

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

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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



WORLD HEALTH ORGANIZATION  
DEPARTMENT OF COMMUNICABLE DISEASE SURVEILLANCE 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 antimicrobials<sup>1</sup>. 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 multi-faceted 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.

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<sup>1</sup> 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**

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## 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<sup>\*</sup>, 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.
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.

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<sup>\*</sup> increasingly strict measures proportional to the risk identified

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:

Coordinator  
CDS/CSR/DRS  
World Health Organization  
1211 Geneva 27  
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
<a href="http://www.aasp.org/">http://www.aasp.org/</a>				
2	Office International des Epizooties	Proposed Set of Minimal Requirements of Veterinary Drugs	Draft	International
<a href="http://www.oie.int/">http://www.oie.int/</a>				
3	Australian Veterinary Association	Code of Practice for the Use of Drugs in Veterinary Practice	1999	Australia
<a href="http://www.farmwide.com.au/nff/vetasscn/antimicrob.htm">http://www.farmwide.com.au/nff/vetasscn/antimicrob.htm</a>				
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
<a href="Http://www.health.gov.au/pubs/jetacar.htm">Http://www.health.gov.au/pubs/jetacar.htm</a>				
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
<a href="http://www.eudra.org/emea.html">http://www.eudra.org/emea.html</a>				
6	EU Scientific Steering Committee	Opinion of the Scientific Steering Committee on Antimicrobial Resistance - 28 May 1999	1999	European Union
<a href="http://www.europa.eu.int/comm/dg24/health/sc/ssc/out50_en.html">http://www.europa.eu.int/comm/dg24/health/sc/ssc/out50_en.html</a>				
7	Federation of Veterinarians in Europe	Antibiotic Resistance & Prudent Use of Antibiotics in Veterinary Medicine	1999	Europe
<a href="Http://www.fve.org/papers/pdf/antibio.pdf">Http://www.fve.org/papers/pdf/antibio.pdf</a>				
8	Bayer AG	Guidelines for the Use of Quinolones in Veterinary Medicine	1999	Germany
<a href="http://www.bayerus.com/agriculture/products/pdf/GUIDE.PDF">http://www.bayerus.com/agriculture/products/pdf/GUIDE.PDF</a>				
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
<a href="http://www.noah.demon.co.uk/noah/pressrel/ruma1.htm#organisations">http://www.noah.demon.co.uk/noah/pressrel/ruma1.htm#organisations</a>				
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
<a href="http://www.comisa.org/">http://www.comisa.org/</a>				
13	World Veterinary Association	Prudent Use of Antibiotics: A Proposal for Global Basic Principles	1999	International
<a href="http://www.worldvet.org/press.htm">http://www.worldvet.org/press.htm</a>				
14	World Health Organization	The Medical Impact of the Use of Antimicrobials in Food Animals	1999	International
<a href="http://www.who.int/emc-documents/antimicrobial_resistance/docs/whoemczoo974.html">http://www.who.int/emc-documents/antimicrobial_resistance/docs/whoemczoo974.html</a>				
15	Standing Medical Advisory Committee	The Path of Least Resistance	1999	United Kingdom
<a href="http://www.doh.gov.uk/pub/docs/doh/smacrep.pdf">http://www.doh.gov.uk/pub/docs/doh/smacrep.pdf</a>				
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
<a href="http://www.fda.gov/cvm/fda/infores/vmac/ANTIM18.htm">http://www.fda.gov/cvm/fda/infores/vmac/ANTIM18.htm</a>				
18	American Association of Bovine Practitioners	Prudent Drug Usage Guidelines	1999	United States
<a href="http://www.aabp.org/">http://www.aabp.org/</a>				
19	Veterinary Antibiotic Policy Working Group of DVL	Danish Veterinary Antibiotic Policy	1998	Denmark
<a href="http://www.svs.dk/dk/publikat/brugerhb99/ovroantpol.htm">http://www.svs.dk/dk/publikat/brugerhb99/ovroantpol.htm</a>				
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
<a href="http://www.parliament.the-stationery-office.co.uk/pa/ld199798/ldselect/ldsctech/081vii/st0701.htm">http://www.parliament.the-stationery-office.co.uk/pa/ld199798/ldselect/ldsctech/081vii/st0701.htm</a>				
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
<a href="http://www.anmv.afssa.fr/oiicc/conferences.htm">http://www.anmv.afssa.fr/oiicc/conferences.htm</a>				
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
<a href="http://www.vet.purdue.edu/bms/aavpt/pastsymposia/aavptbactresist_taskfor6_9802.html">http://www.vet.purdue.edu/bms/aavpt/pastsymposia/aavptbactresist_taskfor6_9802.html</a>				
27	American Veterinary Medical Association	Judicious Therapeutic Use of Antimicrobials	1998	United States
<a href="http://www.avma.org/onlnews/javma/jan99/s011599b.htm">http://www.avma.org/onlnews/javma/jan99/s011599b.htm</a>				
28	EU CMO's Invitational Scientific Conference	The Microbial Threat	1997	European Union
<a href="http://www.eudra.org/humandocs/PDFs/General/988099en.pdf">http://www.eudra.org/humandocs/PDFs/General/988099en.pdf</a>				
29	British Veterinary Association	Guidelines on the Prudent Use of Antimicrobials	1997	United Kingdom
<a href="http://www.bva.co.uk/">http://www.bva.co.uk/</a>				
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

