GARPNet News

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CDDEP's *State of the World's Antibiotics, 2015* and Global ResistanceMap

The State of the World's Antibiotics, 2015

On September 17th CDDEP released *The State of the World's Antibiotics, 2015*, bringing together up-to-date information on the global status of antibiotic use and effectiveness and interventions to minimize resistance. The report provides a graphics-rich overview of patterns and trends in antibiotic resistance and antibiotic use in human beings and animals. Six strategies to change norms around antibiotic use, based in part on the successful experiences of the GARP working groups, are highlighted in the final chapter.

Key messages and a selection of graphics from each chapter follow.

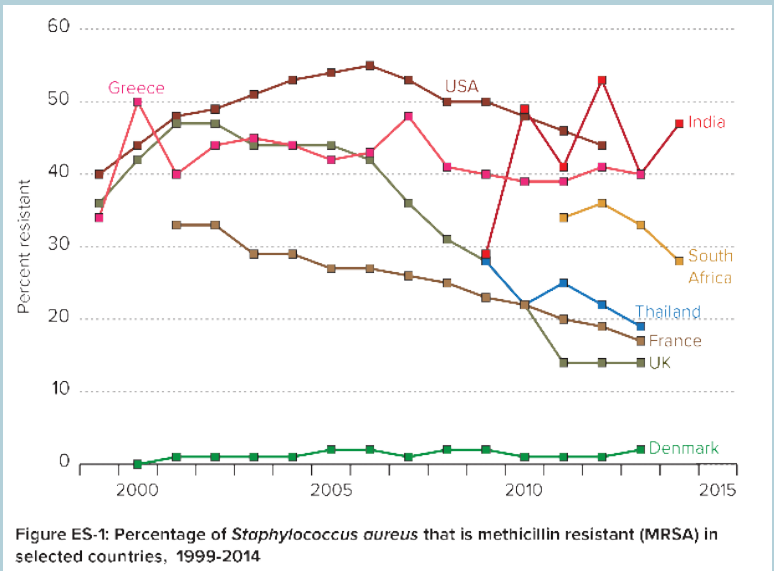


Figure ES-1: Percentage of *Staphylococcus aureus* that is methicillin resistant (MRSA) in selected countries, 1999-2014

Chapter 1: Antibiotic resistance in 2015

Antibiotic-resistant bacteria are increasing in prevalence worldwide, resulting in infections that are difficult and expensive to treat (Figures ES-1 and 1-2).

A major driver of antibiotic resistance is antibiotic use, which is fueled by the high background burden of infectious disease in low- and middle-income countries and easy access to antibiotics in much of the world, which increases both appropriate and inappropriate use.

Few low- and middle-income countries have national surveillance systems to monitor resistance trends and inform policy development and clinical decision-making.

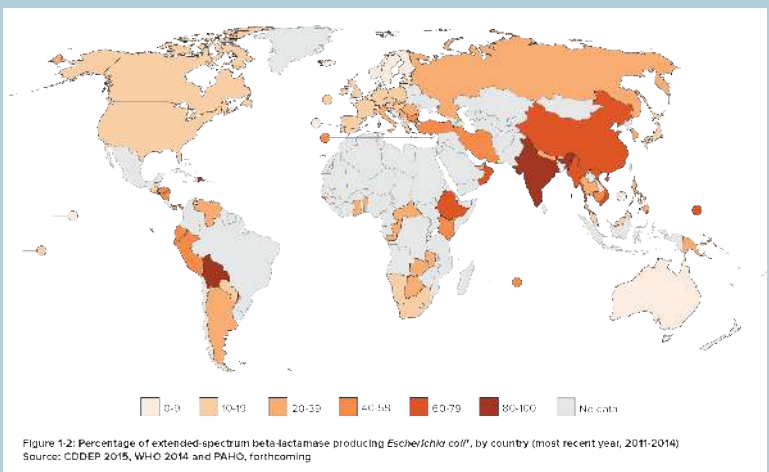


Figure 1-2: Percentage of extended-spectrum beta-lactamase producing *Escherichia coli*, by country (most recent year, 2011-2014)
Source: CDDEP 2015, WHO 2014 and PAHO, forthcoming

The State of the World's Antibiotics, 2015 *(continued from page 1)*

Chapter 2: Human Use of Antibiotics

Antibiotic consumption in humans is increasing globally. The greatest increase between 2000 and 2010 was in low- and middle-income countries, but in general, high-income countries still use more antibiotics per capita (Figure 2-4).

