Comparing Antibiotic Use and Resistance Data Across Hospitals

Scott Fridkin, Centers for Disease Control and Prevention, Division of Healthcare Quality Promotion, Atlanta, GA, USA

In 1997, the Infectious Disease Society of America and the Society for Healthcare Epidemiology of America published a joint consensus statement on what hospitals should do to reduce antimicrobial resistance. Among other points, the consensus statement called for all hospitals to 1) establish some type of monitoring system for bacterial resistance and antimicrobial use, and 2) establish policies to respond to this monitoring system.

The Intensive Care Antimicrobial Resistance Epidemiology project (ICARE) of the National Nosocomial Infections Surveillance System (NNIS) was developed in 1996 to monitor antimicrobial use and resistance. After compiling the surveillance data from participating hospitals, project ICARE created risk-adjusted comparative benchmarks that were distributed to the participating hospitals, allowing them to judge their performance against that of other hospitals and take corrective steps as needed.

To monitor antimicrobial use, ICARE collected data from hospital pharmacies. To monitor antimicrobial resistance, ICARE collected surveillance data from hospital laboratories. ICARE used a laboratory-based approach similar to what most US hospitals use to create an antibiogram, as opposed to the more time-consuming active surveillance for nosocomial infection. Under the ICARE approach, participating hospitals submitted aggregated data from all isolates processed by their laboratories, following standard protocols for defining a duplicate isolate. Data from peri-rectal or rectal swabs were not collected.

At the beginning of the study, ICARE determined whether hospitals attempted to control antimicrobial use. Out of 47 participating hospitals, about 30% had at least one antimicrobial restricted. Vancomycin was restricted at only 20% of the hospitals. To help with the initial selection of antibiotic, 70% of the hospitals used an infectious disease consultation and 66% used a formal pharmacy consultation. Forty percent of the hospitals had some system to measure compliance with the initial recommendations. Pharmacy personnel were often involved beyond the initial selection of antibiotic. In fact, in 60% of the hospitals, a pharmacist made rounds with the physicians in the ICUs.

Developing a comparative benchmark

One goal of project ICARE was to provide feedback to the individual hospitals. To do this, we developed comparative benchmarks by aggregating antibiotic resistance data and antibiotic use data from all participating hospitals. The comparative benchmarks enabled hospitals to compare their antibiotic use or NNIS / ICARE continued on page 2

Antibiotic Resistance in Long-Term Care

L.E. Nicolle, Dept of Internal Medicine, University of Manitoba, Winnipeg, MB Canada

As the populations in developed countries age, increasing numbers of older individuals reside in long-term care facilities. At present, in the US, there are more patients in long-term care facilities than in acute care facilities. The high prevalence of antimicrobial-resistant organisms in some long-term care facilities has been recognized for many years (Table 1). The prevalence of colonization or infection with methicillin-resistant Staphylococcus aureus (MRSA) is as high as 20-30%. Vancomycin-resistant enterococci (VRE), organisms resistant to extended spectrum β-lactamases, quinolone-resistant gram-negative organisms and penicillin-resistant Streptococcus pneumoniae are also reported in long-term care facilities.

When admitted to acute care hospitals, long-term care facility residents are more likely to be colonized or infected with resistant organisms than admissions from the general population. While most reports originate from the US, several European studies confirm a high prevalence of selected resistant organisms in long-term care populations.

It should be noted, however, that there is great variability in the frequency of isolation of resistant organisms among long-term care facilities. While many facilities, such as Veteran’s Affairs facilities in the US, report high rates of anti-

LONG-TERM CARE continued on page 4
resistance to that of other hospitals.

The antibiotic use and resistance data can be used to improve clinical decision-making. Hospital personnel can use the resistance data to make an educated guess as to what the most appropriate antibiotic should be for a patient with nosocomial or other infection, including a community infection. The antimicrobial use data can be used to identify an area of a given hospital or a particular service that uses an unusually large amount of vancomycin or other antibiotic.

