FIU Robert Stempel College of Public Health & Social Work

PAHO Pan American Health Organization World Health Organization Americas

FIU Global Health Consortium

World Antimicrobial Awareness Week
WAAW Special Webinar Series

AMR in Latin America and the Caribbean: innovations and challenges

Report

Day 3: Friday, Nov. 20th

Understanding and Changing Behavior to Combat AMR in Health Professionals

Time	Topic
09:30 am 09:45 am	**Opening remarks** » Dr. José Luis Castro, Medicines and Health Technologies, PAHO » Dr. Carlos Espinal, Global Health Consortium, Florida International University (FIU)
Session 4 **Moderator: Dr. María Virginia Villegas, Universidad del Bosque, Colombia**	
09:45 am 10:00 am	**Setting the scene – AMR and the role of health professionals** » Dr. Hatim Satie, WHO
10:00 am 10:15 am	**Program for the Optimization of Antimicrobials use (PROA) traning course: An overview** » Dr. Paola Lichtenberger, Veteran Hospital, Florida, USA » Dr. Rodolfo Quiros, Bolivia
10:15 am 10:30 am	**Training health professionals on the appropriate use of antibiotics in Guatemala** » Dr. Nancy Sandoval, Guatemala
10:30 am 10:45 am	**Promoting the appropriate use of antimicrobials in Colombia** » Dr. María Virginia Villegas, Universidad del Bosque, Colombia
10:45 am 11:45 am	**Discussion** **Moderator:** Dr. María Virginia Villegas, Universidad del Bosque, Colombia
Session 5 **Moderator: Dr. José Luis Castro, Medicines and Health Technologies, PAHO**	
11:45 am 12:00 pm	**Monitoring antimicrobial consumption in the context of the COVID-19 pandemic** » Dr. Gustavo Marín, University Center of Pharmacology, National University, La Plata, Argentina (CUFAR), Argentina
12:15 pm 12:30 pm	**Dialogue of knowledge between Academy, Science, and Art to face resistance to antibiotics.** » Dr. Carola Cedillo and Dr. Kléver Calle, ReAct Latin America
12:30 pm 13:15 pm	**Discussion** **Moderator:** Dr. José Luis Castro, Medicines and Health Technologies, PAHO
13:15 pm 13:20 pm	**Closing remarks** » Dr. José Luis Castro, Medicines and Health Technologies, PAHO » Dr. Carlos Espinal, Global Health Consortium, Florida International University (FIU)

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Introduction

Within the scope of the World Antimicrobial Awareness Week (WAAW), the third online seminar of these series dealt with what is being done and what are the challenges in the health care system in Latin America at the health care team level, towards the goal of the adequate use of antimicrobials, to combat AMR.

Health care professionals are indeed one of the key actors in this fight, they face the decision of making choices about when and when not to indicate an antimicrobial, which ones for each patient and condition.

The results of some successful stewardship programs (SPs) were presented, as well as the impact of the COVID-19 pandemic in these programs, and conclusions were drawn on how the academy, the science and the community can work together in this field.

Panelists and Moderators

Dr. José Luis Castro, MD, MSc

José Luis Castro is Argentinian, medical doctor graduate from the University of Buenos Aires with a master's degree in Pharmacoepidemiology from the Autonomous University of Barcelona, and in Public Health from the University of Essex. He is currently Regional Advisor for the Rational Use of Medicines of the Pan American Health Organization / World Health Organization (PAHO / WHO), where he joined as a consultant in 2002. From his positions at PAHO / WHO he has collaborated with the countries of the Region in strengthening the drug selection processes, developing National Therapeutic Pharmacopeias, supporting the development of Pharmacovigilance programs, and organizing national work forces to combat the market of fake drugs in the countries of the Region. Dr. Castro has supported the coordination and tasks of the Pan American Conferences on Pharmaceutical Education, has chaired and collaborated in numerous face-to-face and at distance trainings, as well as elaborated documents and publications related to the field of medicines.

Dr. María Virginia Villegas, MD, MSc

Maria Virginia Villegas MD is currently the scientific advisor of the division of bacterial resistance and nosocomial infections, currently focusing on gram negative pathogens, as well as an adjunct professor of the Universidad El Bosque in Colombia.