### List of individual participants

#### Ms Marina Abdul Rahman

Research Officer  
Department of Veterinary Services  
Veterinary Public Health Laboratory  
Ministry of Agriculture  
Pesiaran Barat  
46630 Selangor  
Malaysia  
Tel: +603 7570960  
Fax: +603 7570973

#### Dr Dorothee André-Schoboboda

Directorate General  
Health and Consumer Protection  
Office 1/41  
European Commission  
Rue de la Loi, 86  
1040 Brussels  
Belgium  
Tel: +32 22962315  
Fax: +32 22965963  
Dorothee.Andre-  
Schoboboda@cec.eu.int

#### Dr Frederick J. Angulo

Foodborne and Diarrheal Diseases  
Branch  
Centers for Disease Control and  
Prevention  
National Centers for Infectious  
Diseases  
1600 Clifton Road  
Mailstop A-38  
Atlanta 30333  
United States of America  
Tel: +1 4043715405  
Fax: +1 4043715444  
fja0@cdc.gov

#### Dr Flemming Bager

Danish Veterinary Laboratory  
Ministry of Agriculture and  
Fisheries  
Bulowsvej, 27  
1790 Copenhagen  
Denmark  
Tel: +45 35300152  
Fax: +45 35300120  
flb@svs.dk

#### Dr Mary Barton

Director  
School of Pharmacy and Medical  
Sciences  
Institute of Medical and Veterinary  
Science  
University of South Australia  
GPO Box 2471  
Adelaide SA 50001  
Australia  
Tel: +61 883022933  
Fax: +61 883022389  
mary.barton@unisa.edu.au

#### Dr David Bell

Office of the Director  
National Centre for Infectious  
Diseases  
Centers for Disease Control and  
Prevention  
1600 Clifton Road N.E.  
(mail code C-12)  
Atlanta 30333  
United States of America  
Tel: +1 4046392603  
Fax: +1 4046394197  
dmb1@cdc.gov

**Prof Thomas G. Blaha**

Clinical and Population Sciences  
University of Minnesota  
College of Veterinary Medicine  
385 AnSci/VetMed Building  
1988 Fitch Avenue  
St Paul MN 55108  
United States of America  
Tel: +1 616258290  
Fax: +1 616251210  
blaha002@tc.umn.edu

