

Quando gli antibiotici falliscono - La farmacoresistenza come problema globale

**Dal Globale al Locale:
Grandi Pandemie e Malattie Infettive Emergenti**

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Context of infectious diseases at the beginning of the 21st. century

High disease burden in developing countries (HIV, TB, malaria, neglected diseases)

Emergence of new or newly recognised pathogens (e.g. Nipah, Ebola, SARS)

Recurrence of outbreak-prone diseases (e.g. cholera, dengue, influenza, measles)

Emergence of resistance to many antimicrobial drugs, making treatment more difficult and expensive.



What is antimicrobial resistance?



“Ability of a parasite strain to survive and/or multiply despite the administration and absorption of a drug given in doses equal to or higher than those usually recommended but within tolerance of the subject” (WHO, 1973)

Resistance to antimicrobials is a natural biological phenomenon. All antimicrobials agents have the potential to select drug-resistance populations of microorganisms

What determines drug resistance?



- Characteristics of microorganism
- Over consumption of antimicrobials
- Lack of access to antimicrobials
- Inadequate dosing
- Poor adherence to treatment
- Use of inappropriate or sub-standard drugs

Why AMR is a global concern?



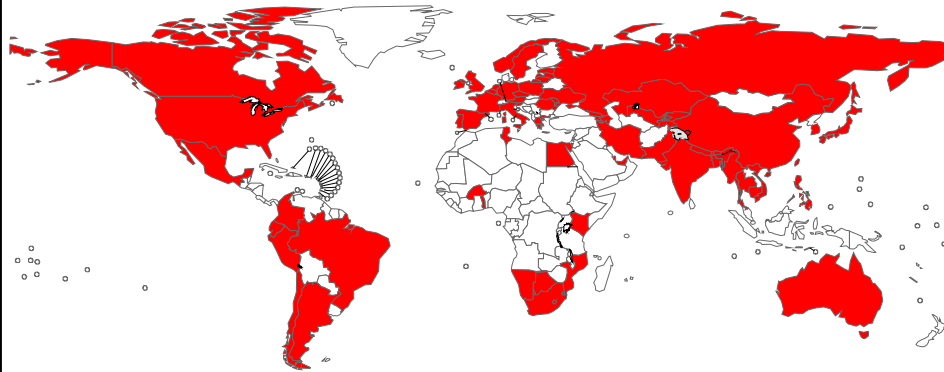
- AMR kills
- Challenges care and control of infectious diseases
- Greatly increases care costs
- Threatens healthcare gains for individuals and society
- Can take us back to the pre-antibiotic era
- Threatens health security and damages trade and economy
- Lack of coherent approaches to prevention and containment

AMR: A Major Challenge



- **Tuberculosis (TB):** 440,000 new multidrug resistance (MDR) TB cases annually; extensively drug resistance (XDR) TB cases reported in 68 countries so far

XDR-TB reported in 68 countries by end 2010



Argentina	Bhutan	France	Kazakhstan	Nepal	Republic of Moldova	Togo
Armenia	Cambodia	Georgia	Kenya	Netherlands	Romania	Tunisia
Australia	Canada	Germany	Kyrgyzstan	Norway	Russian Federation	Ukraine
Austria	Chile	Greece	Latvia	Pakistan	Slovenia	United Arab Emirates
Azerbaijan	China	India	Lesotho	Peru	South Africa	United Kingdom
Bangladesh	Colombia	Iran (Islamic Rep. of)	Lithuania	Philippines	Spain	United States of America
Belgium	Czech Republic	Ireland	Mexico	Poland	Swaziland	Uzbekistan
Botswana	Ecuador	Israel	Mozambique	Portugal	Sweden	Viet Nam
Brazil	Egypt	Italy	Myanmar	Qatar	Tajikistan	
Burkina Faso	Estonia	Japan	Namibia	Republic of Korea	Thailand	

