

# ReAct SPOTLIGHT

Focus on Latin America

14 December, 2011 | ReAct

*(Links to articles via headlines)*

## A Snapshot of ReAct in Latin America

*(Please click [here](#) for a Spanish version)*

ReAct Latin America started in 2005 with the purpose of being an active and creative network that promotes social and political awareness, mobilizes the community and health professionals to action research and health promotion and aims at containing bacterial resistance. In addition, ReAct in Latin America wants to recover and develop a holistic view of health that encompasses a harmonious relationship with ecosystems. Since its establishment, ReAct in Latin America has pursued three complementary lines of work: *research*, generating evidence to determine the magnitude of the problem, making it visible in the media and to people in political decision-making positions, *training* through education and training of health professionals and "Educommunication", for communities to raise awareness about the increasing bacterial resistance and allowing its inclusion in the agenda of health and social networks in Latin America.

Since 2007, ReAct in Latin America has established a network with many academia and research centers. Among these are the University of Cuenca in Ecuador, Peru's Cayetano Heredia University, Universidad de Oriente in Venezuela, National University in Colombia, University of British Columbia, health organizations and state agencies, community and social organizations such as the commission of environmental protection of Victoria of Portete and ecological networks for children and health professionals. Thus, links have been built with groups of experts on antimicrobial resistance, rational use of antibiotics, infectious diseases and pharmacology.

Members of ReAct Latin America have presented their work in international and national workshops on bacterial resistance, infectious diseases, community solidarity and ecosystems. They have participated in examining drug advertising in the First Certification Course with the British Columbia University in the First Latin American Congress in Laboratory Medicine. They have also participated in medicine workshops on Pharmacoepidemiology and Evidence, and contributed to the work plan of research on social determinants on infectious diseases, perceptions of child caregivers on Acute Respiratory Tract Infections and conducted a study on extended spectrum beta-lactamase (ESBL) producing bacteria in neonatal wards in hospitals. Notably, the project "Fotoresistencia", using photography as a tool for educommunication, has been widely used by hospitals, health professionals, university students and social organizations, communities and local governments with the primary goal of community participation.

We know that fragmented interventions are not the solution, since the coordinated actions are necessary. For this reason, the goal in 2012 to 2014 is to carry out urgent education and training processes, starting with health professionals through a Masters program in primary health care with special emphasis on management of infectious diseases and bacterial resistance to antibiotics. This project will be undertaken through interagency and international support. In addition, another project on population health education for children is to be implemented in two countries in Latin America (Ecuador and Nicaragua). This project will be conducted in collaboration with networks in Ghana and South-East Asian countries.

For more information or if you are interested in collaborating with ReAct in Latin America, please contact Professor Arturo Quizhpe at [aquizhpe@yahoo.com](mailto:aquizhpe@yahoo.com).

## First finding of carbapenemases of type New Delhi Metallo- $\beta$ -lactamase (NDM) in Latin America

*(Please click [here](#) for a Spanish version)*

Nov. 22 2011 | PAHO, Epidemiological Alert

Due to the recent finding of carbapenemases of New Delhi metallo- $\beta$ -lactamase (NDM) type in isolations of *Klebsiella pneumoniae* in Guatemala, the Pan American Health Organization/World Health Organization (PAHO/WHO) emphasizes the importance of the surveillance and detection in the Region of this resistance mechanism that increases morbidity and mortality of healthcare associated infections.

On 17 November 2011, the International Health Regulations National Focal Point (IHR NFP) published an epidemiological alert of the isolation of strains of multiresistant *Klebsiella pneumoniae* by carbapenemase type New Delhi metallo- $\beta$ -lactamase (NDM) in Guatemala. According to the published alert, the National Health Laboratory confirmed the presence of NDM in two strains of *Klebsiella pneumoniae* that were provided by two national reference hospitals located in Guatemala City.<sup>1</sup> The Guatemala IHR NFP is conducting epidemiological research to know the origin and the implications of the finding. The National Institute of Infectious Diseases Dr. Carlos G. Malbrán in Argentina carried out the molecular analysis of the strains. Additional molecular analyses are underway to determine the type of NDM and the pulsed field gel electrophoresis, which in turn will help to find the genetic relation of these strains with those circulating elsewhere in the world.

