

Antibiotic Resistance and Use in Malta

A report of a working group setup by the health department

PREFACE

The following is a report summarising the conclusions of an ad-hoc working group established by the Director General - Health Division to evaluate the diverse issues pertinent to antibiotic prescribing in the Maltese Islands.

The members of the working group were:

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The working group discussed the following issues as part of its terms of reference

- Encouragement of more prudent use of antimicrobials;
- Emphasis given to infectious diseases and antimicrobial therapy in undergraduate curricula;
- Drug licensing system;
- The extent of over-the-counter antibiotic sales and appropriate measures or legislation to reduce such practices;
- Assistance that can be provided by international organisations;

- Use of antibiotics in the veterinary field;
- Safeguarding the effectiveness of antimicrobials on a national level.

INTRODUCTION

- 0.1. There are many instances in the medical literature where the treatment of potentially life threatening infections has been compromised by the advent of bacterial resistance.
- 0.2. It is therefore not surprising that the issue of antibiotic resistance has come under the scrutiny of national bodies in the past years. Additionally since international spread of resistance is a well recognised phenomenon, international organisations within and outside the medical field have expressed their concern at this phenomenon. In fact, the European Union, within Council Resolution [1999/C 195/01] of 8 June 1999, calls upon the member states:
- ❑ to establish multi-disciplinary and cross-sectorial policies in order to facilitate the containment of the spread of antibiotic resistance;
 - ❑ to co-operate in order to enable an effective comparable monitoring of the supply and use of antibiotics and an effective comparable surveillance of antibiotic resistance;
 - ❑ to maintain the principle of antibiotics authorised as human and veterinary medicine being 'prescription-only-medicines' and to ensure vigilance on the implementation of this principle;
 - ❑ to promote adherence to the principles of infection control, both in hospital and non-hospital care, as well as in animal production;
 - ❑ to promote optimal prescribing and use of antibiotics (through professional education, guidelines, etc.) and to prevent their unnecessary and inappropriate use in human and veterinary medicine;
 - ❑ to promote actions aimed at raising the awareness of health professionals, farmers and the general public of the problem of antibiotic resistance;
 - ❑ to promote health oriented animal production systems, thus reducing the need for antibiotics.
- 0.3. There is plenty of evidence that, if one removes the selection pressure, the organisms will slowly revert to susceptibility, some types of organisms more quickly than others, and to certain antibiotics more quickly than to others.

- 0.4. Countries with firmer controls on the supply and use of antibiotics, and more rigorous infection control measures, have lower rates of resistant strains, and it is generally assumed that these things are connected. Holland and Denmark have amongst the lowest incidence of methicillin-resistant *Staphylococcus aureus* (MRSA), due to their effective antibiotic and infection control policies. Spain has the highest consumption of anti-infectives per capita in Europe, and one of the worst records of antibiotic resistance.
- 0.5. Although antibiotic resistance is encountered everywhere, there are special problems in hospitals and other health care institutions.
- 0.6. Antibiotics are special modern therapeutic agents with the following characteristics:
 - 0.6.1. Despite being highly specialised drugs requiring in-depth knowledge of use, antibiotics are prescribed by all doctors, who in some cases may have only basic training in their proper use.
 - 0.6.2. This group of therapeutics exhibits considerable overlap of intra-class therapeutic efficacy. For example, there are many cephalosporins and macrolides with very similar spectrum of activity but with major differences in cost.
 - 0.6.3. Antibiotics are frequently administered to healthy patients as prophylactic agents..
 - 0.6.4. Cross resistance often operates within a given class of antibiotics or occasionally to unrelated compounds.
 - 0.6.5. Incorrect antibiotic use will not only (as with any other drug) have detrimental effects for the patient under treatment but in addition has far-reaching repercussions for current and future generations of patients. It is agreed that incorrect use of antibiotics is the single most important factor in the development of resistant bacteria. These in turn will require even more stronger antibiotics to be used, resulting in even more resistance. The result is a never ending spiral of microbial resistance, costs, patient morbidity and mortality.

