



World Health  
Organization

Regional Office for South-East Asia

# HEALTH in South-East Asia

A SEARO Newsletter | March 2011  
Vol. 4 No. 1

**This Issue: Antimicrobial resistance**

## Message from the Regional Director



This year, World Health Day focuses on the problem of antimicrobial resistance, or AMR. Simply put, the microbes that cause many diseases are becoming resistant to the drugs that are

the mainstay of treatment of communicable diseases. The development of resistance is a natural process, because organisms evolve ways to adapt to threats. But we have vastly accelerated the emergence and spread of resistance by careless, unwise and profligate use of antibiotics for everything from the common cold (which they cannot cure) to “preventive” uses in livestock.

The medical management of communicable diseases was revolutionized some seven decades ago with the advent of antibiotics. These “wonder drugs” prevented deaths and reduced the duration of illness, and became the mainstay in the battle against communicable disease. Other modern advances in health care, such as complex surgeries, organ transplants and care for people living with HIV and cancers, have benefited tremendously from the effective use of antibiotics.

But the wonder of the wonder drugs has worn off, and the cavalier use and abuse of these precious medical tools is now presenting a serious menace to public health. People start taking antibiotics but stop once they begin to feel better, abandoning the prescribed course of treatment; doctors prescribe them under pressure from patients, relatives, or suppliers, often without adequate evidence showing that they are indicated; and patients hoard unused medicine for a rainy day—in effect, prescribing for themselves the next time illness comes around (this is known as “self-medication”). In

many developing countries, pharmacies—and sometimes even ordinary stores and shops—sell antibiotics over the counter without a prescription. All of these actions tend to favour the development of antibiotic resistance.

The consequences are severe—economically, socially and personally. Resistance in microorganisms costs money, livelihoods and lives, and threatens to undermine the effectiveness of health delivery programmes. Recent decades have seen the development of pharmacological treatments for deadly diseases such as malaria, TB and HIV. The first two are curable and HIV is now a manageable condition—but AMR could erode or even erase these achievements. Were that to happen it would be catastrophic not only for millions of people, but would have larger social consequences, including hampering efforts to reduce poverty and improve quality of life for people all over the world.

When infections become resistant to first-line antimicrobials, treatment has to be switched to second- or third-line drugs, which are nearly always much more expensive and sometimes more toxic as well. For example, the drugs needed to treat MDR-TB are over 100 times more expensive than the first-line drugs used to treat the non-resistant form. In some countries, this high cost is prohibitive, with the result that some of these cases can no longer be treated. That means that patients become victims.

Resistant organisms can move across and between countries through travel and trade. Therefore, antimicrobial resistance is a global problem, and combating it will require concerted efforts at the national and global levels to preserve the efficacy of the available antibiotics.

The emergence and spread of antimicrobial resistance are complex problems intertwined with the knowledge, expectations, and

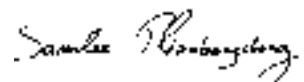
interactions of prescribers and patients, as well as the regulatory environment. Patient compliance with recommended treatment is a major problem. Easy access to antimicrobials in developing countries and myths about their effectiveness in all conditions that give rise to fever also have an important influence on the emergence of resistance.

Several problems continue to plague prevention and containment of antimicrobial resistance, which continues to be neglected despite of its profound impact on health and the economy. National approaches to combating AMR are generally lacking, and regulatory mechanisms are weak. There is also a lack of education, whether for prescribers or for patients. Incentives for pharmaceutical manufacturers to undertake the enormously costly development of new drugs is insufficient as well. Infection control practices in health-care facilities in developing countries are often deficient, and these too play a role. Finally, collaboration between stakeholders is weak at best, and often entirely lacking,

The global pattern of misuse, in both developed and developing countries, has offered an undue advantage to microorganisms and needlessly

depleted humanity's arsenal in its battle against disease. To catalyze national actions, a regional strategy to combat AMR has already been developed by WHO. It gives particular attention to the introduction of legislation and policies governing the use of antimicrobial agents, establishment of laboratory-based networks for the surveillance of resistance, and ensuring the rational use of these drugs at all levels of health-care settings.

The global community can no longer take antibiotics for granted, nor ignore the emergence of AMR. The good news is that not only policy-makers, but also individuals, can make a difference. Coordination and involvement of all stakeholders is key, however; the time for sustained, global action is now, since we are slowly but surely drifting towards a reversion to the dreadful pre-antibiotic era. That would be disastrous. In fact, it would represent the biggest threat to global poverty alleviation and efforts to make this world a better and more healthy place. Hence we must save antibiotics to save human lives



*Dr Samlee Plianbangchang*  
Regional Director

© World Health Organization 2011

All rights reserved. Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – can be addressed to Publishing and Sales, World Health Organization, Regional Office for South-East Asia, Indraprastha Estate, Mahatma Gandhi Marg, New Delhi 110 002, India (fax: +91 11 23370197; e-mail: publications@searo.who.int).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

The named authors alone are responsible for the views expressed.

