial use in food animals, so that they can support efforts to control antimicrobial resistance.

Research

40. Stakeholders should identify research priorities to address public health issues of antimicrobial resistance from antimicrobial use in food animals. Governments, universities, research foundations and industry should give high priority to supporting research in these areas.

Annex 1: Glossary

Antimicrobial agent

Any substance of natural, synthetic or semi-synthetic origin which at low concentrations kills or inhibits the growth of micro-organisms but causes little or no host damage.

Antimicrobial class

Antimicrobials with a related molecular structure, often with a similar mode of action. Variations in the properties of antimicrobials within a class often arise as a result of the presence of different side chains of the molecule, which confer different patterns of pharmacokinetic and pharmacodynamic behavior on the molecule.

Antimicrobial growth promoter

Antimicrobial agents used for the purpose of increasing daily weight gain or feed efficiency (feed-weight gain ratio) of food-producing animals.

Antimicrobial resistance

The ability of a micro-organism to continue to multiply or persist in the presence of therapeutic levels of an antimicrobial agent.

Antimicrobial resistance genes

Genes in micro-organisms which confer resistance to antimicrobials. These are often located on mobile genetic elements thereby enabling transmission from resistant to susceptible strains.

Containment of antimicrobial resistance

Infectious disease control measures that minimize the emergence and spread of antimicrobial-resistant micro-organisms.

Disease control

Activities aimed at preventing or curing disease in animals intended for food.

Empirical therapy

Therapy that is initiated based on observation of clinical symptoms and patient history only, without previous confirmation of diagnosis by laboratory or other methods.

Food producing animal

Animals raised for the purpose of providing food for humans. Most commonly this refers to poultry, swine, cattle and sheep, but does not exclude other domestically managed animals.

Good management/farming practices

Routine practices that minimize risk from harmful antimicrobial resistant bacteria or resistance genes through good farm management and hygiene practices (e.g. optimal housing conditions and feeding strategies) and other non-antimicrobial disease preventive strategies, whilst maximizing the productivity of food animal production.

Pharmacokinetics

The ways in which antimicrobials (principally drugs/medicines) are absorbed by, move within, and are finally eliminated from animals, humans, etc.

Pharmacodynamics

The behaviour (e.g. quick, slow, short term, long term, etc.) of an antimicrobial at its receptor site (i.e. where it initiates its effect).

Prescribing practices

The behavior of licensed medical or veterinary practitioners regarding their prescription of medicines, including such aspects as high or low propensity to prescribe such medicines, and procedural aspects such as readiness to delegate to non-medically-qualified staff decisions on repeat prescriptions and other routine demands.

Prescription-only medicines

Medicines that are only legally available to the “end user” if he/she obtains a prescription from a licensed professional (e.g. veterinarian, medical doctor, dentist).

Prophylactic use

The administration of an antimicrobial to healthy animals prior to an expected exposure to an infectious agent or, following such an exposure prior to onset of laboratory-confirmed clinical disease. Generally such usage is in a herd or flock situation and not an individual animal.

Prudent use of antimicrobials

Usage of antimicrobials, which maximizes therapeutic effect and minimizes the development of antimicrobial resistance.

Registration (Licensing, Authorization, Approval)

The process of approving a drug for marketing in a country/region. Includes assessment using particularly the criteria of safety, quality and efficacy. As a consequence of inadequate local capacity many developing countries rely on “third party certification”, i.e. granting market authorization to products approved in certain developed countries.

Regulatory authority

A government agency responsible for codifying and enforcing rules and regulations as mandated by law.

Relevant authority

An authority with jurisdiction over relevant areas of concern in relation to use of antimicrobials in animals, including registration, licensing, sale, distribution, marketing and dispensing of antimicrobial agents.

Risk

A function of the probability of an adverse health effect and the severity of that effect, consequential to a hazard.

Risk-based evaluation

Evaluation of scientific and other relevant information with the aim of obtaining a qualitative and/or quantitative estimation of the probability of occurrence and severity of known or potential adverse public health effects.