She did her Internal Medicine training at the University del Valle (in Cali, Colombia), followed by a visiting fellowship in Infectious Diseases at the University of Miami, where she is an adjunct professor of the Latin American program. She then obtained a master's degree in Microbiology at the University del Valle, where her thesis was

devoted to studying PCR as a diagnostic tool in TB. In 1999 she spent one and a half years as a visiting research fellow in Infectious Diseases in the United States, working on the epidemiology of multiresistant Acinetobacter at Jackson Memorial Hospital in Miami, followed by a rotation in Dr John Quinn's lab in Chicago, focusing on Bacterial resistance, especially ESBLs.

Her current research interests are nosocomial infections and the molecular epidemiology and mechanisms of antimicrobial resistance of the gram-negative bacilli as well as implementing antimicrobial stewardship programs in hospitals. She is an advisor for many hospital ID committees in Colombia and has developed a successful national network of teaching hospitals studying bacterial resistance, standardizing and optimizing prevention of nosocomial infections and implementing Antimicrobial Stewardship. Dr Villegas has several honor awards including named Fellow of the Infectious Diseases Society of America given by the IDSA and the European Society of Infectious Diseases for her excellence in Infectious Diseases and related fields.

Dr. Hatim Satie, MD, MPH

Dr. Satie works at the Global Initiatives and Research Coordination Unit, Global Coordination and Partnership Department, WHO AMR Division, Geneva

Dr. Paola Lichtenberger, MD

Dr. Lichtenberger is a graduate of the Universidad del Bosque in Bogotá Colombia and completed her training in Infectious Diseases at Jackson Memorial Hospital, University of Miami. She is currently an Associate Professor of Medicine at the University of Miami, Director of the postgraduate program in Infectious Diseases at Jackson Memorial Hospital and Universidad del Bosque and is co-director of the Antimicrobials Stewardship Program at the Veterans Hospital in Miami, Florida. Dr. Lichtenberger is an expert in education in Infectious Diseases, global Tropical Medicine, disaster preparedness and appropriate use of antimicrobials. She has done intensive research on Zika virus and is currently principal investigator in randomized studies to show the safety and efficacy of COVID-19 treatment (EMPACTA, TICO, ACTIV-3 study protocols).

Dr. Rodolfo Quirós, MD, MSc, MBA, PhD

Dr. Quirós graduated as Medical Doctor, Doctor in Medicine and Specialist in Infectious Diseases from Buenos Aires University and MSc in Clinical Effectiveness from Buenos Aires University, Harvard School of Public Health, and Italian Hospital of Buenos Aires. He is also an MBA from Torcuato Di Tella University in Argentina.

Dr. Quirós is the Coordinator of the Antimicrobial Stewardship Program (PROA) in Argentina and Latin America. He coordinates de PROA-net platform and is

currently General Manager at Ángel Foianini Clinic in Santa Cruz de la Sierra, Bolivia.

Dr. Nancy Sandoval, MD, MSc

Dr. Sandoval is Chief Physician of the Internal Medicine Service and Infectious Disease Unit of the Roosevelt Hospital Infectious Diseases in Guatemala and Vice President of the Guatemalan Association of Infectious Diseases.

She graduated as Medical Doctor from the University of San Carlos de Guatemala, and completed and International Master in Parasitic, Tropical and Infectious Diseases at the University of Valencia. Dr. Sandoval is also a Specialist in Infectious Diseases from the University of Barcelona, Spain.

Dr. Gustavo Marin, MD, MPH

Doctor of Medicine. Master in Public Health. Master in Health Economics. Master in Political Science. Specialist in Pharmacology. Co-Director of CUFAR (University Center of Pharmacology – PAHO-WHO Collaborating Center). Head Professor of Public Health and Pharmacology at the National University of La Plata (UNLP), Argentina. CONICET Scientific Researcher. Foreign Assistant teacher at the University of Paris VII, France. Postdoctoral fellow at the University of Sorbonne Paris-Cité. Author of 172 indexed international publications. Former Director of Science, Technology and Innovation of Buenos Aires. Former member of the Public Assistance of Paris and the Medical Association of Paris, France.

Dr. Carola Cedillo

Dr. Cedillo is a Pediatrician and Pediatric Infectious Diseases Specialist, Academic Coordinator of ReAct Latin America. She is a referent in Pediatric and Neonatal Infectious Diseases in Cuenca, Ecuador and a Professor in Pediatrics at Universidad del Azuay, Cuenca, Ecuador.