- 0.6.6. There is also a clear ethical issue in antibiotic misuse since the development of resistance will have a clear impact on future generations. Awareness of such potential implications of improper treatment is vital for all healthcare professionals and the public.
- 0.6.7. Additionally, resistance in micro-organisms within livestock may be passed on to humans via the food chain.

LOCAL

1. Legal status of antibiotics

- 1.1. Antibiotics authorised as human and veterinary products are classified as prescription-only-medicines (POM).
- 1.2. There is a trend in the USA as well as in some European countries to deregulate some antibiotics for topical use. This was discussed within the working group, which was, however, of the opinion that all topical antibiotics should remain POM.
- 1.3. It is possible that, due to the increase in resistance of certain organisms e.g. *Pseudomonas aeruginosa*, antibiotics currently available in topical form because of their toxicity, may have to be utilised in their parenteral form in spite of the risks entailed.

2. Antibiotic licensing

- 2.1. Whilst acknowledging that this issue involves all medicinal products, to-date no required structures exist to ensure that all antibiotics imported are of good quality, efficacy and safety.

3. Data on antibiotic prescribing

- 3.1. There is a paucity of national data elucidating prescribing practices in any detail at any level. The only data that can be obtained to-date on antibiotic use originates from Port Health, namely global antibiotic importation figures. This data is grossly unsuitable for any surveillance purposes.
- 3.2. Even at government hospital level, the data is only available on total purchases of antibiotics by the Government Pharmaceutical Services. This current state of affairs is not conducive to any meaningful surveillance exercises and clearly needs to be improved if any system of auditing is to be introduced.
- 3.3. A report by the Infection Control Unit estimated in January 1998 antibiotic expenditure in the health services in the region of Lm 1 million per year. The report also indicated that a considerable element of misuse may be present.
- 3.4. This state of affairs clearly must improve. It is inconceivable that even basic data is not available, as this is crucial in auditing and surveillance. No initiative to improve antibiotic prescribing can succeed until accurate data on consumption by the different users in the equation is available.

4. Current status of antibiotic resistance

- 4.1. It is very difficult to stipulate with certainty the level of antibiotic resistance in Malta. The reason for this lies in the fact that the reporting system of the Bacteriology Laboratory is currently incapable of undertaking any meaningful data interpretation and surveillance.
- 4.2. What information is available is the result of individual initiatives and research. The results of these initiatives, although scanty, would indicate that a problem of resistance does exist particularly within the tertiary care settings.

- 4.2.1. Current research by the Infection Control Unit into *Staphylococcus aureus* septicaemia as part of its participation in the European Antimicrobial Resistance Surveillance System indicates that approximately 40% of hospital originating *Staphylococcus aureus* isolates from blood cultures are multiresistant MRSA. This compares very poorly with 1% levels reported in Northern Europe and Scandinavia.
- 4.3. On the other hand, resistance in the community does not appear to be a major issue as highlighted in the paucity of reports of significantly resistant isolates from community specimens. Isolated cases of resistance in community strains to a number of antibiotics such as clindamycin, ciprofloxacin, sodium fusidate have nevertheless been recorded from time to time. However, more data is needed for a complete picture to be properly elucidated.
- 4.4. It has been noted that private laboratories are not required to notify any multi-resistant isolates encountered. The situation in private hospitals and the community is, thus, unknown.
- 4.5. Meaningful data is also unavailable on resistant patterns in micro-organisms within livestock.

5. Use of antibiotics in the community

- 5.1. The working group has highlighted a number of discrepancies in antibiotic use in the community which require rectification:
- 5.1.1. The working group could not arrive at a definite conclusion on the extent of over-the-counter (OTC) prescribing in the community. Several members, however, were convinced that this occurs regularly in a number of community pharmacies. Antibiotics are often being dispensed without prior medical examination or prescription, based at best, solely on symptomatology. This is of course highly unethical as well as illegal since all antimicrobials are legally prescription only medicinals (POM).