**Resistance rates in ICUs and non-ICUs**

An analysis of ICARE data from 1996 through 1999 found different antibiotic resistance rates in intensive-care units (ICUs), non-ICU wards, and outpatient areas. In general, the outpatient areas had the lowest rates of resistance, the non-ICU inpatient wards had intermediate rates of resistance, and the ICUs had the highest rates of resistance. This pattern held true for methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococci (VRE), and third-generation cephalosporin-, pipericillin-, and imipenem-resistant *P. aeruginosa* (p<0.01, chi-square). However, the pattern reversed for quinolone-resistant *P. aeruginosa*, which showed the highest resistance rates in the outpatient areas and the lowest rates in the ICUs. This may reflect the amount of quinolones being used outside of the hospital.

We also analyzed the ICARE data to see if antibiotic resistance rates were higher in certain types of ICUs than others. Apart from pediatric ICUs, which tended to have lower resistance rates for several of the organisms, we did not find that any one type of ICU always had lower or higher resistance rates.

As a general rule when doing risk-adjusted comparisons between hospitals, we conclude that you can group data from all non-pediatric ICUs together.

**Antimicrobial use in ICUs and non-ICUs**

Similarly to resistance rates, the rate of antibiotic use was lower in non-ICU inpatient areas than in ICUs for all drugs studied (third-generation cephalosporins, vancomycin, pipericillin, imipenem, and quinolones) (p<0.05, Wilcoxon rank sum). The hospital pharmacies did not report outpatient antibiotic use data, so we cannot compare the inpatient to outpatient antibiotic use.

Differing from resistance rates, the rate of antimicrobial use was dramatically affected by the type of ICU. There was no consistent pattern of high or low antimicrobial use in any particular ICU; it varied depending on the drug. Hematology-Oncology wards used significantly more third-generation cephalosporins than any other ward (p<0.05). Surgical and cardiovascular ICUs used significantly more first-generation cephalosporins than the other wards (p<0.05). Therefore, to compare antibiotic use between hospitals, we recommend making comparisons between similar types of ICUs.

**ICARE feedback to hospitals**

In 1997, ICARE provided comparative benchmark data to all participating hospitals (Tables 1 and 2). The resistance rates and antimicrobial use data were used to determine a pooled mean and 25th, 50th, and 75th percentile. For example, the pooled mean MRSA rate across all the hospitals was 31% and the 75th percentile MRSA rate was 53% (Table 1). Therefore, if a hospital had an MRSA infection rate of 53%, that hospital knew it was in the 75th percentile with 25% of the hospitals having a higher rate of MRSA.

Antimicrobial use data was tabulated according to type of ICU. For example, in the Medical ICUs (MICUs), the pooled mean vancomycin use was 84 defined daily doses per 1,000 patient days, whereas in the Surgical ICUs (SICUs), the
pooled mean vancomycin use was 117 (Table 2).

From 1997 to 1999, 20 of the original 40 hospitals continued to participate in ICARE. In late 1999, we evaluated how these 20 hospitals used the benchmark data provided in 1997. We found that all hospitals that attempted to change their practices focused their efforts on vancomycin. We compared vancomycin use at these hospitals to a published estimate of vancomycin use in all US hospitals. In 1998, it was estimated by industry sources that about 36 daily doses per 1,000 patient-days of vancomycin were used in the typical US hospital, an 11% increase from 1997. In ICARE hospitals, we found a very similar usage rate in 1998, but it was only a 4% increase from 1997.

In summary, hospitals can currently participate in any one of several different systems available to monitor antimicrobial use and resistance. All monitoring systems should make some sort of risk adjustment (for example, ICU vs. non-ICU) before disseminating the antimicrobial use and resistance data back to the participating hospitals. Hospitals can use this data to compare their resistance and use rates to other of institutions, and change some practices if their rates are overly high.

This article was adapted from a talk given by Dr. Frédékin at the APUA conference “Antibiotic Resistant Infections: A Global Problem with Local Solutions” on May 2, 2000.