Lic. Kléver Calle

Kléver is an active member of ReAct Latin America. ReAct is the first international network that articulates a comprehensive and holistic work to face the complex and multilateral problem of bacterial resistance to antibiotics. The ReAct node in Latin America has been present in the region since 2007. It is located in the city of Cuenca, southern Ecuador and promotes actions to contain bacterial resistance to antimicrobials for all Latin America under the “Health of Mother Earth: One Health”. The program is currently hosted by the “Fundación Niño a Niño” of Ecuador.

Session 4

Moderator: *Dr. María Virginia Villegas*

Setting the scene: AMR and the role of health professionals in antimicrobial stewardship

Dr. Hatim Satie, MD, MPH

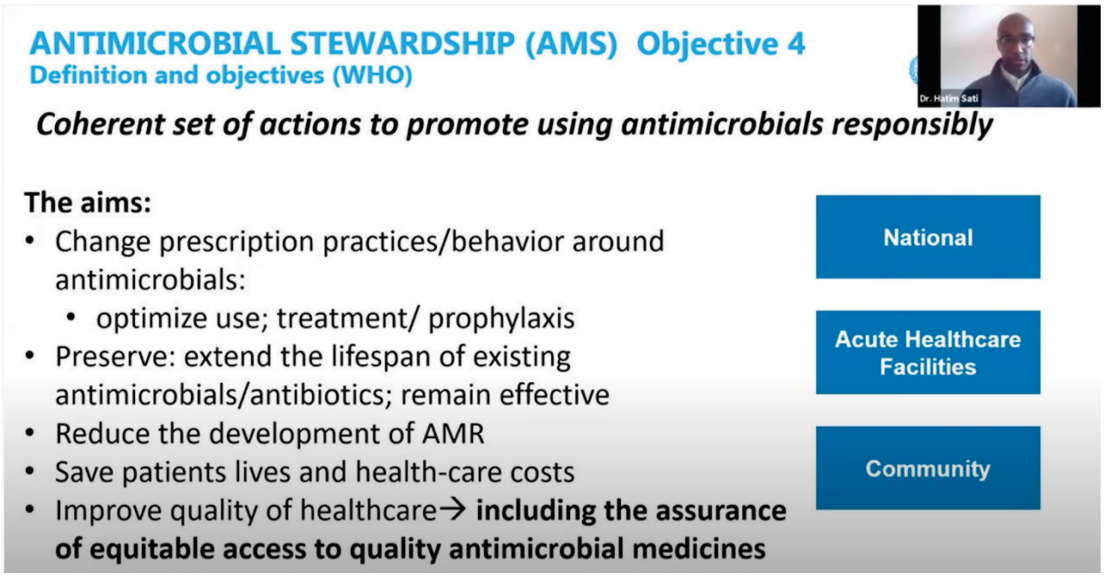
WHO, Geneva

Since 1987 there has been a void in the discovery of new antimicrobial agents. The current scientific and research challenges for developing new antibiotics include the long path from discovery to clinical approval, which combines with uncertainty, high development costs and a high rate of failure. There are limited incentives for investment, companies prefer to go after more profitable products.