## Factors predictive of inappropriateness in requests for parenteral antimicrobials for therapeutic purposes: a study in a small teaching hospital in Brazil

Jul. 2011 | Scand J Infect Dis.

**BACKGROUND:** The identification of patterns of inappropriate antimicrobial prescriptions in hospitals contributes to the improvement of antimicrobial stewardship programs (ASP).

**METHODS:** We conducted a cross-sectional study to identify predictors of inappropriateness in requests for parenteral antimicrobials (RPAs) in a teaching hospital with 285 beds. We reviewed 25% of RPAs for therapeutic purposes from y 2005. Appropriateness was evaluated according to current guidelines for antimicrobial therapy. We assessed predictors of inappropriateness through univariate and multivariate models. RPAs classified as 'appropriate' or 'probably appropriate' were selected as controls. Case groups comprised inappropriate RPAs, either in general or for specific errors.

**RESULTS:** Nine hundred and sixty-three RPAs were evaluated, 34.6% of which were considered inappropriate. In the multivariate analysis, general predictors of inappropriateness were: prescription on weekends/holidays (odds ratio (OR) 1.67, 95% confidence interval (CI) 1.20-2.28,  $p = 0.002$ ), patient in the intensive care unit (OR 1.57, 95% CI 1.11-2.23,  $p = 0.01$ ), peritoneal infection (OR 2.15, 95% CI 1.27-3.65,  $p = 0.004$ ), urinary tract infection (OR 1.89, 95% CI 1.25-2.87,  $p = 0.01$ ), combination therapy with 2 or more antimicrobials (OR 1.72, 95% CI 1.15-2.57,  $p = 0.008$ ) and prescriptions including penicillins (OR 2.12, 95% CI 1.39-3.25,  $p = 0.001$ ) or 1(st) generation cephalosporins (OR 1.74, 95% CI 1.01-3.00,  $p = 0.048$ ). Previous consultation with an infectious diseases (ID) specialist had a protective effect against inappropriate prescription (OR 0.34, 95% CI 0.24-0.50,  $p < 0.001$ ). Factors independently associated with specific prescription errors varied. However, consultation with an ID specialist was protective against both unnecessary antimicrobial use (OR 0.04, 95% CI 0.01-0.26,  $p = 0.001$ ) and requests for agents with an insufficient antimicrobial spectrum (OR 0.14, 95% CI 0.03-0.30,  $p = 0.01$ ).

**CONCLUSIONS:** Our results demonstrate the importance of previous consultation with an ID specialist in assuring the quality of prescriptions. Also, they highlight prescription patterns that should be approached by ASP policies.

*Comment by Ingrid Trolin, ReAct:*

### Factors leading to inappropriate antibiotic prescriptions. Implementation of new routines to overcome difficulties

A new teaching hospital with 285 beds was opened in 2002 in São Paulo State, Brazil. Right from the start an Antibiotic Stewardship Program (ASP) was up and running in the hospital. One of the requirements of the ASP in the hospital is a written request for every prescription of parenteral antibiotics. The Infection Control Committee (ICC) audited all such prescriptions and had a chance to change them during the following day, if deemed inappropriate.

In 2005, a study was performed aimed at evaluating factors which could be predictive of inappropriate prescriptions. A sample of all the requests for parenteral antibiotics during the year was analyzed independently by two researchers. Additional information was collected regarding the patient, the infection, and the prescription.

Appropriateness was judged on the basis of compliance with the IDSA guidelines or other evidence-based sources. Eight categories were used regarding appropriateness, nr 1 being "appropriate" and nr 8 "multiple errors".