### Table 1. Antimicrobial Resistance Data Sent to ICARE Hospitals*

<table>
<thead>
<tr>
<th>Hospital Area</th>
<th>Pathogen-Antimicrobial</th>
<th>Pooled Mean</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>MRSA</td>
<td>31</td>
<td>20</td>
<td>36</td>
<td>53</td>
</tr>
<tr>
<td>ICU</td>
<td>MRON*</td>
<td>59</td>
<td>66</td>
<td>77</td>
<td>83</td>
</tr>
<tr>
<td>ICU</td>
<td>VRE</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>14</td>
</tr>
</tbody>
</table>

* Sent March and October 1997
  ** Methicillin-resistant coagulase-negative staphylococcus

### Table 2. Antimicrobial Use Data Sent to ICARE Hospitals*

<table>
<thead>
<tr>
<th>ICU</th>
<th>Antimicrobial</th>
<th>Pooled Mean</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICU</td>
<td>Vancomycin</td>
<td>84</td>
<td>40</td>
<td>60</td>
<td>114</td>
</tr>
<tr>
<td></td>
<td>1st Cephalosporin</td>
<td>33</td>
<td>23</td>
<td>33</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>3rd Cephalosporin</td>
<td>208</td>
<td>140</td>
<td>176</td>
<td>270</td>
</tr>
<tr>
<td>SICU</td>
<td>Vancomycin</td>
<td>117</td>
<td>54</td>
<td>87</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td>1st Cephalosporin</td>
<td>212</td>
<td>140</td>
<td>200</td>
<td>370</td>
</tr>
<tr>
<td></td>
<td>3rd Cephalosporin</td>
<td>160</td>
<td>104</td>
<td>140</td>
<td>200</td>
</tr>
</tbody>
</table>

* Sent March and October 1997

### Making Official Use and Dosage Recommendations for Generic Antibiotics in Belgium

Paul M. Tulkens, Université Catholique de Louvain, Brussels, and Transparency Commission, Belgian Federal Ministry of Health, Belgium

The Belgian government reimburses patients for antibiotics and other drugs. To reduce expenses, the government favors generic drugs over brand-name drugs. However, Belgian law requires that the labeling on generic drugs carry the same indications and dosages as the original drug that it is copying. Therein lies the rub. Often, many years have elapsed between the approval of the original antibiotic and the request for approval of the generic antibiotic. This elapsed time can stretch to ten years, during which time the appropriate use of an antibiotic can change. For example, changes in epidemiology can render the drug ineffective and changes in antibiotic resistance patterns may require a more restricted use of the drug.

To address this problem, the Transparency Commission of the Belgian Federal Ministry of Health reviews prospective generic antibiotics by comparing the original indications for an antibiotic with those considered reasonable at the present time, based on:

- Current antibiotic resistance patterns in Belgium and adjacent countries
- Trends in effective bacterial susceptibility for organisms with slowly ascending MICs
- Current information on the pharmacokinetic/pharmacodynamic (PK/PD) properties of the class of antibiotic
- Guidelines published by scientific societies in Belgium and elsewhere.

Between January 1999 and October 2001, the Transparency Commission reviewed the applications of 34 generic antibiotics in seven major classes of antimicrobials (Table 1). The opinion of the Transparency Commission was sent to the manufacturer of the generic drug for comment. In most cases, the manufacturer accepted the recommendations of the Commission. That the manufacturers did not challenge the recommendations of the Commission suggests that they are aware of the issues involved with introducing generic antibiotics to the market.

Following the manufacturer’s review, the Commission’s recommendations provide the official evaluation of the antibiotic’s usefulness and are used by the federal authorities to determine reimbursement eligibility. We find that when reimbursement is limited, use of the drug is also severely limited. In Belgium, the prescribing physician needs to justify the use of an antibiotic prior to the patient receiving reimbursement for that drug. The physician is aware that his or her justification is subject to scrutiny by government inspectors.