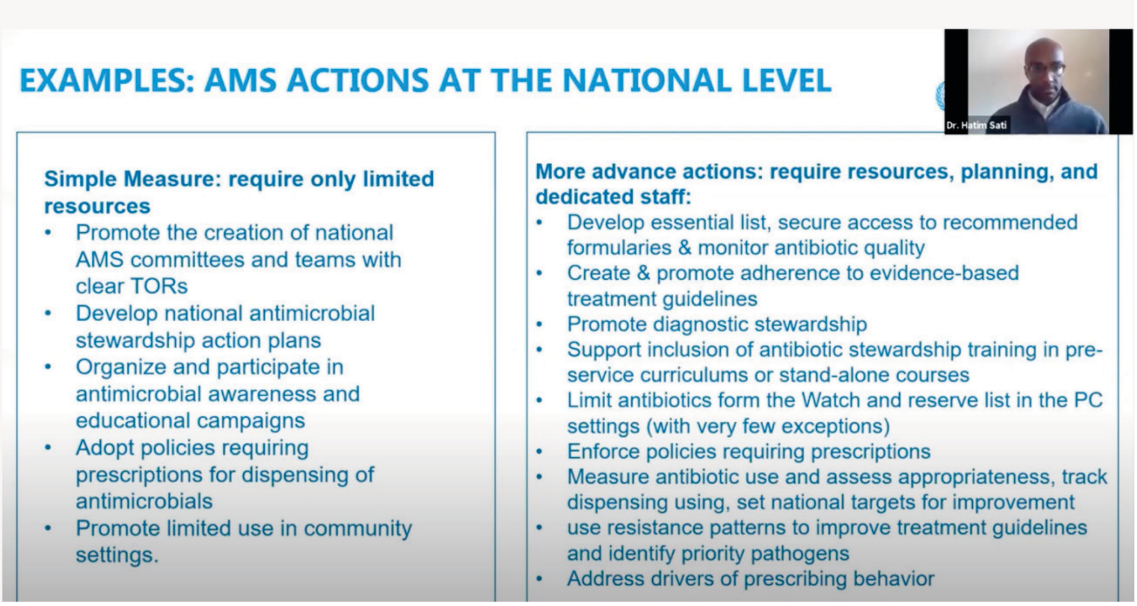
In the face of this limited availability of new antimicrobial agents, there is a rise in AMR, which disproportionately affects children and neonates, particularly in LMICs. Among several factors contributing to AMR, the biggest drivers are misuse or overuse in humans and in animals. From 20% to 50% of the antibiotics used in the hospital are either unnecessary or inappropriate.

In the current pandemic, reports show that 72% of COVID-19 patients received antibiotic therapy, while only 7-8% of them had secondary co-infections.

WHO defined antimicrobial stewardship (AMS) as a coherent set of actions to promote using antimicrobials responsibly, with several aims as shown in this slide:



There are many AMS interventions and actions that have been proposed in different guidelines and documents by many experts across different health care settings, some are ranged from simple measures that require only limited resources, while others are more advanced and demand planning, dedicated staff, and sources.

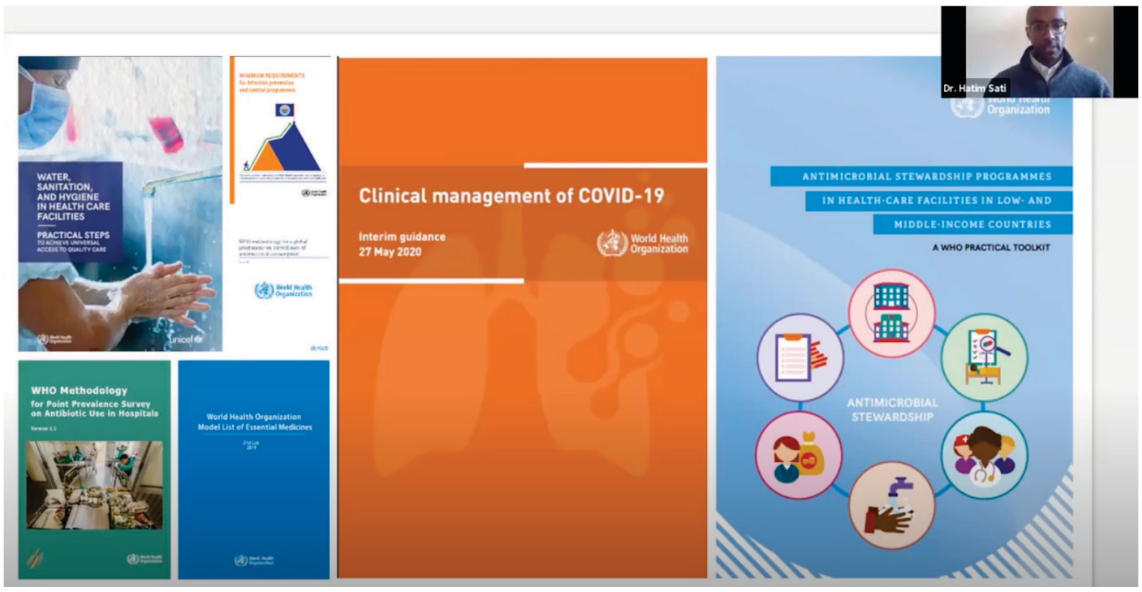


Resource-limited settings face several shared challenges: they lack human and financial resources, there is an inappropriate use of policies and guidelines, there are gaps in training programs in infectious diseases, clinical microbiology and pharmacy, as well as limited diagnostic and laboratory surveillance, inability to track, report, and use AMR data, and lack of support from leaders and decision makers.