Stakeholder

A person or group of persons, or an industry, association, organization, etc. with an economic or professional interest/responsibility in an area or (involuntarily) affected by the developments in the same area. In the field of antimicrobial usage in food animals the farmers, veterinarians, animal feed manufacturers, food processors and distributors, retailers, relevant government organizations, pharmaceutical companies, consumers, public health officials, academic and other related groups are recognized as stakeholders.

Therapeutic use

Application of antimicrobials in curative doses in an adequate period of time to combat an established infection.

Zoonotic bacteria

Bacteria that are present in animal reservoirs, that can be transferred to, and cause infections in, humans.

Annex 2: The WHO Global Strategy for Containment of Antimicrobial Resistance

Executive Summary

Antimicrobial resistance among common human pathogens is emerging as a major threat to the effectiveness of health care systems around the world. In combination with HIV, antimicrobial resistance is likely to further increase the disparity in health between rich and poor, but will eventually affect everyone. Effective interventions are urgently needed to contain emerging resistance – without these the problem will inevitably worsen, with dramatic human and financial consequences.

The Global Strategy for the Containment of Antimicrobial Resistance provides a practical framework in which to identify those issues that are most influential in each region and helps to prioritize those interventions that are likely to be most effective. Implementation of the Global Strategy is in three Sections. Section 1 focuses on the emergence and spread of antimicrobial resistance among bacterial infections and tuberculosis, by establishing a framework to monitor and regulate drug usage, undertaking surveillance for antimicrobial resistance and instigating educational strategies to improve the appropriateness of human and non-human use of antibiotics. Building on these initiatives, Sections 2 and 3 will address resistance associated with malaria and viral diseases (including HIV).

The future containment of antimicrobial resistance requires a coordinated multidimensional approach in which effective change in antimicrobial usage, infection control and epidemiologically-sound resistance surveillance are key endpoints. The WHO Global Strategy aims to fulfill these goals.

More information can be obtained from:

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Switzerland
Tel: +41 22791 2303
Fax: +41 22791 4878

Annex 3: Background Documents

- Used for the preparation of the Working Document for WHO Drafting Group on Draft Global Principles for the Containment of Antimicrobial Resistance from Use of Antimicrobials in Food-Producing Animals, with the participation of FAO and OIE, 13-15 January 2000, Geneva
- Compiled by the Animal and Food-Related Health Risks Team, Department of Communicable Disease, Surveillance and Response, WHO

No	Source	Name	Year	Country/Region
1	American Association of Swine Practitioners	Basic Guidelines of Judicious Use of Antimicrobials in Pork Production	Draft	United States
http://www.aasp.org/				
2	Office International des Epizooties	Proposed Set of Minimal Requirements of Veterinary Drugs	Draft	International
http://www.oie.int/				
3	Australian Veterinary Association	Code of Practice for the Use of Drugs in Veterinary Practice	1999	Australia
http://www.farmwide.com.au/nff/vetasscn/antimicrob.htm				
4	Joint Expert Advisory Committee on Antimicrobial Resistance	The Use of Antibiotics in Food Producing Animals: Antibiotic-resistant Bacteria in Animals and Humans	1999	Australia
Http://www.health.gov.au/pubs/jetacar.htm				
5	The European Agency for the Evaluation of Medicinal Products	Antibiotic Resistance in the European Union Associated with Therapeutic Use of Veterinary Medicines	1999	European Union
http://www.eudra.org/emea.html				
6	EU Scientific Steering Committee	Opinion of the Scientific Steering Committee on Antimicrobial Resistance - 28 May 1999	1999	European Union
http://www.europa.eu.int/comm/dg24/health/sc/ssc/out50_en.html				
7	Federation of Veterinarians in Europe	Antibiotic Resistance & Prudent Use of Antibiotics in Veterinary Medicine	1999	Europe
Http://www.fve.org/papers/pdf/antibio.pdf				
8	Bayer AG	Guidelines for the Use of Quinolones in Veterinary Medicine	1999	Germany
http://www.bayerus.com/agriculture/products/pdf/GUIDE.PDF				
9	Deutsche Veterinär-Medizinische Gesellschaft	Leitlinien der BTK und der ArGeVet für den sorgfältigen Umgang mit antimikrobiell wirksamen Tierarzneimitteln	1999	Germany
Deutsches Tierärzteblatt 12/1999 pp. 1248-49				
10	Responsible Use of Medicines in Agriculture Alliance (RUMA)	RUMA Guidelines on the Responsible Use of Antibiotics	1999	United Kingdom
http://www.noah.demon.co.uk/noah/pressrel/ruma1.htm#organisations				
11	Advisory Committee on the Microbial Safety of Food	Microbial Antibiotic Resistance in Relation to Food Safety	1999	United Kingdom