5.1.2. Another situation of concern involves 'over the phone' prescribing, wherein family doctors recommend antibiotic treatment to patients over the telephone after which these patients go to the community pharmacist and verbally request the specific antibiotic..

5.1.3. Many prescriptions for antibiotics are not being filled in properly or legibly by the physicians having key details missing. In addition, the fact that the patients ends up keeping the prescription results in the possibility of future re-use

5.1.4. Another issue involves brand substitution wherein pharmacists substitute a prescribed product with another of the same generic constitution but having a different brand name. It is acknowledged that it is impossible for pharmacies to stock all brands available on the market. In situations when an antibiotic prescribed is not available, the opinion of the majority in the working group was that the pharmacist should contact the prescriber and obtain authorisation for such a substitution.

5.1.4.1. The Chamber of Pharmacists however contends that pharmacists, as an independent profession and not an appendage of the medical profession, should not be required to seek authorisation from another health care professional on such matters.

5.1.5. More rational and prudent approaches to the use of antibiotics in the community are needed. No disease based guidelines exist for the treatment of common infections.

5.2. The working group is also concerned by a consistent feedback of a pro-antibiotic culture within the Maltese population where patients exert pressure on both doctors as well as pharmacists to prescribe/dispense antibiotics for minor ills. Such a state of affairs requires urgent intervention through educational measures.

6. Use of antibiotics in hospitals

6.1. There is clear evidence of misuse of antibiotics in the hospital setting, particularly in tertiary care, including:

- ❑ use of antimicrobials for situations where anti-infective therapy is not indicated;
- ❑ inappropriate choice of empirical antibiotics;
- ❑ the use of broad spectrum agents when narrower spectrum products would suffice;
- ❑ overlapping spectra of activity when combinations are administered;
- ❑ excessive duration of therapy or prophylaxis;
- ❑ chemoprophylaxis not in line with international, evidence-based literature;

6.2. The picture for antibiotic resistance in St. Luke's Hospital raises major concern. The endemicity of methicillin-resistant *Staphylococcus aureus* (MRSA) has already been stated. In addition isolates of multi-drug resistant *Pseudomonas* and *Acinetobacter* species occur at a worrying frequency. Many of these are now only sensitive to polymixin B, a highly toxic antibiotic when given by the parenteral route.

6.3. It is clear that the Division must upgrade its administrative and managerial input towards improving antibiotic prescribing in hospital care.

6.3.1. An Antibiotic sub-committee was re-instituted in 1998 after a number of inactive years. However this Committee has not met for more than a year and clearly needs revamping. Even if the Committee were to be meeting regularly it is evident that a day-to-day executive involvement is required.

6.3.2. The current Antibiotic Policy is outdated and clearly needs review and publication in a user-friendly manner.

6.3.3. It should be however noted that for the first time in the Division, the post of Consultant in Hospital Infection Control incorporates administrative responsibility to manage antibiotic auditing and improve prescribing.

6.3.4. The posting of a pharmacist on antibiotic auditing duties, albeit initially on a part-time basis, is also encouraging.

- 6.4. There is very little control on antibiotic prescribing in hospitals. Antibiotics designated as consultant drugs usually require a covering letter or a susceptibility report. In practice, however, consultants can prescribe any antibiotic in any situation, especially in specialised units such as Intensive Care, where the impact of resistance is particularly worrying.
- 6.5. It should also be kept in mind that control of antibiotic resistance in the hospital setting is also highly dependent on adequate measures for prevention and control of nosocomial infections. It is, therefore, vital that due attention is given to ensure that health-care facilities adopt stringent infection control measures to reduce the likelihood of spread as well as minimise endemic and epidemic spread of multi-resistant organisms.
- 6.5.1. Improved surveillance of nosocomial infection rates is a target of the Infection Control Unit. Surveillance serves to pinpoint areas requiring intervention and offers an auditing system of quality of care.
- 6.5.1.1. Additional trained staff will be required by the Unit to fulfil such goals. To this end, a request for the appointment of a Scientific Officer to undertake training in Epidemiology with a view to establishing a surveillance infrastructure within the Unit, has been forwarded to the Health Division.