At national and facility levels, health care workers have varied roles, as educators and AMS strategy promoters. They must stay up to date with the state of knowledge and share new knowledge. While focusing on patient safety and the quality of care, diagnosing and correcting patterns and trends of behaviors around antimicrobial use and prescription is essential. To improve AMS actions in healthcare facilities, the key equation is monitoring + evaluation + adjustments.

Some useful tools and materials available from PAHO/WHO and partners, to support AMS:

- Recommendations for Implementing Antimicrobial Stewardship Programs in Latin America and the Caribbean, a manual for Public Health decision-makers. PAHO/WHO – FIU, 2018
- Antimicrobial Stewardship Programs in Health-Care Facilities in Low and Middle-Income Countries, a WHO practical toolkit. WHO, 2019
- Antibacterial Agents in Clinical Development. WHO, 2019 (3rd update).



Program for the Optimization of Antimicrobials use (PROA) training course: An overview

Dr. Paola Lichtenberger

Veteran Hospital, Florida, USA

Dr. Rodolfo Quiros

Ángel Foianini Clinic, Santa Cruz de la Sierra, Bolivia

Experts in antimicrobial stewardship programs (SP) representing different Latin American countries met in In September 2019 in Washington DC to discuss how to to implement a program to optimize the use of antimicrobials, to provide answers and the tools needed for programming, executing and monitoring SPs in the region. The experts developed a check list including all elements of an SP, based on a model from Mexico, PAHO and CDC that allows each institution to self-assess its starting point and where to focus a pilot program.

The course methodology also took into account the overall priorities identified in the region and the contents and methodology of other successful available courses. In 7 weeks' duration, the course includes online seminars, short videos, bibliography and forums to facilitate the interaction between participants and coordinators.

The course helps participants understand the problem of AMR and the factors that influence antimicrobials prescription, and provides tools to implement and monitor a SP.

The self-assessment check list includes 71 items and allows to monitor the SP over time, as well as to compare data between institutions, cities and countries.

The course will open again in February, so registration is now open at PAHO website.
It is important that all members of the SP in a facility take the course at a same time.

Training health professionals on the appropriate use of antibiotics in Guatemala

Dr. Nancy Sandoval
Roosevelt Hospital Infectious Diseases, Guatemala

Guatemala lacks electronic records and has a shortage of human resources, so controlling AMR is a great challenge, as it is the case in many countries in the region, where lack of political involvement appears as the main weakness for the implementation and continuity of these programs.
At Roosevelt Hospital in Guatemala, for example, doctors can access the results of antibiograms from their mobile phones; however, there is no systematic reporting of resistant microorganisms.
The national committee of AMR was organized in Guatemala, following the global action plan outline. It was complex to work in the one-health approach, and it is still today one of the great gaps. Courses and workshops are continuedly offered, with high acceptance. There has been a considerable progress in laboratory surveillance.

Promoting the appropriate use of antimicrobials in Colombia

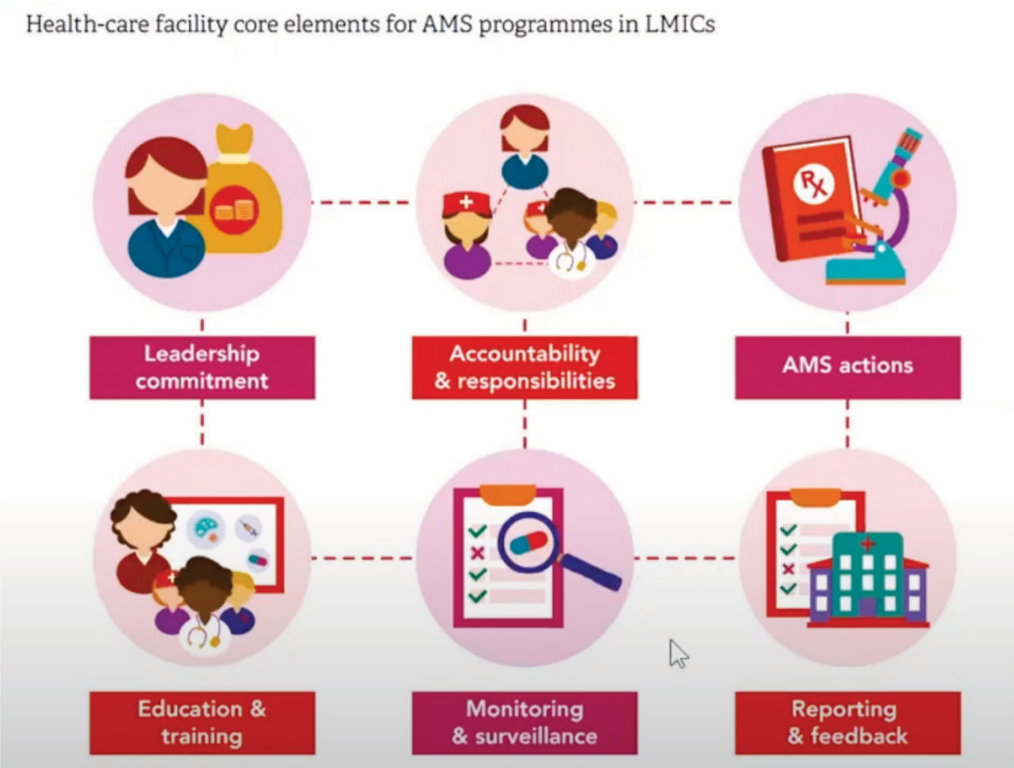
Dr. María Virginia Villegas
Universidad del Bosque, Colombia