This procedure proved useful for a rapid and effective “warning to the authorities” concerning the risk of an inappropriate use of a given antibiotic without requiring a complete reanalysis of the labeling. For more information, contact Paul M. Tulkens, tulkens@facm.ucl.ac.be.

### Table 1. Generics of antimicrobials examined by the Transparency Commission from 1/99 to 10/01

<table>
<thead>
<tr>
<th>Class</th>
<th>Drug</th>
<th># of applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetracyclines</td>
<td>doxycycline</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>minocycline</td>
<td>3</td>
</tr>
<tr>
<td>ß-lactams</td>
<td>amoxicillin</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>amox/ clav</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>cefazolin</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>cefotaxim</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>cefotaxime</td>
<td>2</td>
</tr>
<tr>
<td>Fluoroquinolones</td>
<td>norfloxacin</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>ciprofloxacin</td>
<td>1</td>
</tr>
<tr>
<td>Glycopeptides</td>
<td>vancomycin</td>
<td>2</td>
</tr>
<tr>
<td>Aminoglycosides</td>
<td>tobramycin</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>amikacin</td>
<td>1</td>
</tr>
<tr>
<td>Nitrimidazoles</td>
<td>metronidazole</td>
<td>1</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>acyclovir</td>
<td>1</td>
</tr>
</tbody>
</table>
microbial-resistant organisms, others have reported relatively low rates of resistance.\textsuperscript{16,17} Facilities with a high proportion of patients requiring a high level of chronic care, such as dialysis patients, may also have higher rates of colonization and infection.\textsuperscript{18,19} This variability in occurrence of resistance reflects factors such as differences in antimicrobial use, patient variables, and the prevalence of antimicrobial resistance in acute care facilities in the geographic area. However, the assumption that all long-term care facilities have a high frequency of antimicrobial resistance is not appropriate.

**Origin of Resistance**

Several factors promote resistant bacteria in these facilities. Infections are common in the long-term care facility population\textsuperscript{7} and diagnostic imprecision means that empiric antimicrobial therapy is frequently used.\textsuperscript{20} Recent exposure to antibiotics is an important association for isolation of quinolone-resistant MRSA and gram-negative organisms from patients.\textsuperscript{17,21} On the other hand, recent acute care hospitalization is the major association for MRSA and VRE.\textsuperscript{8,22} Functional impairment is also associated with an increased colonization by resistant organisms.\textsuperscript{3,15} For instance, residents with incontinence of bladder or bowel, who are bed-bound, or who have gastrostomy tubes or decubitus ulcers, are more likely to be colonized with resistant organisms, likely due to greater patient care needs. Once colonized with resistant organisms, carriage is prolonged for months or years.

**Antimicrobial Use**

The observation that there is a high prevalence of antimicrobial resistance in long-term care facilities has occasionally led to recommendations for even more broad-spectrum use of antimicrobial agents, rather than for more controlled use of antimicrobials.\textsuperscript{23} Recent recommendations for treating nursing home-acquired pneumonia empirically with a “respiratory quinolone” are one example.\textsuperscript{24,25} These recommendations appear to be based on the isolation of penicillin-resistant pneumococcus in some nursing home patients, but are not based on clinical trials evaluating alternate therapeutic approaches or documenting benefits of different empiric therapies. The widespread use of quinolones for presumed lower respiratory infection in long-term care facilities will certainly accelerate the emergence of quinolone-resistant organisms in both respiratory\textsuperscript{26} and other\textsuperscript{27} infections. Introduction and evaluation of programs to optimize antimicrobial use, which may also limit resistance pressure, are urgent priorities in this population.\textsuperscript{25}