An estimated 80 percent of all antibiotics are used in the community, where prescribing and purchasing of antibiotics without prescription are common, especially in low- and middle-income countries. In many countries at all economic levels, clinicians have incentives to overuse antibiotics.

The confluence of patients with serious medical conditions, interconnectedness of hospitals, and high density of antibiotic use make hospital antibiotic use disproportionately important.

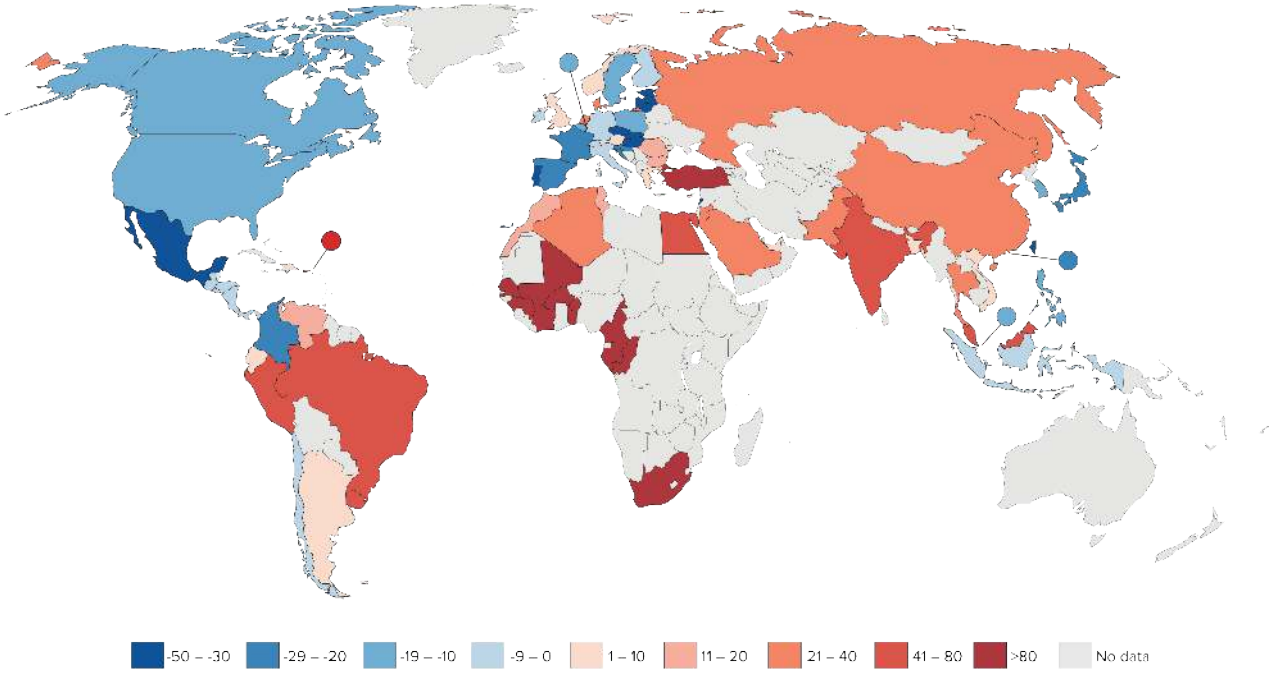


Figure 2-4: Percentage change in antibiotic consumption per capita 2000–2010*, by country
Source: Van Boeckel et al. 2015 (adapted)