7. Undergraduate and CME training

- 7.1. It is the opinion of the working group that both Pharmacy students and Medical students are receiving a reasonable exposure to the subject. Pharmacy students have long been receiving this education (3 credits), whereas medical students now have a credit of circa 16 lectures. In these lectures emphasis is made on the principles involved in correct antibiotic prescribing for both treatment and prophylaxis..

- 7.2. Lectures are also provided to medical students on specific infectious diseases in the general modules. It is, however, noted that many universities abroad are regarding the subject of infectious diseases as a module of its own accord. This would allow a focused approach to the subject and, especially if linked with the Pharmacology module may provide a better alternative.
- 7.3. The absence of a training programme for hospital doctors raises concern. This group accounts for the use of the largest proportion of antibiotics, particularly of the second and third line which are the most expensive and where resistance can be most problematic. From experience CME initiatives are often poorly attended and then, predominantly by junior staff.
- 7.4. Professional development opportunities are mainly available for family doctors and pharmacists. These are organised by the respective professional organisations at times with the support of pharmaceutical companies. Pharmaceutical companies also organise lectures with invited local or foreign speakers.
- 7.4.1. However, the need is felt for specific multidisciplinary programmes on antibiotics and infectious diseases for community practitioners.

8. Veterinary use of antibiotics

- 8.1. The Department of Veterinary Services has 3 roles in the control of antibiotic use:
- Regulation of Importation
 - Registration of imported products
 - Laboratory analysis of antibiotic residues in local meats
- 8.2. The Department follows EU guidelines and is in process of drafting legislation following respective EU Directives.

- 8.2.1. In the EU all antibiotics for veterinary use are available only against a veterinary prescription. Each individual farm should have a veterinarian responsible for its antimicrobial input, including mass prophylaxis.
- 8.3. The Department of Veterinary Services is working in collaboration with Port Health to ensure that products containing antibiotic growth promoters are not licensed and imported.
- 8.4. Veterinary prescriptions are dispensed from both from community pharmacies or from the licensed Veterinary Pharmacies, currently two.
- 8.5. The Director of Veterinary Services is recommending that veterinary medicinals be dispensed only by pharmacists in possession of an M.Sc. (Agricultural & Veterinary Pharmacy).
- 8.5.1. However the Chamber of Pharmacists objects to this concept stating that it goes against European practices as well as recent statements issued by the Pharmacists Group of the European Union.
- 8.6. A problem exists concerning mainly pets and rabbit or broiler farms where antibiotics are sold, illegally, from pet shops.
- 8.7. There is concern that wholesalers are also supplying antibiotics without a veterinarian's prescription directly to farmers.
- 8.8. For large farm animals, such as swine and cattle, specific antibiotics are usually integrated in the foodstuffs.
- 8.8.1. The Department of Veterinary Services is currently working on a legislation where feed mills will have to employ a pharmacist for Quality Assurance and Control in order to ensure that the antibiotics additives are according to approved norms.
- 8.8.2. The use of antibiotic-containing feeds is however still unregulated and farmers may buy and use these products at their own discretion.
- 8.9. Local farmers need to be educated as they have no awareness whatsoever of the implications of antibiotic mis-use on animal husbandry.

8.10. The Department of Veterinary Services feels that the situation in swine, bovine and fish farming approximates EU recommendations but poultry and rabbit farms still require substantial improvement.

8.11. The Veterinary Services Laboratory is equipped to carry out tests for antibiotic residues in eggs and in poultry meat. However, problems in taking specimens for testing have been encountered since this would require remuneration of the farmer for the samples taken.

