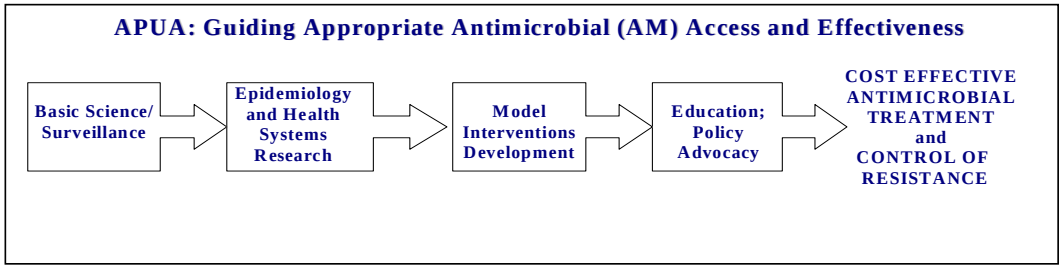
APUA
ALLIANCE FOR THE PRUDENT USE OF ANTIBIOTICS
Preserving the Power of Antibiotics®

Global Mission, Resources and Programs: 2008-2009

I. The APUA Global Mission

Founded in 1981 as a global non-profit organization, APUA's mission is to maximize the effectiveness of antimicrobial treatment by promoting appropriate antimicrobial use and containing drug resistance. With a network of affiliated chapters in over 60 countries, APUA serves as a respected resource to guide antimicrobial supply, treatment, and policy decisions throughout the world. APUA programs are designed to improve the treatment of patients with bacterial infections, malaria, HIV, and tuberculosis by:

- Increasing access to appropriate and effective antimicrobials;
- Improving institutional and governmental antimicrobial policy and community clinical practice; and
- Strengthening local microbiology, resistance + drug use, surveillance and diagnostics



Based in Boston, MA, APUA global resources include: a specialized professional staff with extensive field experience; an international Scientific Advisory Board and specialized consulting panel; affiliations with Tufts University Medical School; and affiliated country chapters in 60 countries, including many in Africa, Southeast Asia and other resource poor regions.

APUA headquarters provides field consultations and organizational assistance to local governments and provider organizations seeking to improve antimicrobial supply, use and management decisions. The APUA local chapters serve as reliable resources for collection and dissemination of information and advocacy for antimicrobial management.

APUA programs are funded through multiyear contracts and grants from organizations such as: the U.S. National Institutes of Health (NIH), Pan American Health Organization (PAHO), the U.S. Agency for International Development (USAID), U.S. Office of Homeland Security, World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC), U.S. Food and Drug Administration (USFDA), the World Bank, Ministries of Health, professional societies and foundations, and private corporations.

II. APUA Resources

A. APUA Project Directors and Managers

Because antimicrobials are unique among drugs, decisions about their supply, management, and treatment must take into account microbiological information about patterns of antibiotic resistance and use. APUA approaches policy questions with a multidisciplinary perspective involving the following disciplines: pharmacoeconomics; operations and policy analysis; epidemiology; microbiology; clinical medicine; and behavioral research. APUA staff expertise is as follows:

Stephanie Boyd, M.A., APUA Program Coordinator, is a Ph.D. candidate in cognitive anthropology at SUNY Buffalo with training in public health and epidemiology. Ms. Boyd has organized expert panels and conducted large-scale consumer surveys concerning antibiotic use and resistance. Prior to her position at APUA, Ms. Boyd was an educator at a wildlife conservation and research facility, where she developed and led educational programs, supported applied ecological research projects and served as a liaison with government groups.

Susan Foster, Ph.D., APUA Director of Public Policy and Education, has a background in pharmaceutical policy and economics with extensive experience at the WHO Essential Drugs Programme and at the World Bank's Population, Health and Nutrition Department. She has numerous publications on infectious disease research and economic and policy issues, including several guest editorials in the *Lancet*. Dr. Foster has extensive field experience in Africa and other resource-poor countries, utilizing qualitative and quantitative research to produce reports on cost-effectiveness of health systems and cost-benefit analysis of various options. Dr. Foster was the first coordinator of the London School of Hygiene & Tropical Medicine's distance learning program and is a Professor of International Health at Boston University.