Chapter 3: Antibiotics in Agriculture and the Environment

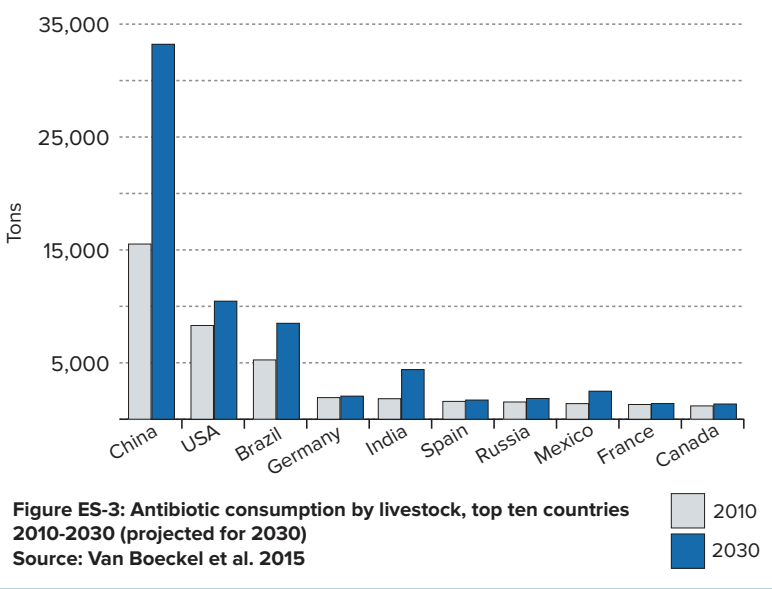


Figure ES-3: Antibiotic consumption by livestock, top ten countries 2010-2030 (projected for 2030)
Source: Van Boeckel et al. 2015

As global demand for animal protein grows, antibiotics are increasingly used to raise food-producing animals in intensive production—increasing the prevalence of antibiotic-resistant bacteria in livestock, poultry, and aquaculture, with spillovers that affect human health (Figure ES-3).

Livestock farmers must be provided the tools to optimize production systems without antibiotic growth promoters and to minimize antibiotic use for disease prevention.

We recommend phasing out sales of feed pre-mixed with antibiotics and reducing the use of antibiotics to prevent animal diseases in all countries.

The State of the World's Antibiotics, 2015 (continued)

Chapter 4: the Global Antibiotic Supply and its Effectiveness

New antibiotics are more expensive and out of reach for many who need them, especially in low- and middle-income countries with a high burden of infectious diseases (Figure 4-1).

New agents are not the only, or the most important, tools in maintaining the global stock of antibiotic effectiveness. Conserving the effectiveness of existing antibiotics and complementary technologies are vital.

An "empty pipeline" argument has led to an emphasis on incentives for new antibiotic development to the exclusion of policies that encourage antibiotic conservation.