**Dr Thomas Burkgren**

American Association of Swine  
Practitioners  
International Pig Veterinary Society  
902 1st Avenue  
Perry, IA 50220  
United States of America  
Tel: +1 515465255  
Fax: +1 5154653832  
aasp@netins.net

**Dr Robin Bywater**

FEFANA - European Federation of  
Animal Feed Additive  
Manufacturers  
Rue Defacqz, 1  
1000 Brussels  
Belgium  
Tel: +32 25383911  
Fax: +32 25393415  
Bywatr00@Pfizer.com

**Dr Mark F. Cantley\***

Head  
Biotechnology Unit  
OECD Science and Technology  
Policy Division  
2, Rue André Pascal  
75775 Paris Cédex 16  
France  
Tel: +33 145248200  
Fax: +33 145249767  
mark.cantley@cec.eu.int

**Dr Thongchai Chalermchaikit**

Director  
Centre for Antimicrobial Resistance  
Monitoring in Foodborn Pathogens  
(CARMFP)  
Faculty of Veterinary Medicine  
Chulalongkorn University  
Henri-Dunant St  
10330  
Bangkok  
Thailand  
Tel: +66 22189671  
Fax: +66 2189587, 66 2511656  
thongchai.c@chula.ac.th

**Dr Mireille Chaton-Schaffner**  
CEVA Santé Animale S.A.  
La Ballastière  
B.P. 126  
33550 Libourne Cedex  
France  
Tel: +33 557554040  
Fax: +33 557554198

**Dr Peter Collignon**

Infectious Diseases Unit and  
Microbiology Department  
A.C.T. Pathology  
Canberra Clinical School  
Sydney University  
The Canberra Hospital  
PO Box 11  
Woden ACT 2606  
Australia  
Tel: +61 262442105  
Fax: +61 262810349  
peter.collignon@act.gov.au

**Dr Paul Cook**

Principal Scientist  
Food Safety Policy Division  
Food Standards Agency  
Room 513A  
Skipton House  
80 London Road  
SE1 6LH London  
United Kingdom  
Tel: +44 02079725343  
Fax: +44 02079725141  
paul.cook@foodstandards.gsi.gov.uk

**Prof Martin Cormican**

Consultant Microbiologist  
Medical Microbiology  
University College Hospital  
Newcastle Road  
Galway  
Ireland  
Tel: +35 39544146  
Fax: +35 39524216  
martincormican@bsi.ie

**Dr Anno de Jong**

Animal Health Business Unit  
Antiinfectives  
Bayer AG  
51368 Leverkusen  
Germany  
Tel: +49 2173384475  
Fax: +49 2173383517  
anno.jong.aj@bayer-ag.de

**Dr Jim Edwards**

President  
World Veterinary Association  
5 Kakariki Grove  
6454 Waikanae  
New Zealand  
Tel: +64 44714138  
Fax: +64 42934977  
edwardsj@maf.govt.nz

**Dr Richard Ellis**

Visiting Scientist  
Food and Nutrition Division  
Food and Agriculture Organization  
of the United Nations  
Room C-282  
Via delle Terme di Caracalla  
00100 Rome  
Italy  
Tel: +39 0657053523  
Fax: +39 0657054593  
Richard.Ellis@fao.org

**Dr. Gerhard Greif**

Director  
Business Affairs  
Elanco Animal Health, Lilly  
Germany  
Teichweg 3  
35396 Giessen  
Germany  
Tel: +49 6419533651  
Fax: +49 6419533660  
greif\_gerhard@lilly.com

**Dr Michael Hansen**  
Research Associate  
Consumer Policy Institute  
Consumers Union  
101 Truman Avenue  
10703-1057 New York  
United States of America  
Tel: +1 9143782452  
Fax: +1 9143782928  
hansmi@consumer.org

**Dr Diana Hermawati\***  
Chief  
Veterinary Drug Assay Laboratory  
Directorate General of Livestock  
Services  
Jl. Harsono RM No3  
16340 Bogor - West Java  
Indonesia  
Tel: +62 217560602  
Fax: +62 217560602