**Table 1. Antimicrobial-resistant organisms identified with increased prevalence in long-term care facilities.**

<table>
<thead>
<tr>
<th>Gram-positive:</th>
</tr>
</thead>
<tbody>
<tr>
<td>methicillin-resistant Staphylococcus aureus</td>
</tr>
<tr>
<td>vancomycin-resistant enterococcus</td>
</tr>
<tr>
<td>high-level aminoglycoside-resistant enterococcus</td>
</tr>
<tr>
<td>penicillin-resistant Streptococcus pneumonia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gram-negative:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ampicillin-resistant Haemophilus influenzae</td>
</tr>
<tr>
<td>extended-spectrum ( \beta )-lactamase producing</td>
</tr>
<tr>
<td>Enterobacteriaceae</td>
</tr>
<tr>
<td>fluoroquinolone-resistant gram-negative rods</td>
</tr>
<tr>
<td>aminoglycoside-resistant gram-negative organisms</td>
</tr>
<tr>
<td>fluoroquinolone-resistant Salmonella typhimurium</td>
</tr>
</tbody>
</table>

**Socialization and Infection Control**

Patients in long-term care facilities have unique needs.\textsuperscript{25} For many residents, the facility is a permanent home. Socialization requires patient interactions during meals, rehabilitation and other programs. These activities should not be limited without compelling reasons. Stringent barrier precautions and restriction of patient activity are not justified unless there is evidence that such interventions lead to improved outcomes for the individual, the facility, and the community.

There is limited excess morbidity or mortality attributable to antimicrobial-resistant organisms in long-term care facility residents. The majority of patients are colonized and infection is infrequent. The introduction of endemic resistant organisms in long-term care facilities has not been associated with increased infection rates.\textsuperscript{2,7} High-risk patients, such as those with chronic renal failure or malignancy, may have an increased risk of mortality.\textsuperscript{18} However, as patients with resistant organisms are more functionally impaired, it is difficult to ascertain whether excess mortality, when observed, is due to the resistant organism or underlying comorbidities.

Two paradigms appear to be emerging with respect to the infection control management of antimicrobial resistance in long-term care facilities. In one, a standard level of patient care with limited specific interventions is recommended, based on current evidence of limited transmission within the long-term care facility and little excess morbidity or mortality.\textsuperscript{2} This standard level of care includes appropriate management of equipment and handwashing,\textsuperscript{2,5} avoiding the use of invasive devices, and appropriately managing wounds, including gastrostomy and tracheostomy sites. Intensified handwashing and glove use have not been shown to decrease endemic nosocomial infections in long-term care settings,\textsuperscript{28} but further studies are required.

In the other paradigm, infection control measures similar to those used in acute care facilities to control VRE are proposed for long-term care facilities.\textsuperscript{4,29,30} These include screening of patients and intensified barrier precautions, including patient activity restriction. However, VRE transmission in the long-term care setting appears to be infrequent whether or not intense interventions for control are used.\textsuperscript{5,22,31} The potential costs and impact on patient care associated with more restrictive guidelines require that appropriate studies document the benefits of such approaches prior to implementing them.

**Transfers to Acute Care Facilities**

Patients who have been transferred from long-term care facilities to acute care facilities have, on several occasions, been a source for an outbreak of resistant organisms in the acute care facility. The intensity of nursing care as well as therapeutic and diagnostic interventions in acute care settings facilitates transmission of organisms among patients. The
acute care facility should have a strategy to identify and manage potential antimicrobial resistance in patients admitted from long-term care facilities. This may include screening of such patients for the presence of resistant organisms on admission and possibly using enhanced barrier precautions pending results of screening cultures.

**Conclusion**

The high prevalence of antimicrobial-resistant organisms in some long-term care facilities is part of the larger global problem of antimicrobial-resistance. The drivers for resistant organisms in this population include antimicrobial use, acquisition in acute care facilities, and impaired patient function. The approach to antimicrobial resistance in these patients, however, can become part of the problem when there is an over-reaction and inappropriate management. Repeatedly, long-term care facilities have refused to accept patients who are colonized with antimicrobial-resistant organisms, despite a lack of evidence that these patients are a risk. In addition, an enthusiastic interpretation of approaches to limit transmission of antimicrobial-resistant organisms, which is appropriate for acute care facilities, is sometimes implemented in long-term care facilities. This may impair quality of life for patients, is costly, and is difficult to sustain. The generalization that all long-term care facilities have high rates of resistance may lead to recommendations for overuse of empiric broad-spectrum therapy, despite little antibiotic resistance in some facilities and lack of studies to support a benefit. Thus, knowledge of the types and extent of resistance for each facility is necessary. Continuing systematic, critical evaluation of risks and appropriate interventions, including further emphasis on antimicrobial use management in this setting, are priorities in addressing this problem.