The first step to start an SP is to evaluate the available resources. These tables show a

quantitative scale used to evaluate SPs progress in a network of hospitals in Colombia.

	Item	Criteria	Score
Organization	Level of dedication of the ASP team	One meeting per year = 1 point Two meetings per year = 2 points More than three meetings per year = 4	1-4
Resources	Existence of a referent in the antibiotic prescription	No = 0 points Yes = 4 points	0 or 4
	Electronic medical records	No = 0 points Yes = 1 point	0-1
	Electronic antibiotic prescription	No = 0 points Partially = 1 point Yes = 2 points	0-2
	Training of antibiotic prescribers	No = 0 points Yes = 1 point	0-2
Actions	**Prevention**		
	Guidelines for antibiotic use	No = 0 points Only empirical guidelines = 1 point Yes = 2 points	0-2
	List of antibiotics available for prescribing	No = 0 points Yes = 0,25 points	0-1
	List of antibiotics with delivery restriction	No = 0 points Yes = 0,5 points	
	Control of the antibiotic administration times during therapy	No = 0 points Yes 0,25 points	
	Surveillance		
	Surveillance of antibiotic consumption	No = 0 points Yes = 2,5 points	0-2,5
	Evaluation		
	Antibiotic prescription evaluation	No = 0 points Yes = 2,5 points	0-2,5

The next graphic summarizes the core elements in a health-care facility in LMC to organize an SP. The basics are leadership, education and training, monitoring, surveillance, and adequate reporting. Information is essential to convince the colleagues about the needed antimicrobial stewardship actions.



The team should include a pharmacologist, a clinician with 50% of his/her time dedicated to the SP, an epidemiologist, an infection control nurse, and an infectious diseases specialist. Of course, a microbiologist is also a key member, and the support from the Hospital Direction.

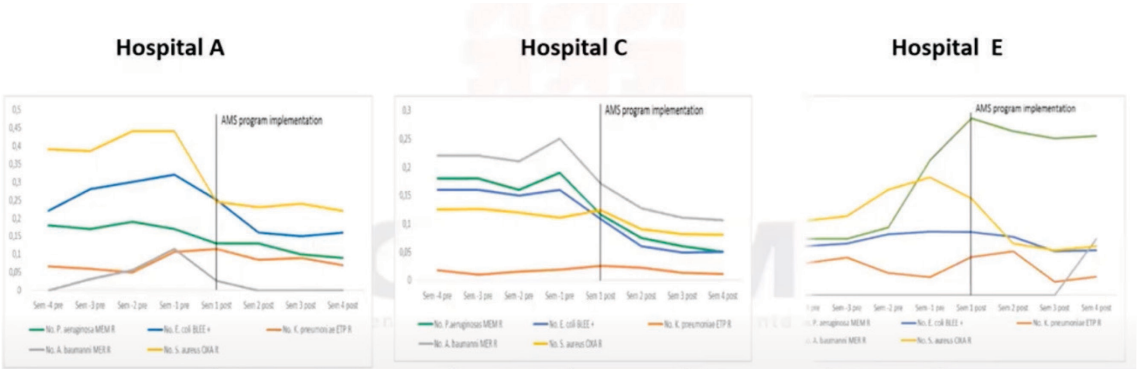
National and local guidelines are important; algorithms are especially useful particularly in the emergency area. Prophylactic guidelines may be the first to be designed, they are "universal" and there is little controversy about the choices and administration of AM based on the widespread evidence of their impact and the benefits for the patient.