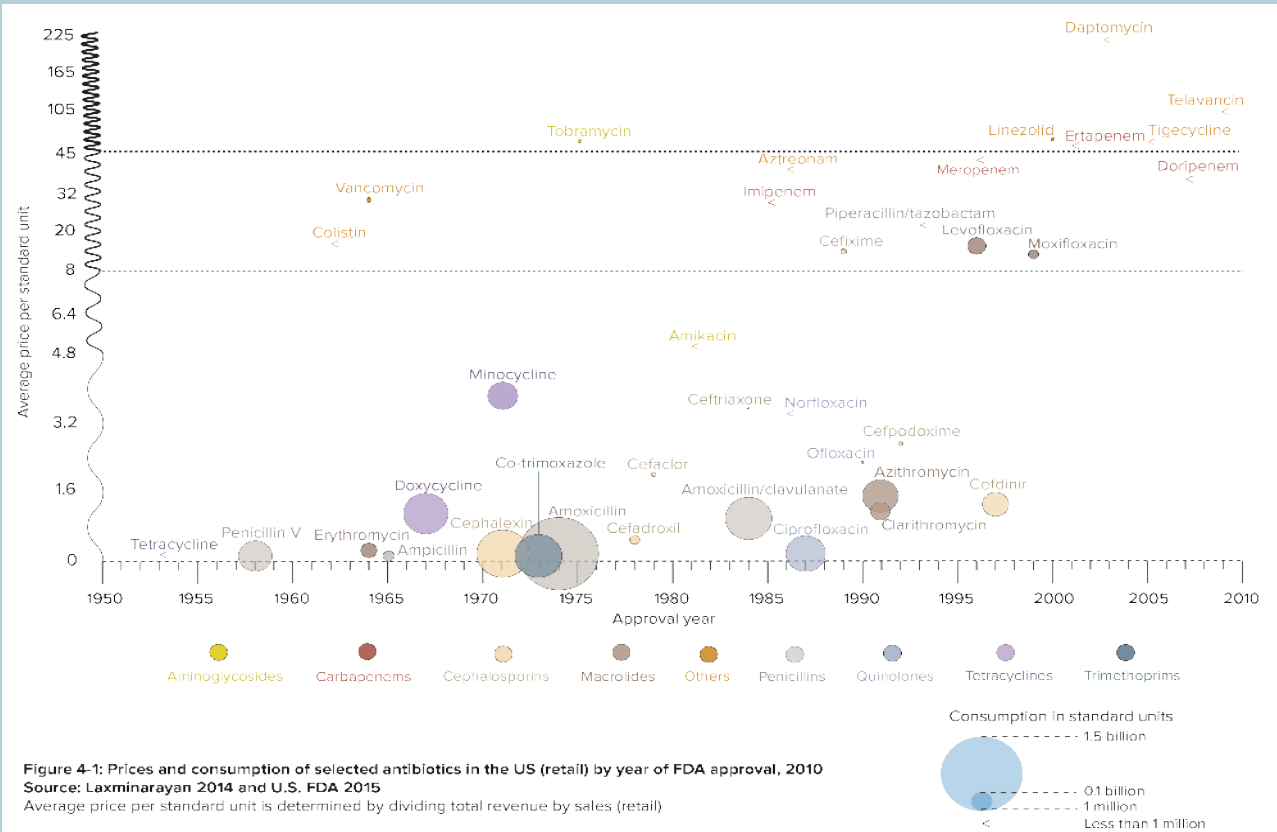


Figure 4-1: Prices and consumption of selected antibiotics in the US (retail) by year of FDA approval, 2010
Source: Laxminarayan 2014 and U.S. FDA 2015
Average price per standard unit is determined by dividing total revenue by sales (retail)

Chapter 5: What Works at the Country Level

Antibiotic resistance is a global problem, but the solutions are at the national and regional level. Benefits of conservation accrue locally and contribute to antibiotic effectiveness globally.

Antibiotic use can be rationalized by reducing the need for antibiotics through better public health, by curbing unnecessary use, and by improving access where use is warranted.

National strategies should address incentives for conservation in hospital and community settings and in the agricultural sector. Solutions should target both healthcare providers and the public.

The evidence in this report, documenting the seriousness of the problem and offering a successful approach to country level action, supports both the urgency and the feasibility of making progress in conserving antibiotic effectiveness.