## *Inside:*

- *Message from the Regional Director* ..... 2
- *Perceptions and usage of antimicrobials in South-East Asia*..... 4
- *Antimicrobial resistance in India*..... 6
- *Containing antimicrobial resistance in Sri Lanka: use of national antibiotic policy and infection control practices* ..... 11
- *Perceptions of communities and physicians in use of antibiotics*..... 17
- *Recent publications from SEARO on antimicrobial resistance*..... 19

# Perceptions and usage of antimicrobials in South-East Asia

Vanvisa Warachit, Uppasala, Sweden

An “antimicrobial” is a chemical compound killing or inhibiting the growth of bacteria without causing the host (human or animal) significant damage. Antimicrobials can be naturally produced by a mold or bacterium, or synthetically made. Antibiotics are the antimicrobials most familiar to the general public. Antibiotics are used to treat illnesses caused by bacteria and, in some cases, preventively--prior to surgery, for example.

*Resistance* occurs when an antibiotic has lost its ability to effectively control or kill bacterial growth; in other words, the bacteria continue to multiply even in the presence of therapeutic levels of an antibiotic.

There are many factors influencing antimicrobial resistance (AMR) in South-East Asia--for instance, patients who stop taking the medicine before the end of the dose period, or use it for a viral infection (antibiotics don't kill viruses). Another cause is too easy access to medicines (sometimes without a prescription),

and there are indirect factors such as economic pressure. Patients sometimes save some of their medicine to use again the next time they get sick, or because of cost they go to a hospital too late and require more expensive antibiotic treatment.

Antimicrobials have enabled us to combat and control some of the most devastating diseases known to humanity, including tuberculosis, malaria, and HIV/AIDS. The rise of AMR presents a very real possibility that these gains could be lost. Action is necessary by all stakeholders in the process, from the manufacturer down to the level of the patient/user.

**Patients** are one of the most important factors in AMR, due to frequent lack of knowledge of the nature and treatment of their infection. One study found that some patients tended to exaggerate their symptoms to get a prescription, and patients' expectation of being prescribed anti-microbials significantly influenced doctors and pharmacists to prescribe or dispense them<sup>1</sup> (Jean, 2001). Therefore, it is important to educate people about which symptoms are caused by viral infections and which do not necessarily need to be treated with antibiotics.

One study in India found that of the survey sample, 69.4% of patients received antimicrobial prescriptions<sup>2</sup>. A Thai study revealed that 53% of those surveyed stopped taking their antibiotics before the course was ended, for such reasons as that they felt better



<sup>1</sup> Jean CP. Patients' interviews and misuse of antibiotics. *Clinical Infectious Diseases*. 2001; 33(Suppl 3):S170-173.


<sup>2</sup> Kumari IK et al. Antimicrobial prescription patterns for common acute infections in some rural and urban health facilities of India. *Indian J Med Res*, 2008; 128:165-171.

or had experienced some negative side effect<sup>3</sup>. Thus, patient attitudes lead to self-medication and uninformed decisions about the use of medication.

**Pharmacists and chemists** may dispense antibiotics to patients without a prescription. It has been documented that chemists sometimes do not explain possible dangers of using these medicines, do not ask for details of the symptoms, or sell the medicines without providing even the name or information on using it. This might be explained by insufficient training of the pharmacy employees and lack of enforcement of regulations. To train chemists to be aware of the dangers of AMR and the impact of for dispensing medicine without a prescription and appropriate information is essential.

But even educating chemists and pharmacists is not enough, because in many countries antibiotics can be obtained elsewhere. The Indonesian government has launched an important regulation allowing only licensed medical shops to dispense antibiotics. However, the regulation does not mention other types of outlets, and the gap in regulation has resulted in the selling of antibiotics in general shops<sup>4</sup>. Both policy and enforcement need to be enhanced throughout the Region to combat AMR.

**Doctors** need, first of all, to be trained in the accurate diagnosis and management of infectious disease. One study found that only a small number of stool cultures were used in the diagnosis of infectious diarrhoea<sup>5</sup>. To use a



laboratory test before prescribing the antibiotic is a crucial measure in containing AMR. Doctors also need to be sensitized to the threat of AMR in order to resist social and economic pressures to overprescribe antimicrobials.

**Manufacturers** also have a role, because substandard antimicrobials contribute to AMR. Regulations on controlling the quality of antimicrobials should be initiated where they are absent and enforced in the future. Incentives for the pharmaceutical company to improve the AMR situation are also important. To encourage companies to improve and develop new kinds of drugs, or to develop a testing kit to distinguish between a viral or bacterial infection, are examples of such measures. In this way, antimicrobials would be used less than at present, which would improve both the AMR situation and the clinical failure rate.