**Dr Richard Hoop**  
Institute for Veterinary Bacteriology  
University of Zurich  
Winterthurerstr. 270  
8057 Zurich 1  
Switzerland  
Tel: +41 13651121  
Fax: +41 13130130

**Dr Wongtavatchai Janenuij**  
Deputy Director  
Centre for Antimicrobial Resistance  
Monitoring in Foodborne Pathogens  
Faculty of Veterinary Science  
Chulalongkorn University  
Thailand  
Tel: +66 22189586  
Fax: +66 22189587  
janenuij.w@chula.ac.th

**Prof. Shaohong Jin**  
Deputy Director  
Antibiotic Division  
National Institute for the Control of  
Pharmaceutical and Biological  
Products  
Temple of Heaven  
100050 Beijing  
China  
Tel: +86 1067017755  
Fax: +86 1067013755  
+86 106708094  
Jinshh@nicpbp.org.cn

**Prof Ivan Nikolov Kaloyanov**  
Head  
Department of Food Hygiene  
National Veterinary Salmonella  
Centre  
Central Veterinary Research  
Institute  
15 Pencho Slaveykov Blvd  
1606 Sofia  
Bulgaria  
Tel: +359 254971  
Fax: +359 29525306  
director@iterra.net

**Dr Mayumi Kijima**  
Senior Researcher  
Antibiotic Section  
National Veterinary Assay  
Laboratory  
Ministry of Agriculture, Forestry  
and Fisheries  
1-15-1 Tokura  
Kokubunji.shi  
Tokyo  
Japan  
Tel: +81 423211841  
Fax: +81 423211769  
[mayumik@nval.go.jp](mailto:mayumik@nval.go.jp)

**Dr Alex Koulikovskii**  
WHO Collaborating Centre for  
Veterinary Sanitation and  
Food Hygiene,  
All-Russian State Research Institute  
for Control of Standardization and  
Certification of Veterinary  
Preparations (VGNKI)  
5 Zvenigorodskoe Shoesse  
Moscow 123022  
Russian Federation  
Tel: +70 951676826  
Fax: +70 959664546  
vgnki-vet@mtu-net.ru

**Mrs Zhu Lijun**  
No. 3 Testing Division  
China Control Institute of  
Veterinary Drugs  
30 Baishiqiao Road  
100081 Beijing  
China  
Tel: +86 62178844 Ext 3291  
Fax: +86 1062170639  
[zhulijun@sohu.com](mailto:zhulijun@sohu.com)

**Dr Johan Lindblad**  
Kronfaagel  
P.O. Box 561  
291 25 Kristianstad  
Sweden  
Tel: +46 281400  
Fax: +46 281460  
[johan.lindblad@kronfaagel.se](mailto:johan.lindblad@kronfaagel.se)

**Dr Erik Bisgaard Madsen**  
Director  
Veterinary and Food Advisory  
Service  
Danish Bacon and Meat Council  
Axelborg - Axeltovej 3  
1609 Copenhagen V  
Denmark  
Tel: +45 33732569  
Fax: +45 33931023  
EBM.POAxelborg.DS  
@danskesslagterier.dk

**Mr Joao Magalhaes**  
Counsellor  
Agriculture and Commodities  
Division  
World Trade Organization  
154 rue de Lausanne  
1211 Geneva  
Switzerland  
Tel: +41227395010  
Fax: +41 227395760  
[joao.magalhaes@wto.org](mailto:joao.magalhaes@wto.org)

**Dr Jean-Louis Martel**  
Laboratoire d'Etude et de Recherche  
en Pathologie Bovine et Hygiène  
des Viandes  
Laboratoire de Pathologie Bovine  
Agence Française de Sécurité  
Sanitaire des Aliments  
31, avenue Tony Garnier  
69364 LYON Cedex 07  
France  
Tel: +33 478726543  
Fax: +33 478619145  
[jl.martel@lyon.afssa.fr](mailto:jl.martel@lyon.afssa.fr)