No	Source	Name	Year	Country/Region
12	COMISA	Prudent Use of Antibiotics: Global Basic Principles	1999	International
http://www.comisa.org/				
13	World Veterinary Association	Prudent Use of Antibiotics: A Proposal for Global Basic Principles	1999	International
http://www.worldvet.org/press.htm				
14	World Health Organization	The Medical Impact of the Use of Antimicrobials in Food Animals	1999	International
http://www.who.int/emc-documents/antimicrobial_resistance/docs/whoemczoo974.html				
15	Standing Medical Advisory Committee	The Path of Least Resistance	1999	United Kingdom
http://www.doh.gov.uk/pub/docs/doh/smacrep.pdf				
16	Responsible Use of Medicines in Agriculture Alliance	Responsible Use of Antimicrobials in Pig Production	1999	United Kingdom
17	Food and Drug Administration, Center for Veterinary Medicine	A Proposed Framework for Evaluating and Assuring the Human Safety of the Microbial Effects of Antimicrobial New Animal Drugs Intended for Use in Food-producing Animals	1999	United States
http://www.fda.gov/cvm/fda/infores/vmac/ANTIM18.htm				
18	American Association of Bovine Practitioners	Prudent Drug Usage Guidelines	1999	United States
http://www.aabp.org/				
19	Veterinary Antibiotic Policy Working Group of DVL	Danish Veterinary Antibiotic Policy	1998	Denmark
http://www.svs.dk/dk/publikat/brugerhb99/ovroantpol.htm				
20	Economic and Social Committee of the EU	Resistance to Antibiotics as a Threat to Public Health	1998	European Union
21	House of Lords Select Committee	Resistance to Antibiotics and Other Antimicrobial Agents	1998	United Kingdom
http://www.parliament.the-stationery-office.co.uk/pa/ld199798/ldselect/ldsctech/081vii/st0701.htm				
22	CODEX Alimentarius	Draft Code of Practice for Good Animal Feeding	1998	International
23	OIE-Collaborating Centre	The Use of Antimicrobials in Animals Husbandry - Protecting Human Health	1998	International
http://www.anmv.afssa.fr/oiicc/conferences.htm				
24	Health Council of The Netherlands: Committee on Antimicrobial Growth Promoters	Antimicrobial Growth Promoters	1998	The Netherlands
25	British Veterinary Association	Report from the Antimicrobials Working Group	1998	United Kingdom

No	Source	Name	Year	Country/Region
26	American Academy of Veterinary Pharmacology and Therapeutics	Prudent Use of Antibacterials in Livestock and Poultry	1998	United States
http://www.vet.purdue.edu/bms/aavpt/pastsymposia/aavptbactresist_taskfor6_9802.html				
27	American Veterinary Medical Association	Judicious Therapeutic Use of Antimicrobials	1998	United States
http://www.avma.org/onlnews/javma/jan99/s011599b.htm				
28	EU CMO's Invitational Scientific Conference	The Microbial Threat	1997	European Union
http://www.eudra.org/humandocs/PDFs/General/988099en.pdf				
29	British Veterinary Association	Guidelines on the Prudent Use of Antimicrobials	1997	United Kingdom
http://www.bva.co.uk/				
30	Commission on Antimicrobial Feed Additives	Antimicrobial Feed Additives	1997	Sweden
31	Dr T. van den Bogaard	Dutch Veterinary Antibiotic Policy - a Personal Viewpoint	1993	The Netherlands