9. **Collaboration with international organisations**

9.1. The Infection Control Unit of St. Luke's Hospital has excellent contacts with or is a member of a number of international organisations such as the Alliance for the Prudent Use of Antibiotics (APUA), WHO etc. These organisations are an invaluable source of information and assistance.

9.1.1. The Unit also strives to participate in international networks and study groups such as EARSS in order to be in a position to compare the local situation with that in similar countries.

9.2. Professional organisations similarly have established excellent contacts and affiliations with international bodies that have published resolutions on antibiotic use and resistance.

RECOMMENDATIONS

i. **Availability of data on antibiotic use**

i.1. It is a priority that antibiotic consumption patterns for both hospital and community practices should be available. Unless this denominator data starts to be collected, it is impossible for any antibiotic initiatives to be adequately managed.

- i.2. Port Health authorities should maintain all details of all antimicrobials imported. A yearly report should be submitted of all antibiotic imports divided by generic product name.
- i.3. All hospitals, whether private or public, should have in place a system whereby antibiotic usage patterns can be easily extrapolated. Computerised systems should be introduced by all hospital pharmacies whereby consumption patterns within hospitals can be easily extrapolated up to ward and consultant levels.
- i.4. Primary government health services must similarly make similar provisions to monitor antibiotic usage patterns.
- i.5. It is strongly recommended that the Health Division consults with all interested parties in order to establish a legal system whereby meaningful data of antibiotic consumption from private pharmacies can be obtained. This should allow a periodic review of data by a future regulatory institution.
- i.6. Each pharmacy should be required to keep all antibiotic prescriptions for a maximum of two years. These prescriptions should be stamped, given a consecutive number, dated signed and filed. This will serve as a record of the antibiotics dispensed to specific patients, eliminate client re-use of antibiotics and allow a thorough assessment of prescribing patterns should this be indicated.
 - i.6.1. With reference to antibiotics for veterinary use, such prescriptions should be kept in a separate file so that data on antibiotics in veterinary use is easily retrievable.
 - i.6.1.1. Records of antibiotic use in livestock should also be noted by the prescribing veterinary surgeon in the farmer's animal health register.

ii. Surveillance of antibiotic resistance

- ii.1. Just as antibiotic consumption data is important, up-to-date statistics on antibiotic resistance in the different bacterial genera must equally be collected, analysed and disseminated. To this end, the Bacteriology Laboratory of the Department of Pathology should be in a position, within the very shortest possible time frame, to install both the required computer systems as well as train its personnel to maintain a comprehensive database of isolates and their respective antibiotic sensitivity patterns.
 - ii.1.1. This is an issue of critical importance to the extent that the whole exercise of sensible antibiotic prescribing would be seriously compromised if a proper computerised system is not introduced immediately. To this end the Division should undertake every effort to provide the Pathology Department with the required funding, IT assistance and personnel for this undertaking.
- ii.2. Private laboratories should also be required to provide antibiotic sensitivity data of the isolates they encounter.
- ii.3. Resistant strains in livestock should also be reported.
- ii.4. Once the data starts to be collected, the Bacteriology Laboratory should work with the Infection Control Unit, as the epidemiological body, to analyse and disseminate it in a clear and concise manner possibly through the Infection Control Newsletter which the Unit publishes from time to time as well as on the St. Luke's Hospital Intranet site soon to be established.