**Dr Dik J. Mevius\***

Department of Bacteriology  
Institute for Animal Science and Health  
Edelhertweg 15,  
P.O. Box 65  
Lelystad  
Netherlands  
Tel: +31 320238238  
Fax: +31 320238153  
d.j.mevius@id.dlo.nl

**Dr David Miller**

Vice-President  
British Veterinary Association  
7 Mansfield Street  
W1M 0AT London  
United Kingdom  
Tel: +44 171636 6541  
Fax: +44 171436 2970  
bvahq@bva.co.uk

**Prof Eric S. Mitema**

Professor of Pharmacology and Toxicology  
Faculty of Veterinary Medicine  
University of Nairobi  
P.O. Box 29053  
Nairobi  
Kenya  
Tel: +254 2630034  
Fax: +254 2631325  
phealth@nbnet.co.ke

**Dr Tony Mudd**

Acting Secretary-General/Vice President  
Representative Body of the Worldwide Animal Health Industry (COMISA)  
Rue Defacqz, 1  
1000 Brussels  
Belgium  
Tel: +32 2541 0111  
Fax: +32 25410119  
[comisa@comisa.org](mailto:comisa@comisa.org)

**Dr Leo A. Obviar**

San Miguel Foods, Inc  
Banay-Banay,  
4026 Laguna  
Philippines  
Tel: +63 495313298  
Fax: +63 26323090  
obviardvm@smfg.sanmiguel.com.ph

**Dr Francis Otim**

Head  
Drug Registration and Assessment  
National Drug Authority  
Plot 93, Buganda Road  
P.O. Box 23096  
Kampala  
Uganda  
Fax: +25 641255758  
nda@imul.com

**Prof. Jean-Claude Pechere\***

Secretary-General  
(Department of Genetics and Microbiology, University of Geneva)  
International Society of Chemotherapy  
C.M.U. Michel Servet 1  
1211 Geneva  
Switzerland  
Tel: +41 227025656  
Fax: +41 227025702  
pechere@medecine.unige.ch

**Dr Knud Borge Pedersen**

Director  
Ministry of Food, Agriculture and Fisheries  
Danish Veterinary Laboratory  
27, Bülowsvej  
DK 1790 V Copenhagen  
Denmark  
Tel: +45 35300123  
Fax: +45 35300120  
kbp@svs.dk

**Dr Silvio Pitlik**

Director  
Department of Medicine and Infectious Diseases  
Rabin Medical Center  
Beilinson Campus  
41900 Petahh Tikva, Tel Aviv  
Israel  
Tel: +97 297431797  
Fax: +97 297601846  
[pitlik@inter.net.il](mailto:pitlik@inter.net.il)

**Prof. Bernard E. Rollin**

Director of Bioethical Planning  
Department of Philosophy  
Colorado State University  
Fort Collins  
CO 80523-1781  
United States of America  
Tel: +1 9704916885  
Fax: +1 9704914900  
brollin@vines.colostate.edu

**Dr Barbara Röstel**

OIE Collaborating Centre for Veterinary Medicinal Products (ANMU-AFFSA)  
BP 203  
35302 Fougères Cedex  
France  
Tel: +33 299947895  
Fax: +33 299947899  
b.rostel@anmv.afssa.fr

**Dr J. Schindler**

Center of Epidemiology and Microbiology  
Srobarova 48  
100 34 Prague 10  
Czech Republic  
Fax: +42 0267162516  
schind@cesnet.cz

**Dr Thomas Shryock**

Technical Advisor  
Microbiology  
Elanco Animal Health  
2001 W. Main St., GL18  
P.O. Box 708  
Greenfield  
Indiana 46140  
United States of America  
Tel: +1 3172775087  
Fax: +1 3172774532  
trs@lilly.com