A recent study in three hospitals in Colombia compared the outcomes in cohorts of patients with hospital acquired infections before and after the implementation of the SP, and showed important economic improvements in the costs of the empiric antibiotic therapy and the total cost of the infection. There was also a dramatic clinical impact, as shown in the following Table.

VARIABLE	Post-AMS n=471 (52%)	Pre-AMS n=429 (48%)	p Value
Post-target antibiotic therapy complications	82 (17%)	79 (18%)	0.694
Septic shock post antibiotic therapy	49 (10%)	47 (11%)	0.789
Clinical improvement at 72 hours of empirical management*	285/391 (73%)	227/364 (62%)	0.299
Clinical improvement at 72 hours of target management*	229/305 (75%)	160/218 (73%)	0.663
Total clinical improvement	438/469 (93%)	314/423 (74%)	<0.001
Mortality	65/464 (14%)	117/425 (28%)	<0.001
Length of stay cost (USD)**	$ 2,728.34	$ 4,110.14	<0.001
Clinical test costs and initial intervention (USD)**	$ 203.65	$ 308.17	<0.001
Empirical antibiotic therapy cost (USD)**	$ 233.58	$ 406.39	<0.001
Target antibiotic therapy cost (USD)**	$ 64.38	$ 79.84	NS
Total infection cost (USD)**	$ 3,307.17	$ 4,655.24	<0.001

Cristhian Hernández-Gómez, Christian Pallares, Kevin Escandón-Vargas, Sergio Reyes, Soraya Salcedo, Lorena Matta, and Maria Virginia Villegas. Economic Impact of an Antimicrobial Stewardship Program Implementation in Three High-Complexity Hospitals in Colombia. Open Forum Infect Dis. 2016; 3 (suppl 1): doi:10.1093/ofid/ofw172.726.

The reductions in the incidence of multidrug resistant pathogens in these three hospitals was also of significant impact. This graphic and table show the average of monthly incidence of some specific pathogens in the ICU and the wards. The not so satisfactory results with *P. aeruginosa* were due to an outbreak.



MICROORGANISM	PRE	POST	Decrease %	p Value
# P. aeruginosa MEM R	1,95	1,80	-7,53	0,248
# E. coli ESBL +	1,63	0,92	-43,77	0,020
# K. pneumoniae ETP R	0,39	0,85	116,62	0,021
# A. baumanni MER R	2,37	0,20	-91,79	0,021
# S. aureus OXA R	3,02	1,09	-64,07	0,021

Cristhian Hernández-Gómez, Christian Pallares, Kevin Escandón-Vargas, Sergio Reyes, Soraya Salcedo, Lorena Matta, and Maria Virginia Villegas. Economic Impact of an Antimicrobial Stewardship Program Implementation in Three High-Complexity Hospitals in Colombia. Open Forum Infect Dis. 2016; 3 (suppl 1): doi:10.1093/ofid/ofw172.726.

Education has resulted in a dramatical impact of adherence to SPs in these hospitals, reaching 96% and 100% rates in some units, and the consequent cost reduction until reaching the lowest possible

and sustainable levels. It is key to share this information with the hospital administrators. Antimicrobial SP have demonstrated to reduce morbidity and mortality, bacterial resistance, collateral damage, adverse effects and costs. The transparent evaluation of the successes, demonstrating the benefits to the individual patients and the hospital, should be shared with all team members, as well as the failures. Passion, faith and leadership are key to the success of any SP.