**US Federal Action Plan on Antibiotic Resistance**

The US Interagency Task Force on Antibiotic Resistance, a group of eleven federal agencies co-chaired by the CDC, FDA, and NIH, is currently implementing its domestic action plan and, with the addition of USAID to the Task Force in 2001, is drafting its global action plan. The Task Force will seek input on the ongoing implementation of its domestic action plan at a public meeting in mid-2002 (see www.cdc.gov/drugresistance/actionplan). The global part of the action plan – a guide for federal actions to address global antibiotic resistance issues and assist in implementing the newly released WHO strategic plan (www.who.int/emc/amr.html) – is in the early stages of being drafted. In 2002, the Task Force expects to seek input from consultants and the public on the draft global action plan.

**Building Resources in Developing Countries**

One of the biggest challenges in tackling antibiotic resistance on a global basis is varying levels of awareness regarding the proper use of antibiotics and the need for accurate monitoring of susceptibility patterns. Even where awareness is strong, some countries lack the resources needed to implement needed programs. The ARTIST (Antimicrobial Resistance Testing International Support Team) program, sponsored by AB Biodisk, Solna, Sweden, aims to assist developing countries as they address the antibiotic resistance problem. ARTIST pairs scientists in the developing world with colleagues from industrialized countries who have established laboratories and experience in the field. The mentors provide training, materials such as scientific literature, reagents and laboratory equipment, and other support. Since its start in 1995, the ARTIST program, including 60 member countries with over 300 “ARTISTS,” has helped developing countries 1) obtain the latest information on antibiotic resistance, 2) obtain laboratory equipment and techniques, 3) develop antimicrobial resistance testing procedures for pathogens of highest priority, 4) initiate local resistance surveillance programs, and 5) encourage young scientists to attend international meetings.

For more information or to enroll in the program, contact AB Biodisk in Solna, Sweden at etes@abbiodisk.se.

References:
APUA News

WHO Global Strategy

On September 11, 2001, the World Health Organization (WHO) was scheduled to release the WHO Global Strategy for Containment of Antimicrobial Resistance at a 10 AM press conference in Washington DC at the Willard Hotel, two blocks from the White House. APUA’s President Dr. Stuart B. Levy was set to moderate the press conference as the official representatives from WHO, USAID, the World Bank, CDC, and others assembled.

The press conference, however, was preempted by the tragic terrorist attacks that day. The Willard Hotel was evacuated and APUA staff Kathleen Young and Barbara Souder, along with Dr. Levy, accepted a ride by the AMA representatives to Anapolis, MD. As there were no hotel rooms available, the AMA Board trustee rented a 14-foot Ryder truck and drove to Detroit while the APUA staff conjured up a car, arriving home in Boston at 5 AM the following morning.

Although the WHO Global Strategy was never formally released, APUA and WHO will celebrate this important milestone at APUA’s 20th anniversary celebration at ICAAC. The Global Strategy can be found at http://www.who.int/emc/amr.html. APUA developed one of the technical documents supporting the Global Strategy, called Antibiotic resistance: synthesis of recommendations by expert policy groups; the primary authors are JL Avorn, JF Barrett, PG Davey, SA McEwen, TF O’Brien, SB Levy, and APUA.

National Antibiotic Resistance Strategies

Much of the responsibility for the implementation of the WHO Global Strategy will fall on individual countries and governments. Effective national task forces and interdisciplinary cooperation will be crucial for the successful implementation and monitoring of interventions.