Bonnie Marshall, M.T., APUA's Research Scientist and editorial consultant, received her B.A. in Microbiology from the University of New Hampshire and Medical Technology degree from Framingham State College. As a Research Associate in the Department of Molecular Biology and Microbiology at Tufts University School of Medicine, Ms. Marshall has over 25 years experience in the management and execution of bench science projects and multiple peer-reviewed journal publications concerning the tracking and quantifying of antimicrobial resistance. She serves as Associate Editor of the APUA Newsletter and microbiology specialist on several APUA projects.

Aníbal Sosa, M.D., APUA's Director for International Chapter Programs and Clinical Advisor, is a microbiologist and infectious disease specialist with considerable experience managing international public health programs in developing countries. He has served as a professor of Medical Microbiology and Tropical Diseases at the University of Zulia School of Medicine and as a clinical instructor at Tufts University School of Medicine. Dr. Sosa manages APUA's Chapter Network and provides technical assistance on guidelines development, laboratory strengthening, and research and education programs concerning antimicrobial resistance control worldwide. Prior to APUA, Dr. Sosa coordinated HIV/AIDS services and served as Director of Community Health at other organizations.

Christopher Spivey, M.A., APUA's Manager for Business Development and Communications, earned a M.A. in communication from Christchurch Technical College in New Zealand where he trained in communication and international marketing. He has managed meetings and programs engaging diverse stakeholders and sponsors at APUA and at the Human Proteome Organization (HUPO). He has served as conference chair for 10 large biotech conferences and several large APUA international meetings and initiated APUA public/private collaborations to accelerate antimicrobial development. Mr. Spivey also serves as manager of clinical news in the APUA Newsletter.

John Stelling, M.D., M.P.H., is an associate Staff Scientist contributing to APUA's projects. A researcher of infectious diseases and epidemiology, Dr. Stelling provides training and support to an international network of microbiology laboratories engaged in global surveillance initiatives. He also supports the development of database and interface software for APUA projects. He travels extensively throughout the world to train local clinicians. He is a graduate of Harvard Medical School with a M.P.H. degree in International Health and Biostatistics from Johns Hopkins School of Hygiene and Public Health and consulted for the World Health Organization (WHO).

B. Operations and Executive Support

Ronald Lanoue, M.B.A., is the APUA Operations Manager responsible for developing and implementing systems for financial analysis and program support to ensure the smooth operations of APUA. Mr. Lanoue has extensive experience supporting large USAID and NIH grants and has held senior administrative positions with various medical provider groups and organizations. He has extensive experience in developing and implementing computer and scheduling systems. He received his MBA from Boston University's School of Management, and is also conversant in French.

Wendy Lu, B.A. is the Executive Special Projects Coordinator for APUA. Wendy received her B.A. in History and Psychology from Boston University and is currently interested in obtaining a graduate degree in Public Health. Prior to her position at APUA, she worked as a Circulation Assistant at Boston University's Mugar Memorial Library, its primary library for study, teaching, and research in the humanities and social sciences.

C. Executive Officers of APUA

Stuart B. Levy, M.D., is President and founder of APUA, and a past president of the American Society for Microbiology. A microbiologist and physician, Dr. Levy discovered the mechanism for tetracycline resistance (efflux) and was among the first to document the transfer of drug resistance among animals and humans. Dr. Levy is the author of *The Antibiotic Paradox: How Miracle Drugs are Destroying the Miracle*, which has been widely cited in both the lay and scientific media and is in its second edition (2002). As a young physician, he worked extensively in the developing world. He has also written more than 250 scientific and medical papers and served as advisor on policy committees including: the NIH Fogarty Center's three year study of Antibiotic Use and Resistance Worldwide (as Chairman); an advisory panel for the U.S. Office of Technology; the EPA Subcommittees on Health and Antibiotic Resistance; the UK House of Lords report on antibiotic resistance; and WHO Scientific Advisory Groups. Dr. Levy has also

served as a consultant for the World Health Organization, the U.S. FDA, the National Institutes of Health, the U.S. AMRIID national security project, and other national and international organizations including official national biosecurity panels. He is currently Professor of Medicine and Molecular Biology/Microbiology, the Director of the Center for Adaptation Genetics and Drug Resistance at Tufts University School of Medicine, and a Staff Physician at the New England Medical Center.