AMR: A Major Challenge



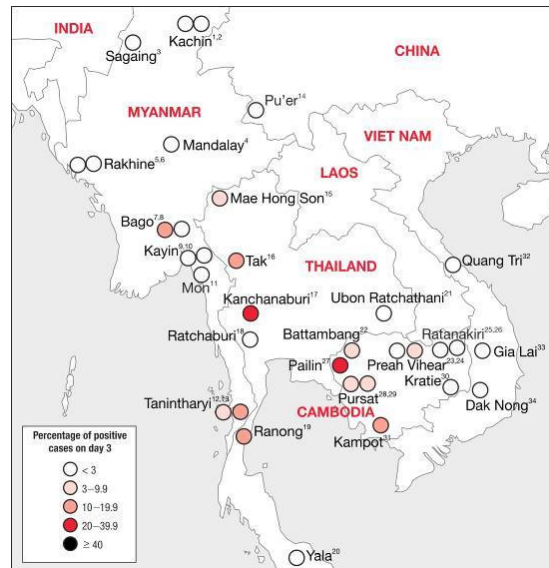
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Emergence of Artemisinin resistance in south-east Asia



THE
STOP TB
DEPARTMENT

% positive cases
after 3 days of
ACTs, 2001-2009

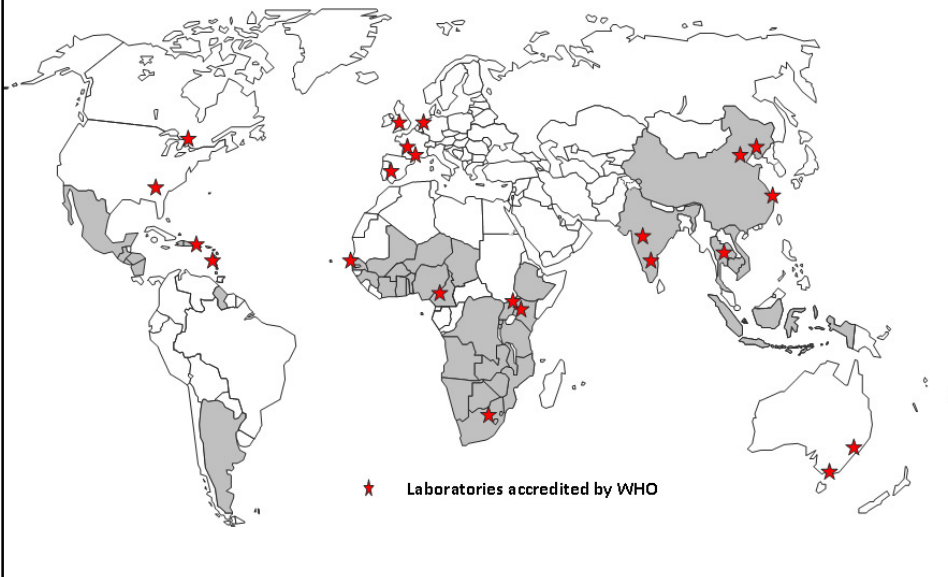


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Global HIV drug resistance surveillance and supranational laboratory network, 2010

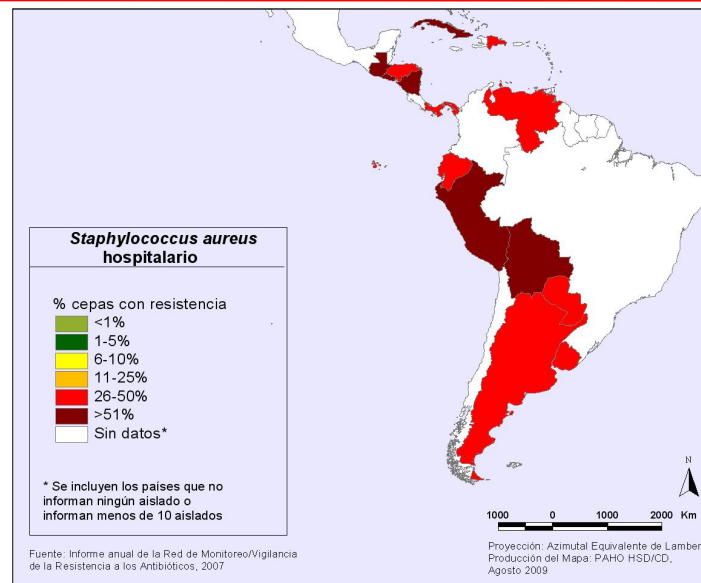


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- Methicillin-resistant ***Staphylococcus aureus***: lethal infections in hospital settings becoming increasingly frequent