One such cooperative venture, the Management Sciences for Health (MSH)’s Rational Pharmaceutical Management (RPM) Plus Program, addresses the gaps in the developing world between the demand for and availability of essential drugs and health commodities, and between availability and rational use. The consequences associated with interrupted availability and irrational use of antimicrobials are more severe than for other drugs since these factors also promote the development of antimicrobial resistance.

The RPM Project, funded by the United States Agency for International Development (USAID), has subcontracted APUA to provide expertise in the area of antibiotic resistance. APUA contributions will draw on expertise from its technical staff, the Scientific Advisory Board, its international membership and its global network of chapters.

Bioterrorism and Antibiotics

The public health scare initiated by the bioterrorist anthrax attacks raised the visibility of the antibiotic resistance issue in the news media.

APUA issued a press release on October 18, 2001 cautioning that the misuse of Cipro could increase bacterial resistance to this valuable antibiotic. The full text is available at www.apua.org.

In the four days between October 15th and 18th alone, over fifteen major newspaper articles cited APUA and/or quoted APUA President, Dr. Stuart B. Levy, on the issue of antibiotic resistance.

Resistance Symposium

Nearly 300 physicians, nurses, and scientists gathered in Burlington, MA on October 17, 2001 to attend a symposium entitled “Antibiotics: Yesterday, Today & Tomorrow.”

APUA President Stuart B. Levy spoke on the history of antibiotics, the mechanisms of resistance transfer, the misuse of antimicrobials, and APUA’s programs and goals. Alfred DeMaria Jr., Assistant Commissioner of the Massachusetts Department of Public Health, addressed antibiotics in relation to the bioterrorism threat, stating that stockpiling is “strongly discouraged because it could lead to inappropriate patient decisions to self medicate, incomplete courses of antibiotics that might select for resistant organisms, the eventual use of expired medications, and the depletion of national supplies for medically-indicated uses.” Other speakers included Drs. Stephen Brecher, George Eliopoulos, and Scott McEwen. Additional sessions focused on treatment and control of pneumococcal disease and the current state of antibiotic susceptibility testing.

The symposium was sponsored by APUA’s Health Provider Education Program, the MA Department of Public Health, the National Laboratory Training Network, the Northeast Association for Clinical Microbiology & Infectious Disease, and the Northeast Branch of the American Society for Microbiology.
APUA’s US Health Provider Education

On October 26, 2001, during the IDSA annual meeting in San Francisco, APUA reviewed the direction of its US Health Provider Education Program. Through this program, APUA sponsors speakers and joint exhibits with the CDC at major health care conferences, and develops CME and website materials about antibiotic resistance. The Education Program was evaluated by several top ID physicians: Drs. Paul Goldmann, Sherwood Gorbach, David Hooper, Thomas Hooton, Joseph Johns, Calvin Kunin, Richard Meyer, and Lindsay Nicolle. APUA’s Executive Director, Kathleen Young, and Director of Public Policy and Domestic Programs, Barbara Souder, PhD, facilitated the meeting.

Following a lively discussion about the lecturers’ experiences, suggestions were made about how to improve the Education Program, such as:

- Developing clear and concise guidelines with minimal footnotes.
- Recruiting more physicians from the ranks of primary care physicians to lecture, as doctors often prefer to hear from speakers within their specialties.

The lecturers also felt that additional support was needed outside of the Education Program to reinforce the message. Their suggestions included:

- Developing a professional marketing campaign to target and deliver the message.
- Studying factors that make guidelines a success; for example, guidelines that are considered successes in terms of impact are vancomycin, pneumonia, UTIs and immunization guidelines.
- Eliciting appropriate peer support for physicians from their professional societies to not prescribe unnecessarily.

The conclusion of the meeting was that each of the lecturers has enjoyed the Education Program experience, and they would like it continued with additional resources, including new expert lecturers, additional handouts and outside resources.