Thomas F. O'Brien, M.D., Vice President of APUA, is a leading authority on antibiotic resistance control and surveillance. An infectious disease specialist and microbiologist, Dr. O'Brien helped develop the WHONET surveillance program. He also initiated the WHO Collaborating Center for Surveillance of Resistance to Antimicrobial Agents at Brigham and Women's Hospital in Boston in 1985, which has established an international network of over 60 microbiology laboratories tracking AMR patterns and developing guidelines based on these data. Dr. O'Brien has performed field consultations to improve clinical services in African hospitals and served as an advisor on numerous national and international committees, including the NIH Task Force on Antibiotic Resistance, (which he chaired from 1984 to 1986); the WHO Scientific Working Group on AMR (1981); the FDA's Veterinary Medicine Advisory Committee (since 1994); the Office of Technology Assessment Advisory Panel on Impacts of Antibiotic-Resistant Bacteria; the Inter-Agency (FDA, CDC, USDA) Working Group on Antimicrobial Resistance; and the CDC Working Group on Drug-Resistant *Streptococcus pneumoniae*. He has also served as a consultant on antimicrobial resistance to WHO (in Geneva and Manila), PAHO, the British House of Lords, and the National Health Research Institute of Taiwan, among others. Medical Director of the Microbiology Laboratory at Brigham and Women's Hospital for the past 20 years, Dr. O'Brien has been a pioneering researcher in the area of AMR since the mid-1960s.

Kathleen T. Young, APUA Executive Director, oversees development, implementation, and evaluation of APUA's operations and programs and coordinates the Board strategic initiatives. At APUA, she has initiated many of APUA's national and international collaborative projects involving diverse stakeholders from governmental and industry organizations including: the Center for Disease Control and Protection, the International Society of Chemotherapy, National Institutes of Health, United States Agency for International Development, the Pan American Health Organization, the World Health Organization, the Food and Drug Administration, the U.S. Department of Agriculture, the World Bank, and APUA-affiliated international chapters. Ms. Young has over 20 years of experience in senior strategic planning positions, designing and executing health services research, policy, and education projects. Ms. Young was formerly a Director of Planning at the Massachusetts Office of Health Planning, the Massachusetts Hospital Association, National Medical Care, Blue Cross/Blue Shield, and a statewide consumer advocacy group. Ms. Young was trained in public administration and health policy at the University of Chicago.

D. APUA Consultants and Scientific Advisory Board

APUA's Scientific Advisory Board and roster of expert consultants represent the world's top experts in antibiotic resistance, development, and use, and they come from 54 countries- 25 in the developing world. This panel includes recognized experts in antimicrobial resistance, with expertise in antimicrobial use, pharmaceutical management, pharmaco-economics, microbiology,

internal medicine, pediatrics, public health, epidemiology, veterinary medicine / animal health, pharmacology, infection control/quality improvement, surveillance, provider training, clinical guidelines development, policy analysis, consumer education, and program administration. Many have field experience in developing countries and are fluent in Spanish, French, and many other languages.

III. APUA Global Programs and Field Activities

A. Epidemiology and Health Systems Research and Interventions

APUA works with affiliated country chapters and non-affiliated local partners to track antimicrobial resistance and execute interventions. Priorities are set in accord with local priorities with guidance from the *WHO Global Strategy for the Containment of Antimicrobial Resistance* and the *US Interagency Plan to Combat Antimicrobial Resistance*.

1. Developing Country Grassroots Programs to Improve AM Management

APUA has initiated and provided support for grassroots AMR interventions. Exemplary projects are:

- Epidemiology and Treatment of Persistent Diarrhea in NE Brazil: Brazil
- Criteria for Defining a Surgical Site Infection (SSI): Peru
- Development of National Antibiotic Guidelines: Nepal
- Impact of Training on Rational Use of Antibiotics in Surgery Departments: Vietnam
- Survey on Antimicrobial Resistance and Use in Bulgaria: Bulgaria
- Analysis of Sale and Dispensing of Antibiotics in Moldova: Moldova
- Cost of *Staph. aureus* in Hospital Acquired Infections
- Study on Antibiotic Use for Pharyngitis and Percentage of Pharyngitis due to Group A Strep: Uruguay
- Cost Analyses of Antibiotic Usage Patterns: Ukraine
- 14 African Countries and many other resource limited nations: Consultations and trainings to improve lab capacity and rational AM use

2. The APUA Chapter Network Championing Local Improvements

APUA and its chapters work in partnership with ministers of health and public health organizations to improve antimicrobial use. With affiliated chapters in 30 resource-poor countries and an expanding network in over 10 sub-Saharan African countries, the APUA chapter network serves as a unique global resource. Each affiliated chapter collaborates with key government organizations to promote appropriate antimicrobial use and increase cost effectiveness of drug supplies and treatment decisions.