During the study year, more than 11 000 patients were admitted to the hospital. Of these, 28,7% received at least one dose of a parenteral antibiotic. In the analysis, 963 requests to the ICC were scrutinized, and in 34,6% inappropriate prescription was detected. In 11 cases, multiple errors were made.

Factors independently associated with inappropriate prescriptions were: prescription during holidays or weekends, admittance to the ICU (Intensive Care Unit), peritoneal or urinary infection, and combination therapy with two or more antibiotics. Consultation with a specialist in Infectious diseases (ID) was protective as it prevented inappropriate and unnecessary prescriptions.

The authors conclude the article by mentioning that after the results from the study were known, several changes to the ASP policies in the hospital were made: ID specialist consultation on holidays and weekends was made possible, ASP daily rounds in the ICU were initialized, reporting of all microbiological results to the ASP team was incorporated in the routines and the request form was made available online for quicker and easier use.

Although the article does not give any information regarding the impact on clinical outcome for the treated patients or about the occurrence of different bacteria in the hospital, the article gives an interesting insight into the daily work in a modern hospital, where the ASP staff seems dedicated to fight antibiotic resistance. An important message is that the results of the intervention lead to practical changes in everyday work and policy.

## Assessing the pharmacodynamic profile of intravenous antibiotics against prevalent Gram-negative organisms collected in Colombia

Oct. 2011 | Braz J Infect Dis

**OBJECTIVES:** This study was designed to simulate standard and optimized dosing regimens for intravenous antibiotics against contemporary populations of *Escherichia coli*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, and *Pseudomonas aeruginosa* using MIC distribution data to determine which of the tested carbapenem regimens provided the greatest opportunity for obtaining maximal pharmacodynamic (PD) activity.

**METHODS:** The isolates studied were obtained from the COMPACT-COLOMBIA surveillance program conducted between February and November 2009. Antimicrobial susceptibility testing was conducted by broth microdilution method according to the CLSI guidelines. Doripenem, imipenem-cilastatin, and meropenem, were the modeled antibiotics. A 5,000 patient Monte Carlo simulation was performed for each regimen and PD targets were defined as free drug concentrations above the MIC for at least 40% of the dosing interval.

**RESULTS:** All carbapenem regimens obtained optimal exposures against *E. coli*, unlike the other Enterobacteriaceae tested. Against *P. aeruginosa*, only a prolonged infusion of doripenem exceeded the 90% cumulative fraction of response (CFR) threshold. Worrisomely, no regimens for any of the drugs tested obtained optimal CFR against *A. baumannii*. For *P. aeruginosa* intensive care unit (ICU) isolates, CFR was approximately 20% lower for isolates collected in the respiratory tract compared with bloodstream or intra-abdominal for imipenem and meropenem. Noteworthy, all doripenem and meropenem regimens achieved greater than 90% CFR against bloodstream and respiratory isolates of *K. pneumoniae*.

**CONCLUSIONS:** Our data suggests that higher dosing and prolonged infusion of doripenem or meropenem may be suitable for empirically treating ICU *P. aeruginosa*, while none of the carbapenems achieved optimal cumulative fraction of response against *A. baumannii*. Standard dosing regimens of all the carbapenems tested achieved optimal CFR against *E. coli* isolates, but higher carbapenem dosages might be required for empiric treatment of *K. pneumoniae*, particularly from an intra-abdominal source. Non-standard dosage regimens studied in this modeling should be proven effective in prospective clinical trials.

## Results of antimicrobial susceptibility surveillance in Chile: Consolidating a network

(Article in Spanish. Click "Traducción automática" for a Google translation to your language)

Feb. 2011 | Rev. méd. Chile

Antimicrobial resistance is an increasing public health issue. Creation of surveillance networks is a matter of major importance for antimicrobial resistance understanding and monitoring. Also, they contribute to design actions for controlling its appearance and dissemination. In 2007 a collaborative group in antimicrobial resistance was formed, representing several health institutions across the country. In this paper we report the results of 2009 surveillance with emphasis in its interpretation, limitations and future perspectives.

