Containing antimicrobial resistance: a renewed effort

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This month in the *Bulletin*, a research paper by Togoobaatar et al. reveals that more than 40% of children in Mongolia are given antibiotics without prescription for respiratory tract infections.[1] Another paper published recently by Kumarasamy et al. highlights the serious threat posed by the NDM-1 (New Delhi metallo-β-lactamase-1) superbug, a microbial threat for which there is limited surveillance and no effective treatment.[2] Almost ten years since the *WHO global strategy for containment of antimicrobial resistance* was published, the World Health Organization has announced this topic as the theme for World Health Day in 2011.[3]

Antimicrobial resistance is a serious problem that strikes at the core of infectious disease control and has the potential to halt, and possibly even to roll back, progress. While it is a natural response of microbes, resistance can be contained through careful and appropriate antibiotic use. Western European countries have managed to decrease the rate of antimicrobial resistance in some pathogens through a multipronged approach in comprehensive well regulated health systems.[4] Integrated monitoring of antibiotic consumption and resistance, prescriber and consumer education that is coordinated and paid for by the government, and regulation of use in communities and hospitals have shown that it is possible to contain antimicrobial resistance. Unfortunately, even in well regulated societies such as in Europe, resistance in some pathogens continues to increase unabated and problems remain in the use of antibiotics outside the health system, especially in veterinary use.

What of the developing world, where there is much less regulation, diagnostics are sparse and comprehensive health care is a distant prospect? Fragmented health services, mainly in the profit-driven private sector, make antibiotics an easy target for misuse and abuse.[5] Given the paucity of surveillance, it is likely that the true extent of antimicrobial resistance is unknown and it is "shooting stars" such as the NDM-1 that draw attention to the problem.

There is sufficient scientific knowledge about appropriate antibiotic use. Specific antibiotics are effective only against certain organisms, must be taken in a particular dose for a specified duration, and they are ineffective against viral infections. What then are the drivers of behaviour that go against such evidence?

There is the fallacy that all infections respond to antibiotics. To many patients, it seems that they do – when a patient with a viral respiratory tract infection gets better after taking amoxicillin, this is usually due to the natural course of the illness and not to the amoxicillin (they may think that the antibiotic's side-effect of diarrhoea is actually a symptom of the illness!). Mothers feel safer giving children antibiotics rather than steam inhalations and paracetamol. Physicians prescribe antibiotics for simple viral infections in otherwise healthy patients to prevent possible secondary bacterial infections, despite good clinical trials showing no value of such prophylaxis. Pharmacists readily dispense antibiotics without prescription in the developing world as their income depends on sales rather than on a professional fee or salary. Pharmaceutical companies may promote sales of antibiotics independent of patient need. Finally, most antibiotics, by virtue of their safety and short courses, lend themselves to abuse; patients often take antibiotics of their own accord, whereas few people would take antihypertensive medications on their own.

Combating these behaviours in settings with poor health-care infrastructure, limited regulation and inadequate health education is a whole new challenge. Repeated calls for better regulation of medicines must not obstruct appropriate access; antibiotic use will continue to grow in low- and middle-income countries to meet underserved needs. Such increased use must be tied to rational use. Improved drug access without significant improvements in appropriate use will have dire consequences, with continued emergence of "superbugs" and untreatable infections. Fortunately, improvements in the appropriate use of antibiotics generally reduce health costs as the majority of antibiotic use in most communities is unnecessary.

Containing antimicrobial resistance is the theme of World Health Day 2011. The World Health Organization is developing a comprehensive policy package for health ministries addressing nearly all stakeholders. This should be an opportunity to launch sustainable action to contain resistance, to raise awareness and education using electronic media, and to track and contain spread of resistance with improved informatics and better clinical decision support through the development and use of bedside diagnostics.

Whatever is done, it would be wise to remember the mother in Mongolia. Until the total package is able to address her concerns, indiscriminate use of antibiotics will continue. Regulation, education and health care that consider sociocultural and economic factors and utilize improving global communication must be critical components of renewed efforts to contain antimicrobial resistance. ■

References

1. Togoobaatar G, Ikeda N, Ali M, Sonomjamts M, Dashdemberel S, Mori R et al. Survey of non-prescribed use of antibiotics for children in an urban community in Mongolia. *Bull World Health Organ* 2010;88: 930–936.
2. Kumarasamy KK, Toleman MA, Walsh TR, Bagaria J, Butt F, Balakrishnan R et al. Emergence of a new antibiotic resistance mechanism in India, Pakistan, and the UK: a molecular, biological, and epidemiological study. *Lancet Infect Dis* 2010;10:597–602. doi:10.1016/S1473-3099(10)70143-2 PMID:20705517
3. *WHO global strategy for containment of antimicrobial resistance*. Geneva: World Health Organization; 2001 (WHO/CDS/CSR/DRS/2001.2).
4. *Annual report EARSS. 2008*. Stockholm: European Antimicrobial Resistance Surveillance System; 2009.
5. *Medicines use in primary health care in developing and transitional countries: fact book summarizing results from studies reported between 1990 and 2006*. Geneva: World Health Organization; 2009 (WHO/EMP/MAR/2009.3).

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