3. Behavioral Interventions

APUA conducts national and local surveys concerning consumer and provider knowledge and attitudes, and behaviors in industrial and developing countries in order to guide interventions that will impact antimicrobial use by consumers and providers. Consumer misuses studied include self-medication, hoarding outdated prescriptions, and poor adherence to treatment regimens. A recent APUA national consumer survey documented consumers' attitudes and practices

regarding the appropriate use of antibiotic therapy and the prevalence of consumer noncompliance. The information was used to develop recommendations, messaging, and educational vehicles to promote more appropriate antimicrobial use and to guide practitioner communications with patients.

4. Refining and Disseminating Treatment Guidelines

APUA engages in studies and consultations to review resistance surveillance data and refine antimicrobial treatment guidelines and cost-effective management supply. Expert consultations involve representatives from the Infectious Diseases Society of America (IDSA), the Centers for Disease Control and Prevention (CDC) and top clinical researchers as well as international consultations to WHO and MOH. (See Consultant roster in Section II, Part D).

B. National and International Communications and Health Practitioner Education

APUA headquarters provides technical assistance, educational materials, and testimony to improve antimicrobial practice and policy worldwide, with specialized field consultations in developing countries.

1. APUA's Newsletter on AMR

The APUA Newsletter, in continuous publication since 1982, is valued as a unique, non-commercial source of information in the developing world, where it is available without charge. The Newsletter carries up-to-date scientific and clinical information on prudent antibiotic use and management of antibiotic resistance. The publication is translated into three languages and distributed to over 7,000 affiliated individuals in more than 100 countries. Articles focus on timely topics including:

Comment: This is redundant

- "Acute Respiratory Infections in Resource-Poor Countries". Interviews with Keith Klugman of Emory University and Shamim Qazi of WHO (Vol. 24, No. 3, 2006).
- "Comparing the Twin Epidemics of AMR and HIV". Ken Mayer of Brown University (Vol. 23, No. 1, 2005).
- "How is Multi-Resistant Tuberculosis Managed in Resource Poor Settings?". Jennifer J. Furin of Case Western Reserve University (Vol. 22, No. 4, 2004).
- "Resistant Respiratory Infections Threaten Developing Countries". Anita K.M. Zaidi of Aga Khan University (Vol. 21, No. 3, 2003).
- "Special Challenges to the Study of AMR in Africa". Iruke N. Okeke of APUA's sub-Saharan Africa Chapter (Vol. 20, No. 4, 2002).

Back issues of the Newsletter are posted on the APUA website.

2. APUA Dedicated Website on AMR

The APUA website has been commended by the American Society of Microbiology and Clinical Infectious Diseases for information targeting individuals, physicians, and policy makers. See: http://www.apua.org.

Comment: journal or society?

3. APUA International Listservs

The APUA staff operates several active listservs including the ROAR Discussion Group, as well as a Spanish and English AMR International Listserv concerning the latest AMR research and publications on antimicrobial development, use, and resistance issues.

C. Basic Science and Surveillance of Antimicrobial Resistance

1. Pathogen Surveillance: GAARD

APUA coordinates several surveillance projects, including a public/private partnership, to pool data from the world's major global antibiotic resistance surveillance systems in order to identify emerging trends in drug resistance (**G**lobal **A**dvisory on **A**ntimicrobial **R**esistance **D**ata). WHO and CDC served as advisors, while Astra-Zeneca, Bayer AG, Bristol Myers Squibb, and GlaxoSmithKline served as data contributors.