## Injudicious and excessive use of antibiotics: Public health and salmon aquaculture in Chile

(Article in Spanish. Click "Traducción automática" for a Google translation to your language)

Jan. 2011 | Rev. méd. Chile

Salmon aquaculture was one of the major growing and exporting industries in Chile. Its development was accompanied by an increasing and excessive use of large amounts of antimicrobials, such as quinolones, tetracyclines and florfenicol. The examination of the sanitary conditions in the industry as part of a more general investigation into the uncontrolled and extensive dissemination of the ISA virus epizootic in 2008, found numerous and wide-ranging shortcomings and limitations in management of preventive fish health. There was a growing industrial use of large amounts of antimicrobials as an attempt at prophylaxis of bacterial infections resulting from widespread unsanitary and unhealthy fish rearing conditions. As might be expected, these attempts were unsuccessful and this heavy antimicrobial use failed to prevent viral and parasitic epizootics. Comparative analysis of the amounts of antimicrobials, especially quinolones, consumed in salmon aquaculture and in human medicine in Chile robustly suggests that the most important selective pressure for antibiotic resistant bacteria in the country will be excessive antibiotic use in this industry. This excessive use will facilitate selection of resistant bacteria and resistance genes in water environments. The commonality of antibiotic resistance genes and the mobilome between environmental aquatic bacteria, fish pathogens and pathogens of terrestrial animals and humans suggests that horizontal gene transfer occurs between the resistome of these apparently independent and isolated bacterial populations. Thus, excessive antibiotic use in the marine environment in aquaculture is not innocuous and can potentially negatively affect therapy of bacterial infections of humans and terrestrial animals.

## The changing pattern of methicillin-resistant staphylococcus aureus clones in Latin America: implications for clinical practice in the region

Dec. 2010 | Braz J Infect Dis

Methicillin-resistant *Staphylococcus aureus* (MRSA) clones belonging to the Brazilian, Pediatric, Cordobes/Chilean and New York/Japan clonal complexes are widely distributed across Latin America, although their individual distribution patterns and resistance to antimicrobial drugs are constantly changing. Furthermore, clones with increased virulence are beginning to appear more frequently both in hospital and community settings, and there is evidence that virulence factors can be transferred between hospital- and community-associated clones through recombination. These changing patterns have significant implications for clinical practice in the region. Most importantly, clinicians need to be aware of the changing antimicrobial resistance profile of circulating MRSA clones in their region in order to choose the most appropriate empiric antimicrobial therapy. Thus, regional molecular epidemiology programs are required across the region to provide accurate identification and characterization of circulating MRSA clones.

## Antibiotic prescription in intensive care units in Latin America

Jun./Sep. 2011 | Rev. argent. microbiol.