**Dr K. Larry Smith**

Department of Animal Science  
Ohio Agricultural Research and Development Center  
The Ohio State University  
1680 Madison Avenue  
Wooster OH 44691  
United States of America  
Tel: +1 3302633804  
Fax: +13302633603  
smith.149@osu.edu

**Prof. Arpad Somogyi\***

Director  
Directorate General, Health and  
Consumer Protection  
European Commission  
Rue de la Loi, 86  
1049 Brussels  
Belgium  
Tel: +32 22958392  
Fax: +32 22954711  
arpad.SOMOGYI@dg24.cec.be

**Mrs Gretchen Stanton-Heimpel**

Senior Counsellor  
Agriculture and Commodities  
Division  
World Trade Organization  
(WTO/OMC)  
159, rue de Lausanne  
1211 Geneva 21  
Switzerland  
Tel: +41 227395086  
Fax: +41 227395760  
gretchen.stanton@wto.org

**Dr Paul Sundberg**

Assistant Vice-President, Veterinary  
Issues  
National Pork Producers Council  
PO Box 10383  
Des Moines 50306  
United States of America  
Tel: +1 515 223 2764  
Fax: +1 515223 2646  
sundbergp@nppc.org

**Dr Robert Sykes**

Senior Agricultural Management  
Advisor to the Registrar of  
Fertilisers, Farm Feeds,  
Agricultural Remedies and Stock  
Remedies  
National Department of Agriculture  
Private Bag X343  
0001 Pretoria  
South Africa  
Tel: +27 123196671  
Fax: +27 12319179  
sykes@nda.agric.za

**Dr Sharon Thompson**

Associate Director for Veterinary  
Medical and International Affairs  
Center for Veterinary Medicine  
Food and Drug Administration  
7500 Standish Place  
Rockville 20855  
United States of America  
Tel: +1 3015941798  
Fax: +1 3015941830  
STHOMPSON@CVM.FDA.GOV

**Prof. Fritz R. Ungemach**

Director  
Institut for Pharmacology,  
Pharmacy, and Toxicology  
University of Leipzig  
Faculty of Veterinary Medicine  
An den Tierkliniken 15  
04103 Leipzig  
Germany  
Tel: +49 3419738131  
Fax: +49 3419738149  
ungemach@rz.uni-leipzig.de

**Dr Ton van den Bogaard**

Department of Medical  
Microbiology  
University of Maastricht  
P.O. Box 616  
6200 MD Maastricht  
Netherlands  
Tel: +31 433881015  
Fax: +31 433884161  
a.vandenbogaard@cpv.unimaas.nl

**Dr Jean Vignal**

Food Law Manager  
Nestec SA  
Avenue de Nestlé 55  
CH-1800 Vevey  
Switzerland  
Tel: +41 219243501  
Fax: +41 219244547  
jean.vignal@nestle.com

**Dr Lyle Vogel**

Director  
Scientific Activities  
American Veterinary Medical  
Association  
1931 North Meacham Road  
Suite 100  
Schaumburg IL 60173-4360  
United States of America  
Tel: +1 8479258070  
Fax: +1 8479251329  
LVogel@avma.org

**Dr Haruo Watanabe**

Director  
Department of Bacteriology  
National Institute of Infectious  
Diseases  
Toyama 1-23-1  
162-8640 Tokyo  
Japan  
Tel: +81 352851111 Ext 2201  
Fax: +81 352851171  
haruwata@nih.go.jp

**Dr Valdir Welte\***

Animal Health Officer  
Agriculture Department  
Food and Agriculture Organization  
Viale delle Terme di Caracalla  
I-00100 Rome  
Italy  
Tel: +39 652253897  
Fax: +39 652255749/5782610  
Valdir.Welte@fao.org

**Prof. M. Wierup**

Head  
Swedish Animal Health Service  
121 86 Johanneshov  
Sweden  
Tel: +46 87258261  
Fax: +46 87258172  
martin.wierup@svdhv.org