iii. **Antibiotic prescribing and dispensing in the community**

- iii.1. Every effort must be taken to ensure that antibiotic prescribing in the community is undertaken in rational and scientific manner.
- iii.2. It is vital to develop prescribing guidelines in the community in an interdisciplinary manner to serve as templates for practitioners. However, it is impossible to devise effective guidelines unless the current and up-to-date status of antibiotic resistance in the different bacterial genera is accurately available.
- iii.3. A problem of the magnitude of antibiotic resistance requires an interdisciplinary approach to patient care thereby ensuring optimal use of antibiotics. Specific practice and ethical standards are needed and all practitioners (doctors, pharmacists and veterinary surgeons) need to be held accountable to meet them.
- iii.3.1. Practices of over-the-phone prescribing and over-the-counter dispensing should be weeded out by means of every possible manner available. The Division should regularly remind all registered practitioners of the illegality of such practices.
- iii.4. The medical profession should also be reminded of its obligation in prescribing correctly. antibiotics prescriptions should be properly and clearly filled including:
- Date
 - Patient's name, age and locality
 - Prescriber's rubber stamp or name in block letters
 - Prescriber's contact telephone number and address
- iii.5. No prescriptions should be entertained if the date on the prescription is older than one week, unless specific instructions are stated in the prescription.
- iii.6. The pro-antibiotic culture amongst the general population should be tackled through a concerted antibiotic campaign as described in (viii)

iv. **Sensible antibiotic prescribing in hospital settings**

- iv.1. It is both the obligation of the Health Division as well as in its best interests to ensure that antibiotic prescribing in hospitals is undertaken in the most cost-effective manner possible.
- iv.2. It is essential that the Department of Institutional Health establishes an administrative infrastructure to spearhead *Sensible Antibiotic Prescribing* initiatives.
- iv.3. In view of the job description of the Consultant – Hospital Infection Control it is recommended that this administrative set-up be established within the Infection Control Unit.
- iv.4. It is however clear that for the initiative to be successful an interdisciplinary effort is required involving all the diverse players involved in antibiotic use.
- iv.5. The role of the current Antibiotic Committee needs to be reviewed. This committee currently functions as a specialist advisory committee to the DTC in recommending additions or deletions to the antibiotic list. This function should not change.
- iv.6. In a number of countries particularly the U.S. sensible antibiotic prescribing initiatives falls within the remit of the Infection Control Committee since the ultimate goal of these initiatives (the prevention of resistance) concerns more this committee than the DTC. Additionally antibiotic resistance cannot be disassociated from hospital epidemiology and infection control measures which are equally essential to reduce the prevalence of multi-resistant organisms in the hospital setting.
 - iv.6.1. Delegating antibiotic prescribing initiatives to the Infection Control Committee would appear sensible in the local setting since the key players all form part of the committee. An Antibiotic Team comprising Infection Control Consultant, Bacteriologist, Antibiotic Pharmacist, Infectious Disease Physician and other member/s from relevant disciplines co-opted on an ad-hoc basis should be established. It would be accountable to the Infection Control Committee and also report regularly to the DTC.

iv.7. The antibiotic policy must be updated to take into account new developments since its publication five years ago. Policy decisions must be evidence-based. The updated policy should be reprinted in a user friendly manner and then be distributed to all government doctors and pharmacists.

iv.8. The antibiotic list could be divided into four sections:

iv.8.1. Formulary: Prescribable by all doctors irrespective of grade.

iv.8.2. Consultant: A list of agents selected to agree with surveillance feedback from antibiotic resistance patterns. They would be made available upon signature from the Consultant/Senior Registrar but no covering letter would be needed. This would cut down on the complaints of excessive bureaucracy often brought up by clinicians. The list would include one or two members from most classes of antibiotics.

iv.8.3. Restricted: Alternative third line agents or "last resort" drugs. They would be either 'duplicates' of antibiotics present on the consultant list, antimicrobials having very close spectrum of activity or else very potent and/or expensive drugs (e.g. vancomycin), where the development of resistance would have catastrophic consequences. They would only be prescribed after endorsement by appointed individuals possessing the required expertise, after discussion of the case with the clinician.

iv.8.4. Reserve: Antibiotics which are used occasionally. A small number of patient-courses would be stocked by the hospital pharmacy and again administered after proper endorsement. This would avoid stocking considerable quantities of rarely used but quite expensive drugs which then go to waste through non-use.

iv.9. Changes in the antibiotic policy or antibiotic lists are, on their own, highly unlikely to change prescribing habits. It is therefore vital that active rather than passive intervention is implemented. Interventions would include:

iv.9.1. *Restricted reporting* from the Bacteriology Laboratory. This is intended to reduce the use of second and third line agents when first line agents are effective and will require the introduction of appropriate software at laboratory level.

