Antimicrobial Resistance Issues Worldwide and the WHO Approach to Combat It

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Hosted by Dr. Benedetta Allegranzi
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Clean Care is Safer Care

The History of Medicine

- 2000 B.C. — Here, eat this root.
- 1000 A.D. — That root is heathen. Here, say this prayer.
- 1850 A.D. — That prayer is superstition. Here, drink this potion.
- 1920 A.D. — That potion is snake oil. Here, swallow this pill.
- 1945 A.D. — That pill is ineffective. Here, take this penicillin.
- 1955 A.D. — Oops… bugs mutated. Here, take this tetracycline.
- 1960 - 1999 — more “oops”… Here, take this more powerful antibiotic.
- 2000 A.D. — The bugs have won! Here, eat this root.

(Adapted from Austrian et al. Ann. Int. Med 1964; 60, 759)

Impact of introduction of Penicillin on mortality in the USA

Penicillin increased the chance of survival from 10% to 90%

(Adapted from Aiello & Larson, LJID 2002)

Unavoidable reality
More use = faster development of resistance

(Adapted from Albrich EID 2004)

1944: Gonorrhea treatment
Advice to World War II servicemen


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70 years later…

'Unstoppable' sex disease: New strain of gonorrhoea that resists all antibiotics could spread quickly

A sexual disease that is resistant to all drugs has been discovered by scientists. They warn the strain of super-gonorhrea could spread very quickly unless better treatments are developed. Although only one case has been confirmed, experts fear many more may have gone unreported.

Spread of metallo-beta-lactamases causing resistance in gram negative bacteria


Percentage of new TB cases with MDR-TB


By September 2013, 92 countries had reported at least one XDR-TB.

WHO HIV drug resistance report 2012

- 8 million people now taking ARVs in low – middle income countries
- 2010: 6.8% people initiating antiretroviral treatment with drug resistant HIV


Artemisinin-Resistant Malaria

- Widespread resistance to earlier generation antimalarial medicines.
- Mekong subregion, 2007–2012
  - suspected or confirmed artemisinin resistance has been detected in therapeutic efficacy studies.

Important factors

- Misuse in many settings & ways
  - Clinical medicine, communities, agriculture
  - Unrestricted sale & use of antimicrobial drugs
  - Substandard or counterfeit ➔ inadequate dose

- Widely used in food animals
  - Growth enhancement & therapeutic purposes
  - Same classes of antimicrobials as used in humans

- Globalized distribution of food
  - Food: important vector for spreading resistance

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Now facing a global public health crisis

Increasing resistance to antimicrobial medicines
- bacteria
- viruses
- parasites

Few new antimicrobial medicines in pipeline

Environmental contamination
Contamination from agri-and aquaculture, hospitals and pharmaceutical industries leads to antibiotic exposure to the ecosystems.

Consequences of antimicrobial medicine resistance

- Reduced public health control over many infectious diseases
  - Bacteria like tuberculosis, gonorrhea, pneumonia ....
  - Viral diseases like HIV/AIDS ....
  - Major tropical diseases like malaria ....
- Reduced safety net for patients undergoing medical procedures such as surgery, transplantation
- Impact on specific groups
  - Vulnerable populations

High morbidity and costs

- In the EU
  - 2.5 million extra hospital days in 2007
  - 25 000 deaths per year
  - Overall about 1.5 billion € per year


- Thailand
  - > 140,000 cases/yr AMR infected patients
  - 2.0 billion USD per year

Higher treatment costs when first line antimicrobials can't be used

High costs: lives and resources

2011
- 12 million cases of TB
- 630,000 involved multi-drug resistant TB strains.
- Only slightly more than 50% will be cured.
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Economic Impact: beyond medical costs
- Significant impact of AMR on consumer income, employment, national savings, investment spending, healthcare delivery.
- Gross domestic product (GDP) losses: 1.4% to 1.6%

Who owns the AMR-problem?
AMR is a social and economic issue beyond the health sector!

True scope of AMR much broader
- Global, social, multisectoral, ethical, security dimensions
- Need much higher engagement by many in all countries
  - Governments: decision makers, regulatory authorities . . .
  - Health sector: health systems, doctors, pharmacists . .
  - Communities: consumers, patients, families . .
  - Agriculture: farmers . .
  - Industry: medicine companies . .

Challenges
- Lack of capacity
  - Laboratory, diagnostic, quality assurance, regulatory, and surveillance capacity
  - Control over how antimicrobials are obtained and used
  - Control of spread of drug resistant pathogens
- Utter poverty

WHO guidance
- Comprehensive plan, accountability, civil society engagement
- Strengthen surveillance and laboratory capacity
- Access to essential medicines of assured quality
- Rational use of medicines
- Enhance infection prevention and control
- Foster innovation and R&D for new tools

The way forward: need for global action
- WHO AMR Strategic and Technical Advisory Group provided advice to WHO on the development of global strategies, including:
  - Intersectoral engagement and partnering
  - Fostering comprehensive national plans
  - Strengthening the evidence on the magnitude of the AMR problem
  - Better national and international regulatory mechanisms to foster optimal use of diagnostics, antimicrobial drugs and vaccines
  - Prevention and control of infections
  - Innovation for development of new tools to tackle AMR
  - Social mobilization

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AMR, Another "Tragedy of the Commons"

- No quick or easy solutions: will require years of effective action to reduce AMR
- Key actions urgently needed
  - Awareness & engagement beyond health community
  - Behavioural change
  - Development & application of innovative strategies

Photo: Sharon Loxton at geograph.org.uk.

2013 WHO Teleclass Schedule

- February 6: Improving the Patient Safety Culture as a Successful Component of Infection Control Strategies, Dr. B. Allegranzi
- March 6: Patient Participation in Hand Hygiene Promotion and Improvement, Dr. T. Longth, Dr. M. McSorley
- April 9: Innovation and New Indicators in Hand Hygiene Monitoring, Prof. I. Koyce
- May 6: Special Lecture for 5 May, Prof. D. Pittet
- July 9: Risk Assessment and Priority Setting in Infection Control in Low to Middle Income Countries, Prof. N. Danan
- September 3: Preventing Central Line-Associated Bloodstream Infections: The Matching Michigan Approach Applied in the USA and Other Countries, Prof. P. Pronovost
- October 9: Implementing Infection Control Through a Patient Safety Partnership Approach in Africa, Prof. N. Steer
- November 11: Antimicrobial Resistance Issues Worldwide and the WHO Approach to Combat it, Dr. C. Pessoa da Silva
- December 4: Control of Multi-Drug Resistant Organisms in the Nursing Home Setting, Prof. A. Voss

Thanks to Teleclass Education

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