METHODS

This document presents a situational analysis of antibiotic resistance programs from selected nations. It also provides factual information and key contacts for strategies and programs to reduce the incidence of antimicrobial resistance in Canada.

It is intended to provide a brief comparative international analysis as well as a broad sampling of the activities and some of the approaches being used to disseminate information about antimicrobial resistance including the best practices to reduce its incidence. While the present supplement has attempted to provide information on the full array of current Canadian programs, it is expected that several programs would have been omitted due to a lack of knowledge on the committee's part or lack of response by the program leaders. While the research is not all inclusive, the activities cover a broad spectrum of separate sources.

A variety of efforts to provide information about antimicrobial resistance, from web sites aimed at academic researchers to pamphlets for the general public, were reviewed.

Sources of information on antimicrobial resistance included the following:

- Direct requests by phone and/or e-mail with the following organizations (approximate response rate 20%):
  - Health Canada
  - United States Department of Health and Human Services
  - World Health Organization (WHO)
  - National associations of health care professionals
  - Coalitions established to operate information or other programs
  - Independent groups or individuals conducting projects on antimicrobial resistance
- Direct requests by phone and/or e-mail with organizations in the United Kingdom, Finland, Iceland, Denmark and Sweden
- E-mail survey distributed to 45 organizations to determine their activities (10 responses)
- Web sites
- Press releases
- Medical journals.

Sources of information specific for Canadian activity profiles included the following:

- Direct requests by phone to the following Canadian organizations:
  - Federal and provincial government health and agriculture departments
  - National and provincial trade associations, and associations of health care professionals and agricultural producers
  - Canadian universities
  - Independent groups or individuals attempting to limit antimicrobial resistance.

RESULTS

The problem of antimicrobial resistance is recognized widely throughout the health care and agrifood community. A number of national conferences or regionally driven consensus exercises have been completed with respect to antimicrobial resistance. This document views the various activities through a communications lens. Communications are critical to the effort to control antimicrobial resistance, because a key objective is to change the behaviour of physicians, patients, veterinarians and farm producers and have them become more judicious in their use of antibiotics.

The programs that were studied in this report share some general characteristics, both benefits and weaknesses.

Benefits

- Communications are universally recognized as a critical component of each activity, with most efforts focused on physicians and farmers, and to a lesser extent on patients and veterinarians.
- Almost all initiatives employ a 'broad spectrum' of communications tools.

Weaknesses

- No one communications tool emerges as a panacea.
- There is little coordination of effort or economy of scale among activities.
- Despite a virtual absence of organizational constraints (coordination), there is little indication of innovation in the communications activities. Most initiatives use basically the same tools, with varying levels in the quality of execution.
- There seems to be no uniform measurement of the impact of the initiatives and no universally accepted methodology for measurement of the effects.

On the global scene, national conferences, seminars and studies in many countries have led to the adoption of individual strategies, all of which share a common adherence to the need for coordination and consensus. It is apparent that different jurisdictions, regions and countries operate most effectively through their unique channels and systems. The de

facto global strategy targets the promotion of the judicious use of antibiotics by physicians, patients, veterinarians and farm producers; and a decrease in the rate of antibiotic resistance.

CANADA

The Canadian strategy is the product of a consensus conference that was organized by Health Canada and the Canadian Infectious Disease Society and held in Montreal in 1997. Similarities can be found between the recommendations made in the Canadian strategy, *Controlling Antimicrobial Resistance: An Integrated Action Plan for Canadians* (8) and the formula used in the Antimicrobial Treatment Strategies of Finland program (MIKSTRA) (14). The Canadian plan places a strong emphasis on good communications and recognizes the need for ongoing assessments. Recommendation 27 of the plan states:

> To use a communications package that will promote behavior change in useable, practical, attractive, achievable steps. Ongoing evaluation of the communications strategy will permit modifications and improvement.

The major components of the Canadian strategy are as follows:

- identification of objectives in community and institutional settings;
- reduction of overall antimicrobial usage (prescriptions) by 25% within three years by focusing on community-acquired respiratory infections;
- identification of monitoring criteria;
- establishment of national laboratory standards;
- establishment of surveillance systems to obtain the data;
- establishment of a coordinating committee to facilitate the implementation of the recommendations;
- undertaking communications activities to promote behaviour change; and
- periodic review.

Health Canada took the first step by establishing the Canadian Committee on Antimicrobial Resistance (CCAR) in the latter part of 1997 and by making a three-year commitment of $750,000 in 1999 to support CCAR as it continues the strategy implementation.