iv.9.2. *Restricted prescribing* whereby a selected number of antibiotics require endorsement by a appointed individuals prior to dispensing. These would normally be antimicrobials which are either liable to rapid development of resistance, indicated for specific conditions or potentially toxic.

iv.9.3. *Auditing* of antibiotic prescribing on an individual basis. In this way every three or six months, consultants will be provided with confidential feedback of their prescribing over the period of time in question. Such feedback will serve as a self-learning tool to gradually but surely improve prescribing practices

iv.9.4. *Automatic Stop dates* through which antibiotics are stopped automatically after a designated period unless specified beforehand by the clinician. This has been universally recognised to be a simple but highly effective means of cutting down on antibiotic over-use. The services of clinical pharmacists at ward level are essential for this key initiative and should be developed.

v. **Training & CME**

v.1. The Faculty of Medicine & Surgery of the University of Malta as well as professional associations and colleges need to address ways and means on how to cultivate appropriate attitudes amongst health care professionals and promote an awareness of the ethical considerations of antibiotic resistance.

v.1.1. Joint continuing professional development initiatives would also provide an incentive for mutual collaboration, respect and trust.

v.2. The Department of Pathology of the Faculty may wish to evaluate the feasibility of organising a module on applied Infectious Diseases during the second clinical year of the M.D. course to compliment the pharmacology module on antibiotic therapy and prophylaxis.

v.3. Specific training in veterinary physiology, anatomy and pharmacology should be integrated into the B. Pharm. (Hons) course.

- v.4. The Malta College of Family Doctors could be asked to include lectures on antibiotic therapy in its regular CME meetings.
- v.5. CME of hospital medical personnel, particularly of senior grades, is a more contentious issue. Past experience indicates that presentations undertaken during hospital hours are on the whole poorly attended. Involvement of the individual specialist associations or college may be an avenue worth pursuing.

vi. **Correct use of antibiotics in veterinary practice**

- vi.1. Current literature implicates the use of growth promoters in the development of resistant pathogens in humans such as VRE. To this end, the blanket restriction of antibiotic growth promoters is to be commended.
- vi.2. It is important that the use of medicated feeds be placed on the same levels as antibiotics. Therefore the use of antibiotic supplemented feed should be subject to the same requirements of restriction and documentation. Such feeds should only be supplied under pharmacist supervision against a veterinary prescription and for a specific duration of time.
- vi.3. The Department of Veterinary Services should undertake an educational campaign amongst farmers to explain the importance of the judicious use of antibiotics in farm animals and the implications of resistance.
- vi.4. Because of the clear limitations that such a campaign can attain, education must be accompanied by regulation. Farm inspections as well as testing for antibiotic residues in meat and fish should be intensified. Current problems involved in testing poultry and eggs should be overcome either by a legislative changes allowing the testing of a specified number of samples or by incorporating a budget to recompense farmers for items taken.

vii. **International assistance**

- vii.1. The Health Division should encourage every effort of the relevant departments to associate with or become members of relevant international organisations which can prove invaluable assistance and expertise.
- vii.2. Allocation of a budget specifically for such antibiotic initiatives will guarantee that such initiatives materialise rather than flounder through lack of funds diverted for other purposes as not uncommonly happens.

viii. **Antibiotic campaign**

- viii.1. The Government and the health authorities must do more to educate the public about the proper use of antimicrobials. The working group therefore recommends that a publicity campaign be undertaken in order to increase awareness and influence expectations in respect to the prescribing of antibiotics amongst the general public and highlight the problem of resistance.
- viii.2. The campaign should ensure that the information disseminated should not be misconstrued to deter people from visiting their family doctor promptly, or from taking their medicine when necessary. Evidence should be presented to the public in clear and understandable terms that *unnecessary* antibiotics not only have public health consequences, but also increase the risk to the individual patient in that any subsequent infection will involve a more resistant strain.
- viii.3. It is recommended that the campaign is particularly targeted at upper respiratory tract infections and skin disorders.
- viii.4. The best time for this campaign would be from September to January since feedback from primary care indicates that most abuse occurs in upper respiratory tract infections in children.

