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

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Emergence of Artemisinin resistance in south-east Asia

% 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* (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

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

Source: ECDC. Report on antimicrobial resistance, 2009

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

- Regional action: WHO Regional Committee Resolutions (e.g. AFRO, PAHO, SEARO)
- Despite progress, strategies for AMR containment have not been widely implemented
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