The federal government's response to the Auditor General's report in November 1999 (15) indicates that it is committed to working together with the provinces to "make health care as effective as possible and to make information about the health care system available to Canadians".

In addition, the Canadian Institute for Health Information (CIHI) will receive a $95 million grant from Health Canada over the next four years. The grant will allow the CIHI to work with the provincial and territorial governments to:

- build a consensus on which health indicators to measure;
- develop standards for data;
- fill key gaps in information; and
- build the capacity to analyze data and disseminate information to those who need it.

However, progress in Canada may be affected by changing resource allocations within the Canadian government caused by changes in population demographics and new priorities.

Before its reorganization, the Laboratory Centre for Disease Control (LCDC) predicted a shift in focus of funding from 71% of the budget going to infectious diseases strategy in 1999/2000 to 51% of its budget going to infectious disease strategy in 2004/2005. The business plan for the new Population and Public Health Branch (which now includes the former LCDC) has not yet addressed this issue (LCDC Business Planning and Restructuring Presentation to Science Advisory Board, May 19, 1999). Given that antimicrobial resistance issues are one of the many priorities for the Population and Public Health Branch, there may be less funding available for this priority area in the future. Resistance surveillance and immunization programs as well as programs to develop infection control guidelines may be in jeopardy.

NORDIC COUNTRIES

The worldwide consensus among those involved in antimicrobial resistance is that the Nordic countries are the recognized leaders in this field. Researchers and physicians list many reasons for this. The most often cited reasons are as follows. First, the national health structures in the Nordic countries allow for easier coordination and centralized management of an issue. Second, several of the health structures were already in place and were simply adapted to monitor antibiotic use. Third, the countries began addressing the issue as soon as the problem was recognized and were able to quickly mobilize resources.

Examples of the Nordic efforts is Finland's MIKSTRA (14), a joint program that is administered by several Finnish organizations and Sweden's Strategic Programme for the Rational Use of Antimicrobial Agents and Surveillance of Resistance (STRAMA) (16). The Finnish MIKSTRA project, aimed at reducing antimicrobial resistance, is based on the existing structures of health care centres, state institutions and a medical society. Their communications activities follow a pattern that tends to be repeated around the world. The approach includes:

- dissemination of material for health care professionals;
- dissemination of material for patients;
- seminars for physicians;
- news releases;
- mailings to doctors;
- web sites; and
- posters for medical offices.

What distinguishes the MIKSTRA project from those in North America and elsewhere is its strong emphasis on monitoring the various elements of the program. The integral assessment process includes:

- monitoring changes in the diagnosis and treatment of six outpatient infections (the monitoring is done yearly from 1998 to 2002, ie, before and after the 1999 launching of the national, evidence-based current care guidelines for these infections);
- analyzing the costs of these infections for the patient, health care and society before and after launching the guidelines;
- studying patients' and physicians' attitudes towards antimicrobials and treatment decisions during the program;
- studying the effect of different educational approaches in the implementation of current care guidelines, including cost-benefit analysis;
- monitoring changes in bacterial resistance among major outpatient pathogens; and
- conducting a cost-benefit analysis of the entire MIKSTRA program.

The MIKSTRA program identifies objectives, identifies areas for measurement and establishes a measured, pre-implementation benchmark including communications activities. It operates under a set of national standards. The results of the MIKSTRA measurement and evaluation are expected at the end of the year 2000.

UNITED KINGDOM

The Standing Medical Advisory Committee of the United Kingdom's Department of Health has examined the issue of antimicrobial resistance in relation to clinical prescribing practice. The concluding page of the committee's 150-page report in July 1997, *The Path of Least Resistance* (17) states: "Antimicrobial prescribing is an activity with roots in many cultures, clinical and lay. It is only through addressing all of those involved that we are likely to find *The Path of Least Resistance*."

While the report from the United Kingdom recommended a coordinated approach with a variety of activities in the areas of education, organization change and economic inducements, the committee also focused on specific targets. The targeted approach inevitably encourages the best communications. The more finely focused the messages are the more effective the communications results.

One recommendation of the United Kingdom committee recognizes that the inappropriate use of antibiotics mainly concerns upper respiratory tract infection in the community and that the key messages should be targeted to this situation. Key messages are the fundamental building blocks of any communications exercise. They succinctly present the essential ideas that should 'register' with the target audience. In this case, the key messages included:

- "Patients should not expect antibiotics for viral infections, especially of the upper-respiratory tract."
- "Taking antibiotics unnecessarily does you no good and damages them for everyone else."