**Prof Boleslaw Wojton**

Head  
Department of Food Animal  
Hygiene  
National Veterinary Institute  
Al. Partyzantow 57  
24-100 Pulawy  
Poland  
Tel: +48 818863051 ext 176  
Fax: +48 818862595  
wojton@piwet.pulawy.pl

**WHO Secretariat**

**Dr Peter Braam**

Animal and Food-Related Public  
Health Risks,  
Department of Communicable  
Disease, Surveillance and Response  
World Health Organization  
1211 Geneva 27  
Switzerland  
Tel: +41 227912607  
Fax: +41 227914893  
braamp@who.int

**Dr David Heymann**

**Executive Director for  
Communicable Diseases**  
World Health Organization  
1211 Geneva 27  
Switzerland  
Tel: +41 227912214  
Fax: +41 227914752  
marip@who.int

**Dr Klaus Stöhr (Secretary)**

Animal and Food-Related Public  
Health Risks  
Department of Communicable  
Disease, Surveillance and Response  
World Health Organization  
1211 Geneva 27  
Switzerland  
Tel: +41 227912607  
Fax: +41 227914893  
stohrk@who.int

**Dr Lieven Uytterhaegen**

INPPAZ - OPS/OMS  
Casilla de Correo  
Talcahuano 1660  
Martinez (1640)  
Buenos Aires  
Argentina  
Tel: +54 17920087/88  
Fax: +54 17930927  
ulieven@inppaz.ops-oms.org

**Dr Henrik Caspar Wegener**

Animal and Food-Related Public  
Health Risks  
Department of Communicable  
Disease, Surveillance and Response  
World Health Organization  
1211 Geneva 27  
Switzerland  
Tel: +41 227912842  
Fax: +41227914893  
wegenerh@who.int

**Dr Rosamund Williams**

Coordinator  
Anti-infective Drug Resistance  
Surveillance and Containment  
Department of Communicable  
Disease, Surveillance and Response  
World Health Organization  
1211 Geneva 27  
Switzerland  
Tel: +41 227912303  
Fax: +41 227914893  
williamsr@who.int

\* Unable to attend

## Annex 5: Agenda

*Monday, 5 June 2000*

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

*Tuesday, 6 June 2000*

08.30 - 10.30	<b>Distribution and Sales - factors contributing to resistance</b> <b>Advertising and promotion. The view of a marketing department</b> <b>Surveillance of antimicrobial consumption - goals and examples</b> <b>Surveillance of antimicrobial resistance</b>	<b>Prof Fritz Ungemach</b> <b>Dr Gerhard. Greif</b> <b>Dr Flemming. Bager</b> <b>Dr Dik Mevius</b>
10.30 - 11.00	Tea/Coffee	
11.00 - 12.30	<ul style="list-style-type: none"> <li>- <b>Consumer perspective</b></li> <li>- <b>Education and training</b></li> <li>- <b>Feasibility and effectiveness</b></li> </ul>	<b>Consumer International</b> <b>Dr Hans Hogerzeil</b>
12.30 - 14.00	Lunch	
14.00- 15.30	<b>The use of antimicrobials in farm animals:</b> <ul style="list-style-type: none"> <li>- <b>Prudent use guidelines/treatment formularies</b></li> <li>- <b>Prophylactic treatment</b></li> </ul>	<b>Dr Ton van den Bogaard</b> <b>Dr Thomas Blaha</b>
15.30 - 16.00	Tea/Coffee	
16.00 - 17.30	<b>Antimicrobial Growth promoters:</b> <ul style="list-style-type: none"> <li>- <b>Farmers' perspective (developed countries)</b></li> <li>- <b>Farmers perspective (developing countries)</b></li> </ul>	<b>Dr Erik Bisgaard Madsen</b> <b>Dr Leo Obviar</b>

*Wednesday, 7 June 2000*

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

*Thursday, 8 June 2000*

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

*Friday, 9 June 2000*

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