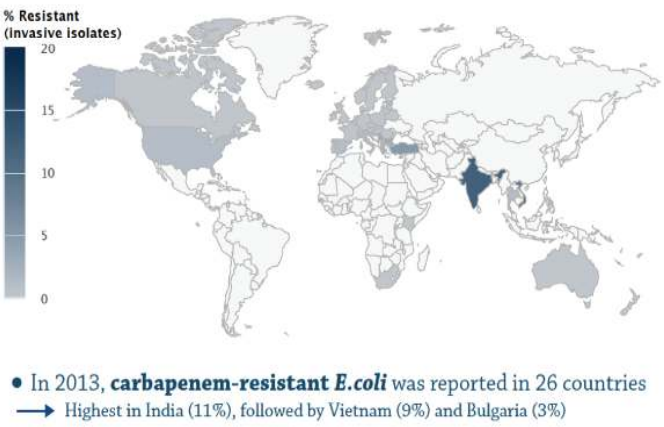
1. **Reduce** the need for antibiotics through improved water, sanitation, and immunization
2. **Improve** hospital infection control and antibiotic stewardship
3. **Change** incentives that encourage antibiotic overuse and misuse to incentives that encourage antibiotic stewardship
4. **Reduce** and eventually phase out subtherapeutic antibiotic use in agriculture
5. **Educate** health professionals, policy makers, and the public on sustainable antibiotic use
6. **Ensure** political commitment to meet the threat of antibiotic resistance

Global ResistanceMap

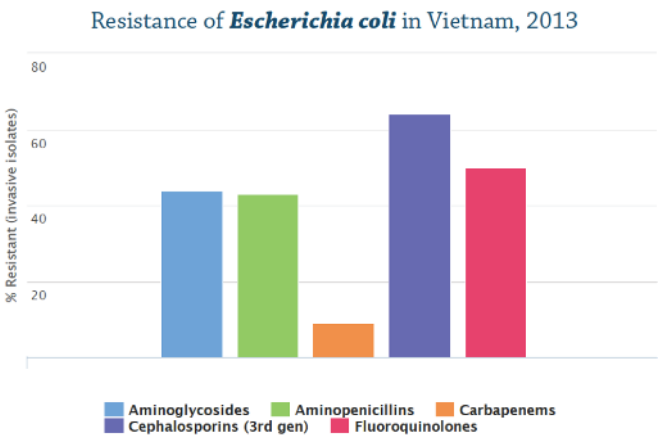
ResistanceMap is an interactive, data-rich visualization tool that brings together the most current antibiotic resistance surveillance statistics from the United States, Europe, and many LMICs. The tool allows users to view the evolution of national and regional resistance rates of each pathogen to classes of antibiotics or specific antibiotics in the United States from 1999 to 2012. Where comparable data are available, rates are also provided for Europe, Australia, Canada, India, Kenya, New Zealand, South Africa, Thailand and Vietnam. ResistanceMap can also be used to visualize outpatient antibiotic use (by class and by U.S. state from 1999 to 2012) and global trends in antibiotic use (by class and country from 2000 to 2010). The updated website was launched on September 17th, 2015.

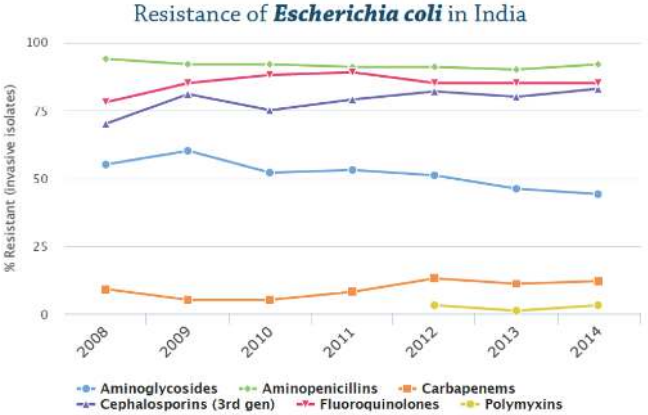
A brief introduction to ResistanceMap and a few screenshots, below, should whet your appetite to explore the program online.