The United Kingdom committee proposed that a campaign to provide national advice to the public would run concurrently with a Campaign on Antibiotic Treatment to reduce and rationalize prescribing in primary care. The committee also suggested communications including billboard and bus advertising, patient information leaflets, and programs for young school children.

UNITED STATES

While there are indications of high levels of activity in the United States in the area of antimicrobial resistance, coordination appears to be still in the early phases. The Centers for Disease Control and Prevention (CDC), an agency of the Department of Health and Human Services, is the primary organization dealing with antimicrobial resistance in the United States. However, there remains a plethora of uncoordinated activities, reflecting the private sector nature of health care in the United States. The CDC, which recognizes that a strategy must be multidimensional to effect change and modify behaviour, published a 1998 report *Preventing Emerging Infectious Diseases – A Strategy for the 21st Century* (18). It outlines a five-year plan to combat infectious diseases. Antimicrobial resistance is but one among the nine CDC target areas in this report. A brochure is available for each area.

The United States has yet to publish a report that deals solely with the issue of antimicrobial resistance. The CDC convened an interagency conference in the summer of 1999. A draft report was released in June 2000 for comment (6).

Communications tools employed in the United States include patient information on the judicious use of antibiotics

Centers for Disease Control and Prevention activities for prevention and control

Implement public health programs that prevent the emergence and spread of drug-resistant micro-organisms. Such public health programs would include:

1) Infection control strategies in diverse settings
2) Behavioural and educational interventions for modifying drug-prescribing practices of health care providers
3) Behavioural and educational interventions for patients on the appropriate use of drugs and adherence to prescription instructions
4) Health education programs to promote the use of new vaccines for infectious diseases
5) Feedback of antimicrobial resistance data to health care providers to reinforce and evaluate intervention programs

Develop and disseminate practical recommendations and guidelines for the prudent use of antimicrobial drugs.

Develop and disseminate recommendations and guidelines for laboratory tests to improve the accuracy and timeliness of drug-resistance detection in clinical settings.

(brochures, fact sheets for different audiences on various subjects) and tools for health care providers on judicious use of antibiotics (newsletters, prescription pads and letters).

WHO

The WHO is mainly involved in surveillance through global networks that monitor drug resistance and share information. Through its antimicrobial resistance monitoring (ARM) activities, the WHO assists developing countries through the provision of training, quality assurance, laboratory reagents and computer software (WHONET) to detect and monitor resistance by establishing laboratory-based surveillance networks.

A WHO global electronic information bank on antibiotic resistance includes information on resistance surveillance networks and resistance data. This database can be found at <http://oms2.b3e.jussieu.fr/arinfobank/>.

The WHO has produced a report entitled *Overcoming Antimicrobial Resistance – World Health Report on Infectious Diseases 2000*, which was released in June 2000 (5).

The WHO convenes conferences and workshops on the issue and produces many other reports including their September 6, 2000 draft of the *Global Strategy for Containment of Antimicrobial Resistance*. The WHO sponsors national policy workshops such as the February 1999 event in Geneva, Switzerland entitled *Containing Antimicrobial Resistance: Review of the Literature and Report of a WHO Workshop on the Development of a Global Strategy for the Containment of Antimicrobial Resistance* (19). The WHO also sponsors training courses on surveillance.

In January 1998, the 101st session of the Executive Board of the WHO adopted a resolution that urged member states to step up their efforts to control the growing resistance to these drugs.

PHARMACEUTICAL INDUSTRY

The pharmaceutical industry is heavily involved in the antimicrobial resistance movement. Although there are anecdotal reports of industry involvement in a number of projects, there is little documentation about the scope and the results of the various initiatives.

Pharmaceutical companies tend to be more involved in funding rather than operational activities in the area of antimicrobial resistance. Individual pharmaceutical companies have sponsored informational brochures, CD-ROMs, infectious disease conferences, and local surveillance and data gathering efforts. Detailed documentation is scant or nonexistent.

Little consolidated information about the industry's activities in Canada exist. However, the industry tends to be global in nature and in its approaches to issues. Activities in one jurisdiction can reasonably be assumed to exist on a pro-rata basis in other jurisdictions. While estimates for industry activities in Canada were not available, the industry is estimated to have spent $2.8 billion in the United States in 1997. A reasonable assumption would be that the industry has spent about one-tenth of that amount on similar initiatives in Canada.