Chapter News

APUA-Venezuela, in collaboration with the Venezuelan Society of Infectious Diseases, sponsored an “Antimicrobial Resistance Week” from November 12-16, 2001. The event highlighted the importance of antimicrobial resistance in Venezuela and used press, radio, TV and internet reports, as well as live interactive community sessions, to educate physicians and consumers. A survey will be published in a national newspaper to gain information on physicians’ knowledge and practice on the issue. Manuel Guzman-Blanco, MD, APUA-Venezuela coordinator, is leading the effort.

Shyam P. Lohani reported that APUA-Nepal, using a grant from the National Health Research Council, held a training for new medical graduates on the prudent use of antibiotics from November 1-3, 2001.

APUA’s Small Grants

In response to APUA’s most recent Request for Proposals, 11 international APUA chapters have submitted 13 plans for proposed research activities for 2001-2002. The proposals range from the analysis of sales of antibiotics to the cost of hospital-acquired methicillin-resistant Staphylococcus aureus infections. APUA anticipates that the coordinated research effort by chapters will yield high-impact results, and further APUA’s mission as the source of the latest information on antibiotic use and appropriate interventions. Between three and five proposals will be funded, with awards immediately following the review process.

GAARD: Emerging H. influenzae Resistance

The GAARD (Global Advisory on Antibiotic Resistance Data) project, coordinated by APUA with data contributions from GlaxoSmithKline, Bristol-Myers Squibb and Focus Technology, has developed a global databank to monitor trends in antibiotic resistance worldwide. Using the GAARD database, a cluster of Haemophilus influenzae isolates was identified with reduced susceptibility to fluoroquinolones. Although they would not be characterized as “resistant” according to current NCCLS standards, the group theorizes they could represent first steps towards a resistant phenotype. Genetic analysis indicated that single DNA mutations in these isolates were associated with the noted decrease in fluoroquinolone susceptibility. These isolates may be more likely to respond to further fluoroquinolone exposure by becoming fully resistant. The increase in the frequency of these isolates over time suggests an increase in the risk of highly resistant isolates emerging. Thus, by coordinating the datasets in the GAARD project, we have identified a potential problem before its emergence. This serves as an early alert for hospitals and larger clinical laboratories to look for trends indicating an emerging problem.

FAAIR: Antimicrobials & Animals

The October 18, 2001 issue of the New England Journal of Medicine contained a guest editorial by Dr. Sherwood Gorbach, a member of the APUA Scientific Advisory Board and co-chair of the Scientific Advisory Panel of the Facts about Antibiotics in Animals
If you are concerned about the public health threat of antibiotic resistance, become part of the solution. Make a tax-deductible contribution and join our global network of citizens, clinicians, researchers and policy makers.

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APUA is a non-profit organization dedicated to curbing antibiotic resistance and improving the use of antibiotics throughout the world. Founded in 1981, APUA’s mission is to improve public health through education and research concerning antibiotic use and resistance. With members in over 100 countries and numerous country chapters, APUA provides a unique network to support country-based activities and facilitate international communication. APUA’s resources include an international scientific advisory board with members of national academies of medicine and science, and a professional staff with specialized expertise.

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FAAIR continued from page 7

and the Impact on Resistance (FAAIR) Project of APUA. The editorial accompanies three articles that present new scientific research related to antimicrobial use in food-animal production.

Entitled “Antimicrobial Use in Animal Feed—Time to Stop,” Dr. Gorbach’s editorial is substantively informed by the deliberations of the FAAIR Scientific Advisory Panel. As presented in the editorial, the FAAIR Panel concluded that the elimination of non-therapeutic use of antimicrobials in food animals will lower the burden of antimicrobial resistance in the environment with consequent benefits to human and animal health.

The complete findings of the nine members of the FAAIR Panel, including their Conclusions and Policy Recommendations, will be published as an authoritative Report in the journal Clinical Infectious Diseases in early 2002. A summary version of the report intended for policy makers, other stakeholders, and the general public will also be generated and distributed by APUA this winter.

The text of Dr. Gorbach’s editorial and an overview of the issues from various stakeholders perspectives can be accessed through the APUA website (www.apua.org). The APUA site will also feature updated information on the online availability of the full text and summary of the FAAIR Report.