Discussion

Moderator: *Dr. María Virginia Villegas*

The main topics of discussion were:

- The key relevance of rapid laboratory diagnosis in SP, the need to discuss who should pay for them, and the role of reference laboratories.
- The impact and advances in medical and patient education to combat AMR in the region.
- How countries should work to control and enforce the sales of antibiotics only under medical prescription.
- How to involve and obtain the support of the hospital administration to sustain the SP.
- The importance of self-assessment tools, situational diagnosis, priorities, and realistic goals setting (e.g., it should not be strategic to stat by the ICU if there is a problem with surgical prophylaxis, improve how antibiotics are used in surgery could be a simple and effective step to start a SP in an institution).
- Teams make SPs, they are not the property of the Infectious Diseases specialists: pharmacists, infection control nurses, microbiologists, physicians from internal medicine, the ward, the ICU, and those who make the decisions on what antibiotic to buy, should be active members of the SP team.
- How to deal with non-adherent physicians: personal feedback from the SP team with the treating physician as a key approach to improve adherence, by explaining and reaching agreements.

Session 5

Moderator: *Dr. José Luis Castro*

Monitoring antimicrobial consumption in the context of the COVID-19 pandemic

Dr. Gustavo Marín

University Center of Pharmacology, National University, La Plata, Argentina (CUFAR), Argentina

A study was carried out by the Pharmacology Centre, University of La Plata, Argentina aims at obtaining data about antimicrobial consumption in six priority countries in Latin America, to evaluate its evolution over time. The study started in Argentina, Brazil, Chile, Colombia, Paraguay and Perú, and was based on a pilot study carried out in 2016, comprising several stages, from identifying representatives in each country, designing the measurement instruments, education and training, data collection and analysis.

A five modules course was designed to train each country's coordinator on how to obtain and upload the data; 20/25 (80%) participants completed the course.

To identify adequate sources of information at each country, representatives were asked to fill in an online form with relevant data on the source so that it could be assessed and categorized. It is important to have both public and private sources of information for higher accuracy.

Some countries have already entered all their data, others are still on-going, when databases are received, they are centrally validated to identify potential errors and sent back to the countries for double-checking. Once completed, the study will provide valuable information for countries to assess their evolution and to compare with others.

Dialogue of knowledge between Academy, Science, and Art to face resistance to antibiotics.

Dr. Carola Cedillo and Dr. Kléver Calle

ReAct Latin America

React Latin America focuses the combat of AMR in the integration and convergence of the scientific and academic communities with the ancestral knowledge of the people, social movements and governmental organizations, with the goal of changing the paradigm that knowledge is only found at universities and research centers. Thus, the dialogue between the health care team and the community grows based on mutual trust and knowledge exchange. The approach also promotes community and health care workers empowerment in health issues, particularly on AMR.

Students, experts and first line health care workers from all fields of life sciences have been the main actors in the work of React, to contain the advancement of AMR based on

understanding all its causing and determinant factors, the role of microbes in human health and the ecosystem, and the relationship between health, disease, and the microbiome.

Future projects by React Latin America include the study on the knowledge on the microbiome among medical and life sciences students; the evaluation of the curricula and how this topic can be incorporated in the study programs.

Other projects and initiatives of React Latin America stood on art as a tool in the fight against AMR. In 2012, a program on using photography among first line health care professionals to document real stories related to AMR in their settings. Also in 2012 they organized "the caravan for life and bacteria" held in the streets and public spaces, with medical students and school-aged children.

The third project was to promote a dialogue to foster initiatives from life sciences students and art students, which proved difficult at start but was also successful, both groups joined to organize an international event at Cuenca University ("Feel me, I am here"), telling the story of antibiotics and their effects on the human microbiome.

Another project targeted to school-aged children who wrote short stories on the world of bacteria, human and planet health

Discussion

Moderator: *Dr. José Luis Castro*

The main topics of the discussion were:

- The importance and complexity of supporting countries to achieve their

national estimation on antibiotic consumption
- How self-medication and the inadequate use of antimicrobial agents grew in the COVID-19 pandemic
- The solution to AMR beyond the health care settings, the role of the communities and primary health care and the impact of educating through art and communication.
- The need of regulations and innovative approaches to the growth of animals for human consumption and find solutions beyond antibiotic treatment to manage diseases among these animals and educating people to gradually stop buying meat of animals that have been grown with the routine use of antibiotics.
- The need to move from agricultural-intensive models to sustainable ecologic systems.
- Promote studies relating antibiotic consumption and resistance and generate public policies to control the problem.

Conclusions

These three consecutive webinars have provided valuable information and insights on multiple aspects of AMR. The currently available tools, programs and initiatives, and the support of international organizations are enough to further promote a collaborative effort of the one-health approach to work towards avoiding that the terrifying estimate of 10 million deaths in 2050 due to AMR does not come true.