viii.5. It is important that the driving force behind the campaign will be the Health Promotion Department, which has both the experience and the financial resources to mount such an initiative. Other sections such the Infection Control Unit and the Department of Bacteriology of St. Luke's Hospital as well as professional organisations can provide the expertise required.

viii.5.1. Specific funding should be allocated to the Health Promotion Department for this initiative.

viii.6. It is vital that maximal use of the media is made to ensure that the message reaches the widest possible audience.

viii.7. Leaflets and posters and similar techniques can also be designed, depending on the financial resources available, and disseminated through pharmacists and doctors' clinics.

viii.8. The campaign should also incorporate scientific information aimed at the health care profession particularly family doctors and community pharmacists who are directly involved in antibiotic prescribing and dispensing.

ix. **Statutory body**

ix.1. The present ad-hoc multidisciplinary working group on the National Antibiotic Policy should become statutory having more or less the same composition. It is proposed that this could be a committee of the Council of Health. The setting up of such a National Antibiotic Committee would be in accordance with EU Council Resolution 1999/C 195/01 which calls on member states "to establish multidisciplinary and cross-sectorial policies to facilitate the containment of the spread of antibiotic resistance".

ix.2. It is recommended that this Committee will act as a co-ordinating and supervisory body between hospital, community and veterinary practices with wide terms of reference including antibiotic auditing, monitoring of resistance, formulation of disease based guidelines, research and education of healthcare professionals and the general public.

SUMMARY

A national strategy to address the problem of antimicrobial resistance is urgently required, based on the three key elements of:

- Surveillance to provide the information base for action
- Prudent antibiotic use to limit unnecessary pressure for the emergence of resistance;
- Infection control to generally limit the spread of infection, particularly antimicrobial resistant cases, thus reducing the need for antibiotics.

Surveillance initiatives should be directed at:

- Establishing a database of antibiotic consumption patterns on national basis with particular emphasis on institutional health settings where the problem of resistance at its greatest.
- Maintaining up-to-date statistics on antibiotic resistance in the different bacterial genera isolated in local laboratories
- Extrapolating epidemiological patterns of multi-resistant infections, especially in tertiary care hospitals.

Prudent antibiotic use may be attained by:

- Discouraging the current pro-antibiotic culture by a targeted educational campaign amongst the general public

- Improving training of undergraduates as well as Continuing Medical Education of health professionals in infectious diseases and the use of antimicrobials
- Reducing incorrect prescribing and dispensing practices at community levels
- Introducing Sensible Antibiotic Prescribing initiatives in government hospitals.

Infection control measures in both hospital and community should endeavour at:

- Establishing evidence based guidelines aimed at reducing the spread of infection
- Encouraging compliance with these protocols through all health care professions
- Emphasising the importance of quality of care, clinical governance and performance management in antimicrobial issues

A multi-disciplinary interdepartmental steering group should be established in order to continue to develop, co-ordinate and monitor the national strategy on antimicrobial resistance as well as provide expert advice on antimicrobial resistance.

These key activities are underpinned by education, communication, research, the necessary infrastructure (including information technology) and where necessary, regulation or legislation. They also require commitment and a sense of ownership of the problem and the necessary action from a wide range of individuals and organisations, including the general public.

CONCLUSION

This working group is convinced that resistance to antibiotics and other anti-infective agents constitutes a major threat to public health, and ought to be recognised as such more widely than it is at present. The Council for Health should develop a strategy to safeguard the effectiveness of antimicrobials along the lines recommended in this report; it should back it with resources and set itself challenging targets for real improvement

Dr. M. A. Borg
Chairman

15 July 2000

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