A full list of GAARD Peer-reviewed research is listed on the APUA website and includes:

- Link between *Haemophilus influenzae* type b vaccination and its effect on infection and resistance. (Submitted to peer reviewed journal.)
- "Integrating *Escherichia coli* Antimicrobial Susceptibility Data from Multiple Surveillance Programs". John M. Stelling, et al., *Emerging Infectious Diseases* (Vol. 11, No. 6, June 2005, pp. 873-882).
- The 2005 Report of the Global Advisory on Antibiotic Resistance Data (GAARD), by APUA, *Clinical Infectious Diseases*, August 15, 2005, Vol. 41, Supplement 4, pp. S219-S288.

2. Commensal Surveillance

The *Reservoirs of Antibiotic Resistance* (ROAR) project is a 5-year international research project sponsored by the National Institute of Allergy and Infectious Diseases. The ROAR clinical and research network is the first scientific/clinical collaboration to document the role of commensal bacteria in the emergence and spread of antimicrobial resistance. Project outputs include a commensal isolate database and bioinformatics tools and risk analysis. A major goal of the project is to determine the patterns of antibiotic resistance genes in commensals in order to predict the subsequent emergence of antibiotic resistance in pathogenic bacterial populations. APUA functions as a project coordinator reviewing proposals and awarding ROAR research sub-grants to major academic centers worldwide. See www.ROARProject.org.

Comment: Outdated?

3. Biosecurity

APUA conducts joint research projects in collaboration with the laboratory at Tufts University School of Medicine's Center for Adaptation Genetics and Drug Resistance. Through a new biosecurity contract with US AMRIID, APUA and the Center are working with several APUA chapters to expand collection of commensal bacteria that will compile data on worldwide antibiotic resistance trends.

D. Policy Analysis, Stakeholder Organization, and Advocacy

APUA convenes expert panels involving diverse stakeholders, including industry, governmental, and consumer organizations, to document evidence and provide national policy guidance on AMR. The panels include representation from industry, government and the non-profit sectors. Exemplary projects are:

1. Economic Cost of Antimicrobial Resistance and Misuse

Resistant infections are a major cause of morbidity, mortality, and disability with associated economic impacts on health care costs and lost productivity. APUA engages in systematic evaluations to determine the economic burden of resistance on society and to compile evidence that can help guide clinical and regulatory action. These studies provide policy makers with evidence on the factors impacting the cost of drug resistance, the economic burden of drug resistance on the health care systems, and the cost effectiveness of various interventions.

2. Accelerating Access to Antimicrobials and Diagnostics

APUA's ABC project involves experts from industry, academia, and government seeking to identify barriers and opportunities that can accelerate diagnostics and drug development in order to control AMR. Over 20 corporations and 10 academic and public health organizations, as well as the International Society for Chemotherapy, have been involved in several national and international meetings to document barriers and recommend solutions. APUA works with the Infectious Diseases Society of America (IDSA), the American Medical Association (AMA), and the Society for Healthcare Epidemiology of America (SHEA) to promote U.S. public policy and legislation that will maintain incentives for pharmaceutical antibiotic development and appropriate use.

3. Improving Sanitation and Hygiene to Control Infectious Disease

APUA conducts collaborative research and education projects to help guide policy related to antimicrobial products. These projects solicit international experts to document the latest scientific knowledge and gain consensus on applications and policy recommendations. APUA is developing a scientific consensus on threshold home hygiene practices and the risks and benefits of antibacterial products. The project will produce guidelines on the responsible use of hygiene agents so as to promote infection control, while reducing misuse of agents such as triclosan that could potentially compromise the effectiveness of antibiotic resources.

3. The Facts about Antibiotics in Animals and the Impact on Resistance (FAAIR)

APUA has engaged diverse stakeholders to gain consensus on controversial policy issues, such as "The Need to Improve Antimicrobial Use in Agriculture: Ecological and Human Health Consequences", published in *Clinical Infectious Diseases* (CID) 2002:34 (Supp 3). This APUA report was cited by the Institute of Medicine and served as the scientific basis for the McDonald's Corporation ban on certain antibiotics to promote animal growth. APUA has provided scientific evidence in FDA hearings to remove fluoroquinolones from use in animal growth promotion. A follow-up report, "Animal Antimicrobial Use Data Collection in the United States", published in *Preventive Veterinary Medicine*, 2006:73 (Issues 2-3), guides future research efforts and regulatory agricultural policy.