**Antimicrobial resistance**

The Report by the Secretariat EB134/37 “Antimicrobial Drug Resistance” identifies the imminent danger to global health which antimicrobial resistance, in particular, represents but downplays the urgency of the situation and measures needed

**Bacterial resistance to antibiotics.**

The UK has, rightly, compared this urgency to climate change. Overuse has generated bacteria resistance to such an extent that modern medicine (and notably surgery) are threatened, while general epidemics such as diarrhea or tuberculosis are among the present day threats, and the pharmaceutical pipelines are empty. *We have entered the post-antibiotic era* (DG Dr Margaret Chan, July 5th, 2013)

The Report recommends minimal set of measures by Member States but falls short of the emergency this represents for global health. We are a few years away from a return to pre-WWII medicine, when a common cut could mean death, according to scientists and experts. Today figures demonstrate 50 000 deaths recorded for the US-EU together, and over 4 million hospitalizations. But this is only the *tip of the iceberg*. Once ingested, bacterial genes of resistance can transfer to other bacteria in the human gut, and the epidemiological consequences are awesome: global epidemics of untreatable diarrhea, for example, are a real prospect *(as discussed in the June 2013 ICPI conference in Geneva)*

This emergency situation requires a set of urgent measures:

- **An early warning system**, based on an internationally agreed mechanism, should be instigated as rapidly as possible, to detect outbreaks/events as well as new mechanisms of resistance. As was discussed at the WHO Strategic and Technical Advisory Group on Antimicrobial Resistance, such a system would enable the rapid identification and reporting of AMR events of serious public health significance. The use of the IHR (2005) as a reporting tool, is envisioned.

- **A massive effort to clean the environment, notably the water supply.** The demonstrated presence of bacterial genes of resistance in the water supply, notably but not solely in emerging countries, demands both national and international urgent investments to establish sanitation and water supplies at a decent level. Such an effort would have the other beneficial effect of immediately saving millions of children from diarrheal diseases every year and is long overdue. In OECD countries, where the pollution of the environment exist as well via sewage, waste disposal of hospitals as well as industrial meat processing (to wit, antibiotic resistant bacteria was identified last year in Lac Geneva), the need for monitoring and investigation is evident and ought to be initiated immediately.

- **An inquiry into novel ways to support innovation** in the field of antibiotics drugs, away from present day Intellectual Property Rights based on the market. In today's situation, there is no market for antibiotics drugs – because while the pipeline has been drying up in recent years, any new antibiotic must be considered a precious resource to be used for emergency human medicine. A prize mechanism could be ideal to reward public or private innovators. A group of public health experts have proposed an **Antibiotics Innovation Funding Mechanism (AIMF)** to sustain innovation in the face of antibiotic resistance: Prizes for innovation would delink innovation from marketing and market sales. The prize approach has received the support of Nobel Prize economist Joseph Stiglitz and Norwegian Pr John Arne Rottingen (who presided the Consultative Expert Working Group on Research and Development (CEWG)). The AIMF combines the advantages of supporting innovation, eliminating incentives to overuse, and supporting transfer of technologies to insure access to medicines for low income countries. *(full text at http://keionline.org/node/1832)*

- **Publicly funded cooperative research**, along the lines of the CERN (the European Organization for Nuclear Research), in which all European countries participated, even at the high point of the Cold War, to investigate the origin of our universe, might be a global model to study antibiotic resistance. The need is to investigate novel paths to protect human lives against the looming threat of a hundred years set back in health. In the US-EU large scale research projects on the human microbiota (the fact that there are more bacteria than human cells in a human body) have been initiated. There is the need to develop investigation and research on ‘phages’ (phages are viruses specific to bacteria), and renewed interest in phagotherapy (Georgia, Russia, especially). Today FDA type of regulations mean that phages are developed by Start ups for processed food, or domestic animals veterinary medicines, although large EU projects are starting in human health for burns (Phagoburn program). New regulations need to be developed to permit more investigations on ecologically friendly paths.

- **Regulatory mechanisms are urgently needed for husbandry.** While the EU banned antibiotics to fatten animals only in 2006, the US FDA has only progressed towards a voluntary recommendation to that effect. We need to prevent overuse in prophylaxis (fattening in disguise, in most instances, since animals have acquired resistance). Regulations to prevent the use of antibiotics used for human health to be used for husbandry. Monitoring and cleaning up obligations for industrial meat waste products. Regular monitoring of over the counter meat (FDA recent investigation showed over 50% of samples in the USA had antibiotic resistant bacteria).

- **Regulation and restriction on the use of antibiotics in human medicine.** Over 50% of medical prescription for antibiotics in the EU are useless (because the illnesses are not bacterial in origin!). Authorities ought to regulate to stop overuse in prescriptions by family physicians, or direct purchases by individual consumers which is still a big problem
India just banned over the counter sales of antibiotics some months ago. The need for a 'specialized' prescription, for referent physicians, for more diagnostic tests before prescription, is demanded by expert organizations on AMR. There is also the need to stop the dangerous habit reported from Least Developed Country (LDC) physicians to give out the latest antibiotic systematically as this is the surest way to further assist bacteria in developing resistance to everything.

- **A serious global effort for infection prevention and patient safety in the era of antibiotic resistance, Tuberculosis, HIV and Hepatitis.** Treatment cannot succeed without containment. Patient safety – a ten year old program in the WHO – is still today a neglected element in antimicrobial resistance program in general. Yet, the mounting levels of resistance already identified in LMIC countries with the least use and access to treatment - and advanced methods of investigation of outbreak which ought to be much more frequent and generalized shows that from Hepatitis C to Totally Drug Resistant Tuberculosis, from resistant bacteria to HIV, there is transmission of blood borne or air borne diseases, including highly resistant micro-organisms. Emerging and LMIC countries would do well to revisit the WHO publication: “*Natural Ventilation for infection Control in Health Care Settings*” should be implemented. For 2014, the WHO is preparing, at the request of Member States, a global campaign on safe injection practices in health care settings.

- The UNAIDS PCB meeting in Geneva of Dec 17-18, stressed the need to monitor mounting resistance of HIV to ARV both on the national and global level. Increased resistance represents a threat even in the best recorded national policy of universal access to treatment and low level epidemic as in Brazil. As with treatment for Hepatitis C, treatment for third line ARV regimen against HIV cost in the range of 150 000 to 200 000 US dollars per person per year. Dr Michel Sidibe insists time and again on the need for **African countries to set up and develop their own national production capacities for ARV** and the need to organize procurement in such a way as to prevent gaps. In a parallel situation, LMICs would do well to develop their own research and production capacities for treatment of hepatitis (Hepatitis C is estimated to affect 150 million persons today, and still growing even in countries like Egypt with a model prevention and treatment effort)

- **As regards other type of antimicrobial resistance, namely drugs for parasitic diseases like malaria this is** related to two main factors:
  - **Environmental determinants:** The main reason for its spread is the abandonment of environmental control: water management and pests controls in favor of the 'quick fix' solutions of distributing drugs to poor populations.
  - Liberal economics experiments **bypassing pharmacists and health systems for 'direct to consumer' schemes.** Oxfam documented well the mounting resistance of malaria resulting from this policy. Unwitting villagers purchase over the counter drugs to street peddlers when a child has fever with the assumption that it could be malaria while it might be a bacterial or other disease! (http://www.oxfam.org/en/category/oxfam-general/malaria)

**Antimicrobial resistance is the number one priority facing global public health today.** Let us insist that in each country and globally the responses are at the level of the task!