In addition to its contributions to education and prevention, the pharmaceutical industry is focused on the development of new products to respond to the challenge of antimicrobial resistance. In Britain, according to the Association of the British Pharmaceutical Industry (ABPI):

> Most of the major pharmaceutical companies have invested heavily in the last five years or so in the antibacterial area, and antimicrobials are now the third largest therapeutic class in R&D [research and development], accounting for 20 per cent of pre-clinical research projects and 9 per cent of clinical development projects. It is more than 20 years since the emergence of the last major new class of antibiotics; but industry is now using genetics to look for new drug targets and modes of action, including modes of action which would either not give rise to resistance or even possibly reverse it.

THE INTERNET

The Internet offers many cost effective channels to communicate with diverse audiences. The secret to effectiveness, however, is in promoting awareness of the sites and ensuring that the target audiences have access to the Internet. As with other communications tools, there is no clear measurement of the effectiveness of the Internet as a communications tool.

Nevertheless, it is recognized as a useful communications route to deliver messages to physicians, patients, veterinarians and farm producers. The CCAR web site <www.ccar-ccra.org>, which went live in May 2000 and is the most comprehensive site on antibiotic resistance in Canada, is recording over 2000 hits per month. This is expected to increase in the next few months as the main search engines list the site in their directories. This web site is monitored by a working group within CCAR, and is a credible and reliable source of data on antibiotic resistance in Canada from both the human and agrifood perspective.

The potential to reach health care professionals is reflected in the fact that approximately two-thirds of physicians in Canada report having access to the Internet (personal communication, Canadian Medical Association). However, this is not an excessively high proportion given the level of education, relative wealth and information needs of physicians. In the United States, the percentage of physicians who have access to the Internet is even less. A recent American Medical Association survey shows that only 37% of American physicians have Internet access (20).

In addition, survey information gathered by Forrester Research, an American-based independent research firm, shows 72% of the healthcare professionals surveyed said that physicians will not personally respond to patient e-mail in the future; another 19% said doctors would do so only if they are compensated for such exchanges. The research also found that generally, physicians find consumer-oriented health web sites more of a nuisance than an aid.

Despite these statistics, online medical research sites are numerous and gaining acceptance in the American medical community, especially nonprofit, government and tightly restricted, physicians-only sites. *Physicians' Online* (21), launched in February 1994, offers its member physicians access to medical and nonmedical resources, secure communications and web access

in a private professional network. Other sites include *Medscape* (22), *Medem* (23) and *drkoop.com* (24). Sites that offer medical advice to patients are also available in abundance.

However, there is no 'validation' or 'seal of approval' for physicians or patients to use in assessing the source of materials available on the Web. In the United States, there are at least two organizations that have launched initiatives to develop and promote ethical principles relevant to the fast expanding area of online, interactive health care communications. One is the e-Health Ethics Initiative started by *Medscape* (22), another is Hi-Ethics (Health Internet Ethics) (25), an alliance of more than a dozen online health information competitors that have pledged an ethical code of conduct to consumers.

ASSESSMENT OF COMMUNICATIONS ACTIVITIES

The review of communications activities suggests that it is extremely difficult, if not impossible, to assess accurately the various communications activities in the area of antimicrobial resistance in both the heath care and agrifood sector. Although people share knowledge and communications ideas, it is not always clear whether their efforts are effective and if they suit the objective(s) of each projects. Several observations may be made:

- Almost all communications activities target the same audiences: physicians, pharmacists, veterinarians, farm producers, hospitals, patients, parents, schools and daycare centres.
- There is a glaring lack of use of standardized monitoring to gauge the effectiveness of activities. Some project coordinators consider their activities to be effective if the number of prescriptions being filled goes down. Others believe that this is not an effective measurement and that Canada should adopt a measurement of 'defined daily doses', as is used in Europe, and that Canada needs to measure the amount of antibiotics being used now to have a benchmark for future reference.
- Project coordinators, in general, feel that activities must take place at the local level (provincially) mostly because of Canada's healthcare structure (health is a provincial jurisdiction). This does not mean, however, that coordination is not critical. As mentioned by some respondents from both the health care and agrifood sectors, problems with a duplication of effort and lack of sharing of information among other organizations do occur. This is due to the lack of awareness of the activities implemented by other regional or national organizations.
- Pharmaceutical companies are willing to invest considerable resources, but this goodwill is often expended in local or regional activities, lacking a national framework or methods of assessment of effectiveness.
- Key messages vary widely and are sometimes inconsistent within a country.
- Of the 75 organizations or projects researched, the majority of communications activities target physicians and patients or the public, with physicians being the primary target.
- Of the 18 organizations or projects researched in the agrifood sector in Canada, the majority of communication activities targeted veterinarians and farm producers, with farm producers being the primary target.
- Projects that are strictly informational in nature such as web sites are difficult to assess with respect to effectiveness because there is no scientific analysis performed to determine their impact.
- The American Alliance for Prudent Use of Antibiotics (APUA) relies on feedback from physicians who fill out questionnaires following the lecture series. The feedback is positive so the APUA concludes the program is a success.
- From a communications perspective, school programs can be a useful tool in some cases; however, they often require long lead times and negotiations with education authorities.
- Physicians, patients, veterinarians and farm producers would appear to be priority target audiences.