The intensive care units (ICUs) are often considered as the epicenters of antibiotic resistance. Therefore, the total antibiotic consumption is approximately ten fold greater in ICU wards than in general hospital wards. The aim of this study was to evaluate the current use of antibiotics in Latin American ICUs. Three cross-sectional (one-day point) prevalence studies were undertaken in 43 Latin American ICUs. Of 1644 patients admitted, 688 received antibiotic treatment on the days of the study (41.8 %) and, 392 cases (57 %) were due to nosocomial-acquired infections. Of all infections, 22 % (151/688) corresponded to septic shock; and 22 % (151/688) to nosocomial pneumonia (50/151 [33 %], ventilator-associated pneumonia). In 485 patients (70.5 %), cultures were performed before starting antibiotic treatment. The most common microorganisms isolated were extended-spectrum  $\beta$ -lactamase *Enterobacteriaceae*, (30.5 %), and *Pseudomonas aeruginosa* (17 %). Carbapenems (imipenem or meropenem) were the antibiotics most frequently prescribed (151/688, 22 %), followed by vancomycin (103/688, 15 %), piperacillin-tazobactam (86/688, 12.5 %) and broad-spectrum cephalosporins (mainly cefepime) (83/688, 12 %). In summary, carbapenems were the most frequent antibiotics prescribed in Latin American ICUs. This practice seems justified for the high rates of ESBL- producing Gram-negatives found in our patients. Beyond this reason, the problem of bacterial resistance in LA requires that physicians improve the use of carbapenems. The high prevalence of carbapenem-resistant *A. baumannii* and *P. aeruginosa* in the region, along with the prevalence of carbapenem-resistant *Enterobacteriaceae*, have increased markedly. A comprehensive evidence-based stewardship program based on local antimicrobial use and resistance problems should be implemented in our clinical settings.

## Impact of inappropriate antimicrobial therapy on patients with bacteremia in intensive care units and resistance patterns in Latin America.

Jul./Sep. 2010 | Rev. argent. microbiol.

Patient care in an intensive care unit (ICU) is associated with an increased risk of developing nosocomial infections. Bacteremia is responsible for a great number of cases, 23% of which have attributable mortality in developed countries and can affect up to 52% of ICU patients. The main cause of mortality is inadequate and inappropriate antimicrobial empirical therapy. The incorrect use of antimicrobials is a major risk for identifying multidrug resistant microorganisms, thereby involving increased morbidity, mortality and costs. Implementing several surveillance systems and becoming acquainted with resistance patterns represent a valuable tool for identifying, preventing and treating this infectious complication. There is paucity of data regarding antimicrobial resistance in bacteremic patients in Latin America, and the available data reveals a worrying scenario.

## Increasing prevalence of extended-spectrum-beta- lactamase among Gram-negative bacilli in Latin America – 2008 update from the Study for Monitoring Antimicrobial Resistance Trends (SMART)

Jan./Feb. 2011 | Braz J Infect Dis

**Objectives:** This analysis of the Study for Monitoring Antimicrobial Resistance Trends (SMART) evaluated the susceptibility patterns of Enterobacteriaceae in Latin America in 2008, with emphasis on susceptibility trends of *E. coli* and *K. pneumoniae*. **Methods:** Clinical isolates were recovered from intra-abdominal infections (IAI) from 23 centers in 10 Latin American countries. Isolates were sent to a central laboratory for confirmation of identification, antimicrobial susceptibility and ESBL testing, following the Clinical Laboratory Standards Institute (CLSI) guidelines. **Results:** Of 1,003 Gram-negative bacilli collected from intra-abdominal infections, *E. coli* and *K. pneumoniae* were the most commonly isolated organisms, and 26.8% of *E. coli* and 37.7% of *K. pneumoniae* were ESBL positive. Ertapenem and imipenem were the most consistently active agents tested; 99% of ESBL- positive *E. coli* isolates were susceptible to ertapenem and 100% to imipenem as well, and 91% of ESBL-positive *K. pneumoniae* were susceptible to ertapenem and 98% to imipenem. Quinolones and cephalosporins were less active, achieving 1.5% to 76% inhibition against ESBL-producing *E. coli* and 3.5% to 61% inhibition against *K. pneumoniae*. **Conclusions:** Local and unit-specific surveillance data is particularly important for selection of empiric therapy and in community-acquired infections as they can help the clinician with antibiotic selection by providing guidance regarding the likely pathogens and their resistance profiles. Our data also confirm the increasing frequency with which ESBL-producing organisms are found in the community setting, with 31.4% of community- acquired and 24.9% of hospital-acquired infections found to produce ESBLs. Imipenem and ertapenem are the most active agents tested for ESBL-positive *E. coli* and *K. pneumoniae*.