Annex 4: List of Participants

List of participating governmental and intergovernmental organizations, federations and associations

- ◆ Alliance for the Prudent Use of Antibiotics
- ◆ American Veterinary Medical Association
- ◆ British Veterinary Association
- ◆ COMISA (Representative Body of the Worldwide Animal Health Industry)
- ◆ Consumer International
- ◆ European Commission
- ◆ European Federation of the Animal Feed Additive Manufacturers
- ◆ Federation of Veterinarians of Europe
- ◆ Food and Agriculture Organization of the United Nations
- ◆ International Dairy Federation
- ◆ International Pig Veterinary Society
- ◆ National Pork Producers Council
- ◆ OECD Science and Technology Policy
- ◆ Office International des Epizooties
- ◆ World Trade Organization
- ◆ World Veterinary Association

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Annex 5: Agenda

Monday, 5 June 2000

TIME	SUBJECT	SPEAKER
13.00 - 14.00	Registration, Welcome Coffee	
14.00 - 15.30	Welcome Opening Introduction, Objectives/Scope	Dr David Heymann, Dr Rosamund Williams Dr Klaus Stöhr
15.30 - 16.00	Tea/Coffee	
16.00 - 18.00	Approving and licensing - requirements and reality Post approval surveillance - why and how? Quality of antimicrobials - generic and proprietary products	Dr Sharon Thompson Dr Fred Angulo Dr Mireille Chaton Schaffner
18.30 - 20.30	Reception - WHO Cafeteria	

Tuesday, 6 June 2000

08.30 - 10.30	Distribution and Sales - factors contributing to resistance Advertising and promotion. The view of a marketing department Surveillance of antimicrobial consumption - goals and examples Surveillance of antimicrobial resistance	Prof Fritz Ungemach Dr Gerhard. Greif Dr Flemming. Bager Dr Dik Mevius
10.30 - 11.00	Tea/Coffee	
11.00 - 12.30	– Consumer perspective Education and training Feasibility and effectiveness	Consumer International Dr Hans Hogerzeil
12.30 - 14.00	Lunch	
14.00- 15.30	The use of antimicrobials in farm animals: – Prudent use guidelines/treatment formularies Prophylactic treatment	Dr Ton van den Bogaard Dr Thomas Blaha
15.30 - 16.00	Tea/Coffee	
16.00 - 17.30	Antimicrobial Growth promoters: – Farmers' perspective (developed countries) Farmers perspective (developing countries)	Dr Erik Bisgaard Madsen Dr Leo Obviar

Wednesday, 7 June 2000

08.30 - 10.30	Ethics, Science and Antimicrobial Resistance - Comments for a WHO Consultation Review of electronic discussion group results	Prof Bernard Rollin Dr Henrik Wegener
10.30 - 11.00	Tea/Coffee	
11.00 - 12.30	Discussion on Draft Global Principles Document	
12.30 - 14.00	Lunch	
14.00 - 15.30	Discussion on Draft Global Principles Document (contd)	
15.30 - 16.00	Tea /Coffee	
16.00 - 17.30	Discussion on Draft Global Principles Document (contd)	

Thursday, 8 June 2000

08.30 - 10.30	Discussion on Draft Global Principles Document (contd)	
10.30 - 11.00	Tea/Coffee	
11.00 - 12.30	Discussion on Draft Global Principles Document (contd)	
12.30 - 14.00	Lunch	
14.00 - 15.30	Discussion on Draft Global Principles Document (contd)	
15.30 - 16.00	Tea/Coffee	
16.00 - 17.30	Secretariat: Preparation of Final Draft Global Principles	

Friday, 9 June 2000

08.30 - 10.30	Discussion of final document	
10.30 - 11.00	Tea/Coffee	
11.00 - 12.30	Discussion of final document Closing	