ADDRESSING THE ISSUES

In "Strategies for promoting judicious use of antibiotics by doctors and patients" (26), the authors state:

> … identifying and educating opinion leaders as a priority group would be effective, particularly if resources are limited. Education of future healthcare providers about the importance of judicious antibiotic use will have a long-term impact and is useful in addition to strategies focused on current providers.
>
> Among patients and the public a multifaceted approach is needed to increase the public's understanding of antibiotic resistance and to change expectations about the use of antibiotics.
>
> The key elements should include a public relations campaign, clinic based education and community outreach activities.
>
> Conducting a public relations campaign with paid advertising is an effective but expensive strategy to change health related behaviour.
>
> Educating the public about the difference between bacterial and viral infections, and the potential risk of taking antibiotics is more complex than other health education messages because the risk to benefit ratio is less clear.
>
> A successful public relations campaign will require expertise in marketing and communications.

CONCLUSIONS AND PERSPECTIVES FOR THE CANADIAN STRATEGY

General

- National coordination is required to reduce both fragmentation and duplication while maximizing economy of scale.
- Surveillance efforts continue to be weak and poorly coordinated.
- Measurement of effectiveness should be a critical prerequisite for funding of any communications initiative, if only to eliminate ad hoc activities.

Communications

- Clear, concise, consistent and coordinated messages are a prerequisite for effective communications. This vital criterion has been generally met in most communications activities regarding antimicrobial resistance.
- The communications solutions have been developed. The challenge is to coordinate implementation so that resources are concentrated for the greatest beneficial effect.
- The pharmaceutical industry is a powerful source of expertise and funding, but would benefit from structure to channel its contributions into an effective program.
- The regional nature of health care delivery is an impediment to the creation of a single coordinated effort; it may be necessary to develop high level criteria that will allow for specific regional preferences in Canada.
- Within Canada, most of the agrifood and health care communications activities are involved in optimal use and surveillance.
- Most of Canada's agrifood communication activities are completed by national associations, whereas health care activities are mainly provincial or regional collaborations, private companies or national associations.
- The Internet can be an effective channel through which to deliver information but must be promoted and the content 'endorsed' for effective results. While important, the World Wide Web is not a communications panacea.

WHERE WE GO FROM HERE

The Canadian Committee on Antibiotic Resistance (CCAR) advocates for, facilitates and promotes programs related to surveillance, optimal antimicrobial use and infection prevention and control to limit antimicrobial resistance. While most of our efforts to date have focused on optimal antibiotic use and resistance surveillance, we will now begin to expand into infection prevention and control. As well, we will be increasing our efforts to raise the visibility and credibility of the organization to provide a more effective voice to government, the health care community and the public. Upcoming priorities are to continue to harmonize with individual/regional/provincial programs promoting optimal use through advocacy and education. In addition, plans are underway to develop a section within the CCAR web site as a feedback tool for the prescribers and consumers of antibiotics in Canada with respect to detailed total antibiotic consumption by region/province/population served and to provide real time surveillance reports on key antibiotic resistant organisms in Canada. Additional priorities are to advocate for an integrated and improved national surveillance system, which is a recognized weakness within Canada.

Antibiotic resistance is a global problem and must be addressed by a wide variety of stakeholders in both Canada and abroad. Governments, academia, industry and the health care community have to redouble their efforts to deal with this emerging threat. The CCAR will work with a wide variety of organizations and individuals to keep Canada at the forefront of global efforts to limit resistance.

The Canadian programs described in the following pages are attempting to monitor or assess the size and scope of the threat, provide visibility for resistance issues and offer solutions for minimizing resistance in both agriculture and health care. These programs form the baseline from which Canada can build a consolidated and continuous effort to contain antimicrobial resistance.

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