

## **Antibiotic Course needs to complete: A critical view.**

Bacteria are, in a way, Darwin's microcosm. Not only can a population of millions of independent, self-serving organisms exist in a space the width of a dime, they can also reproduce on such a scale of speed that the effects of the selective process can actually make a difference in a matter of days or hours. This is, of course, of great use to those involved in medical and biological research, but it should be of additional interest to those worried about killing the little buggers off.

Antibiotics are, as we likely know, prescribed to almost anyone with a potentially threatening bacterial infection. They work by interrupting some key process in bacterial reproduction, such as DNA or RNA synthesis, or the production of stable cell membranes. This seems, of course, like a magic bullet, but over time some bacteria have developed a resistance to one or many of these chemicals. Research indicates that this resistance may be an evolutionary response to the widespread use of antibiotics, especially on the scale in which they are applied to livestock.

While this does arouse the obvious argument that antibiotic use should be scaled back in all but the most necessary of cases, it also means that antibiotics, when taken, should be taken with absolute thoroughness. You see, according to theory, an incomplete dose of antibiotics would kill only the bacteria least resistant to the drug, leaving only the 'strongest' ones to remain, propagate and infect others. This process, repeated, results in a strain of bacteria more and more resistant to antibiotic treatment, one that will eventually, in theory, infect longer and spread more thoroughly than any other strain. This in turn leads to the presence of antibiotic-resistant strains that can infect the human population, but which cannot be treated effectively by medicine.

The real problem with this common caveat is that, while doctor's word is taken usually taken as gospel (usually to the benefit of the patient), dosage rounds are usually pretty arbitrary. There's a reason doctors always prescribe for you three, five, seven, ten days of antibiotics, and not two, four, nine or twelve. They're not magic numbers--they're approximations. Usually, with bacterial infections, if you're feeling well, you probably are well, regardless of the term of your dose. This doesn't mean you should disobey your doctor--to the contrary, a little extra never hurt anyone, at least not severely. But excessive antibiotic doses can rid your body of beneficial intestinal bacteria, and for women can cause very uncomfortable yeast infections as the microbial balance of the body is upset.

So use common sense in taking your medications. Nine times out of ten, your doctor's word is probably the best track to getting you healthy. Antibiotics have their long-term

risks, but they are some of the most effective medicines for treating bacterial infections in humans. Take them with care, and take them responsibly. Finish your dose unless you are fully sure that your infection has been cured, and don't stockpile them for unnecessary use. They will do no good against viral infection, and may very well do some harm.

▲Antibiotic or 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. 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 systems, resistance in some pathogens continues to increase unabated and problems remain.

What about the developing countries like Bangladesh — where there is much less monitoring, diagnostics are sparse and comprehensive healthcare is a distant prospect? Fragmented health services, mainly in the profit-driven private sector, make antibiotics an easy target for misuse and abuse.

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. There is the fallacy that all infections respond to antibiotics. Many patients with a viral respiratory tract infection feel better after taking antibiotic ▲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. Quacks readily dispense antibiotics without prescription 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 the settings with poor healthcare system, limited regulation and inadequate health education is a big challenge. Repeated calls for better regulation of medicine must not obstruct appropriate access; antibiotic use will continue to grow in low- and middle-income countries to meet under-served 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. 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 Organisation 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, raise awareness and educate target people using electronic media. Alongside it will help to track and contain spread of resistance with improved informatics and better clinical decision support bedside diagnostics.