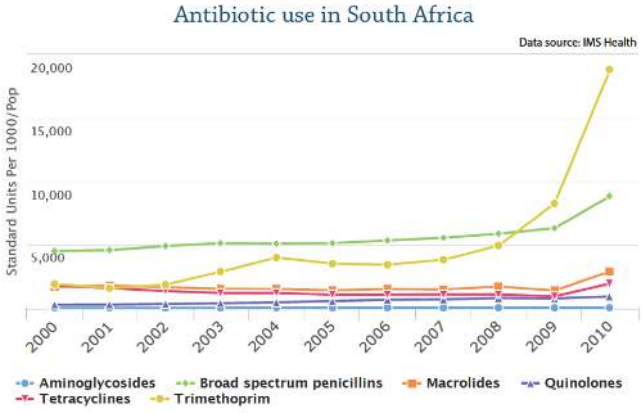
CDDEP is expanding ResistanceMap to include additional data from low- and middle-income countries.



- In 2013, **carbapenem-resistant *E.coli*** was reported in 26 countries
  - Highest in India (11%), followed by Vietnam (9%) and Bulgaria (3%)







Global Antibiotic News

Country Highlights:

- GARP-Uganda launched their situation analysis, *Antibiotic Resistance in Uganda: Situation Analysis and Recommendations*, on September 15th, 2015 in Kampala. Opening remarks were given by Professor Nelson K. Sewankambo, president of UNAS. Other speakers included Professor Denis K. Byarugaba, Chair of the GARP Uganda Working Group, Hellen Gelband, Associate Director of CDDEP, and representatives from WHO, the CDC and the Ministry of Health. The guest of honor, Professor Anthony K. Mbonye, Director of Health Services, Clinical and Community Health, formally launched the report.

- GARP-Nepal held the symposium "Role of Academic Health institutions in combating Anti-Microbial resistance in Nepal: A National symposium" on August 16th and 17th at the B.P. Koirala Institute of Health Sciences in Dharan. Following the symposium, GARP working group members met with representatives from the Ministry of Health, who agreed to expand the DRI and to collaborate with GARP on national antibiotic resistance awareness week activities. GARP-Nepal chair Buddha Basnyat published an article on the need for increased vaccination against typhoid.

State of the World's Antibiotics GARP country launches

National launch activities for the *State of the World's Antibiotics, 2015* and ResistanceMap are set to take place in India, Kenya, Nepal, Tanzania and Vietnam, and local press will be notified in Mozambique and Uganda. South Africa held a successful launch on September 22 (photo below).

GARP in the News

- National Geographic Phenomena: "Antibiotic Resistance Getting Worse Globally, But Fixes Could be Simple" (see below)
- BBC News: "Developing Countries Show Increase in Antibiotic Resistance"
- Nature: "Dramatic Rise Seen in Antibiotic Use"
- Wired: "Where Antibiotic Resistance is Worst Around the World"
- NPR Goats and Soda: "Why India is a Hotbed of Antibiotic Resistance and Sweden is Not"

Antibiotic Resistance Getting Worse Globally, But Fixes Could Be Simple

by Maryn McKenna

The state of knowledge about antibiotic resistance gets a powerful update today with a new report from the think tank known as CDDEP—the Center for Disease Dynamics, Economics and Policy—and what it has to say, about the rise in resistance around the world, is disturbing.

The report, called The State of The World's Antibiotics 2015, brings together data from sources that have never been aggregated before: public surveillance programs and private laboratory networks from most regions of the world. The data paints a dismaying picture of antibiotic use and resistance rising in areas where international attention and policy haven't yet focused: the developing economies where the drugs are easily available but national strategies to contain their use don't exist or are just being launched.

The industrialized world can't escape criticism though. The data the report harvests makes clear that rising resistance and lack of policy attention to it are critical issues worldwide.

"Antibiotic resistance is now clearly a problem in both the developed world and developing countries," Ramanan Laxminarayan, a co-author of the report and CDDEP's founder, told me by phone. "Things are about to get a lot worse before they get better."

GARP Phase III

GARP Phase III has been approved and will commence in November – details to come in the next issue of GARPNet News.

Send us your feedback!

We welcome your comments on and additions to each newsletter. Please send any content or questions to Molly Miller-Petrie at millerpetrie@cddep.org

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