Methicillin-resistant *Staphylococcus aureus* (MRSA), Latin America 2007

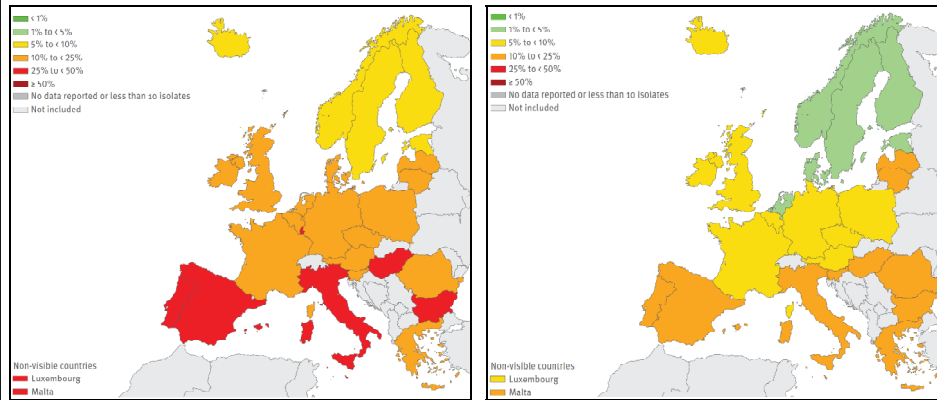


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- Methicillin-resistant *Staphylococcus aureus*: lethal infections in hospital settings becoming increasingly frequent
- Multi-drug resistant *E. coli* and *K. pneumoniae*: infections are on the rise
- *Neisseria gonorrhoeae* and *Shigella*: becoming increasingly resistant to drugs

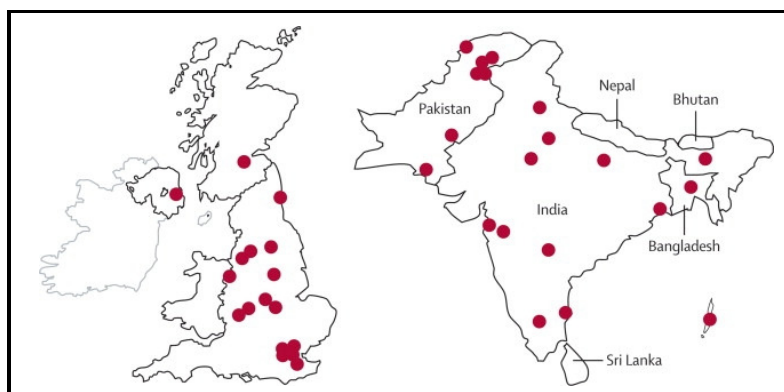
***Escherichia coli*: proportion of invasive isolates with resistance in 2009**



Resistance to fluoroquinolones Resistance to aminoglycosides

Source: ECDC. Report on antimicrobial resistance, 2009

NDM-1: New Delhi metallo-beta-lactamase 1



Distribution of NDM-1 producing *Enterobacteriaceae* strains in Bangladesh, India, Pakistan, and UK

Source: Lancet Infect Dis 2010;10(9):597-602

What drives AMR?

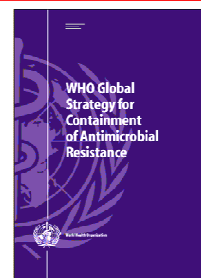


- Plans and resources not comprehensive or coherent; poor accountability
- Consumers and communities not engaged
- Surveillance systems weak or absent
- Systems for ensuring quality and supply of medicines inadequate
- Use of medicines inappropriate and irrational, including in animal husbandry
- Infection prevention & control poor
- Antimicrobials and diagnostics arsenal limited
- Research & development for diagnostics and medicines insufficient

Global policy response to AMR



- Global commitment: WHO Global Strategy for Containment of AMR (2011)
- Regional action: WHO Regional Committee Resolutions (e.g. AFRO, PAHO, SEARO)
- Political will: World Health Assembly Resolutions
1998 – Emerging and other communicable diseases AMR
2005 – Improving the containment of AMR
2009 – Prevention and control of MDR-TB and XDR-TB
- **Despite progress, strategies for AMR containment have not been widely implemented**



Acknowledgments



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