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World Health Day 2011: combating antimicrobial resistance

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World Health Day marks the founding of the World Health Organization (WHO). It is celebrated each year on April 7, with a theme selected each year that highlights priority public health issues for WHO that affect the international community.[1] The focus this year is on combating antimicrobial resistance.[2] This is a problem virtually as old as antibiotics – Alexander Fleming had recognised that one could rapidly make microbes resistant to penicillin shortly after his famous discovery, and had sounded the first warning as early as 1945, toward the end of his Nobel prize lecture in Stockholm.[3] However, the proliferation of effective antimicrobial agents against an ever-increasing spectrum of infectious diseases in the postwar years had drowned out such warnings, leading the then-United States Surgeon General William Stewart to say in 1969—in a much-quoted but unverified statement—that "it is time to close the book on infectious diseases and declare the war against pestilence won".[4]

Via a series of converging social, political and economic factors, the situation has reversed. We live in the era of multi- and extensively drug-resistant tuberculosis (XDR-TB), artemisinin-resistant malaria, antiviral-resistant HIV, and a literal menagerie of antibiotic-resistant hospital pathogens amidst the reality of a declining antimicrobial pharmaceutical pipeline.[5] For the majority of these infections, the issue is that of cost and access; there are effective drugs, but they are either unavailable or unaffordable in areas where they are needed the most. For the rare few nosocomial pandrug-resistant Gram-negative infections, no effective antibiotics are projected over the next 5–10 year horizon.

Singapore is fortunate in that the prevalence of primary HIV drug resistance,[6] XDR-TB[7] and autochthonous malaria[8] remains negligible. However, nosocomial bacterial drug resistance rates are high in public hospitals.[9] The situation in the large private sector is unknown, as no data is publicly available. As the medical tourism industry grows, the import (and export) of drug-resistant bacteria from (and to) overseas hospitals and communities will continue to increase. This is highlighted again in the case reported by Chan et al in this issue of the *Singapore Medical Journal*.[10] Bacteraemia due to New Delhi metallo-β-lactamase-1 (NDM-1)-producing *Escherichia coli* occurred in a medical tourist from Bangladesh following chemotherapy for acute lymphoblastic leukaemia. The index patient died, but fortunately, the bacterium did not spread to other patients.[10]

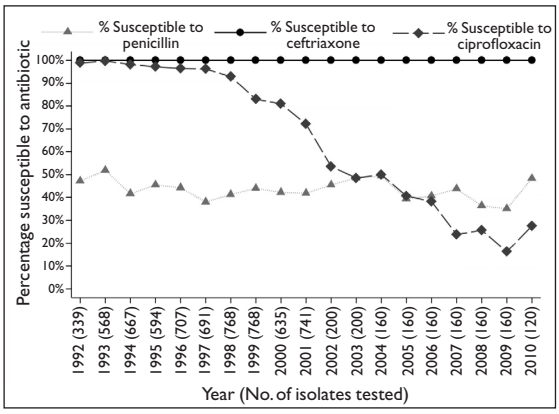

Fig. 1 Percentage susceptibility of *Neisseria gonorrhoeae* to various antibiotics. Based on data from the WHO Gonococcal Antimicrobial Surveillance Programme and the Singapore General Hospital microbiology laboratory.[11]

Less work, however, has been done at the community level, but there are suggestions that antimicrobial resistance rates are increasing here as well, best exemplified by the *Neisseria gonorrhoeae* susceptibility results submitted by the Department of Pathology, Singapore General Hospital to the WHO Gonococcal Antimicrobial Surveillance Programme since 1992 (Fig. 1). Fluoroquinolone resistance increased from < 10% pre-1999 to > 70% by 2007, where it has remained since.[11]

The solutions are clear, but implementation is difficult without political will that is supported by concerted action on the ground. Being a small country with no real agricultural industry, Singapore can influence neither the global development of antimicrobial agents nor the use of antibiotics as growth promoters in animal husbandry. Nonetheless, effective action remains possible, as previously suggested.[12] The recently convened National Antimicrobial Taskforce has submitted recommendations to the Ministry of Health for controlling bacterial drug resistance in public hospitals. This is a good start, if accepted, but the current narrow focus does not include all segments of the healthcare industry. Public campaigns targeting both the general public and physicians may be useful for improving the use of antibiotics in the outpatient and primary care setting.[13] Finally, increased funding for

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research into the design of novel antimicrobial agents and/or their testing may align the aims of the local biomedical research industry toward addressing this major public health threat.

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