**Policy-makers** are clearly pivotal in addressing AMR. A key aspect is how we look at control programmes for infectious diseases. Non-pharmaceutical measures—such as hand hygiene or isolation precautions—need to be promoted as being among the best strategies to slow the development of resistance. And just as there is a burden of disease, there is a “burden of resistance” due to AMR, which should be included in any calculation related to disease control programmes. This burden of resistance includes the cost of substitution of the antimicrobial, cost of implementing a new kind of antimicrobial, cost of infection control and cost of morbidity and mortality.

The cost of indiscriminate use is not just loss of effectiveness; it also means loss of life. Action is long overdue to meet the challenge of AMR.

*It is important to educate people about which symptoms are caused by viral infections and which do not necessarily need to be treated with antibiotics.*

<sup>3</sup> Jean CP. Patients' interviews and misuse of antibiotics. *Clinical Infectious Diseases*. 2001; 33(Suppl 3):S170-173.

<sup>4</sup> Usman Hadi et al. Cross-sectional study of availability and pharmaceutical quality of antibiotics requested with or without prescription (over the counter) in Surabaya, Indonesia. *BMC Infectious Diseases*, 2010; 10:203.

<sup>5</sup> L Rand Carpenter et al. Stool cultures and antimicrobial prescriptions related to infectious diarrhea. *The Journal of Infectious Diseases*, 2008; 197:1709-1712.



## Antimicrobial resistance in India

Mohuya Chaudhuri, New Delhi

If you're sick for a couple of days, nose running with a splitting headache and fever racking your body and you pop some antibiotics for relief without taking medical advice, then you are one of millions who use antibiotics indiscriminately. Taking antibiotics without a doctor's diagnosis and prescription has led to widespread antibiotic resistance in India. However, the problem is not restricted to India; globally, antimicrobial resistance (AMR) is growing. A broad spectrum of antibiotics is no longer able to treat routine infections because of the rise in the number of antibiotic-resistant microbes. Some of the microorganisms that have drug-resistant strains are those that cause, tuberculosis, typhoid fever and pneumonia.

Over the years, popular drugs like penicillin, tetracycline used for treating respiratory infections, and quinolones like ciprofloxacin (second generation) used for typhoid fever have become less effective. With few new drugs in the pipeline, the options for treatment are getting limited. Several studies have established

*With few new drugs in the pipeline, the options for treatment are getting limited.*

that the scale of resistance is extensive but few steps, such as stricter supervision of the use and sale of antibiotics, have been taken. But with an increasing number of people not responding to a spectrum of drugs, can India afford to ignore antibiotic resistance any longer? This debate was placed centre stage in August 2010, when

The Lancet published the study on NDM1 (New Delhi metallo – B lactamase 1), or the “Superbug”. This enzyme, hosted by the *E-coli* bacteria and *Klebsiella pneumonia*, was found to be non-responsive to carbapenems — the most potent antibiotics available currently and usually used for emergencies. Both these bugs can cause urinary tract infections and blood poisoning, leading to death. So far, patients infected by NDM1 are untreatable.

This discovery put AMR in the public eye. People are worried. For the first time, the quality of infection control in intensive care settings such as ICUs, CCUs and NICUs is being raised. Even though the community is generally aware of antibiotic resistance in their

day-to-day life, there is little knowledge about its own role in creating it.

So what is AMR? It is the process by which bacteria become resistant to known drugs by genetic mutation. There are several reasons why resistance occurs but the key driver in India is ignorance. Cutting across all sections of society, antibiotic abuse is common, both by patients and by pharmacies. Since medical care is expensive, people end up indulging in self-medication. General practitioners are a disappearing breed. So unless the condition

is considered “serious”, people fall back on their neighbourhood pharmacist. After discussing the symptoms over the counter, often antibiotics are handed out liberally without a prescription. Madhushree Sinha, 34, says she takes antibiotics whenever she has fever with cough and cold, a toothache or a stomach infection. “I am a single mother and I cannot afford to be ill. It’s simpler to ask the local chemist and he usually gives me the right medicines. Usually I get better on the second or the third day. But these days, it takes longer to fix. At times, I do not complete the course if I am feeling better.” Sinha said she did not have time to visit a doctor. “These are regular illnesses and can be handled at home,” she said.

Here’s where the trouble begins. Irrational use of antibiotics, faulty dosages, counterfeit drugs, truncated treatment and above all, use of antibiotics for infections not caused by bacteria are a recipe for disaster.

But some chemists disagree. They say not all of them hand out antibiotics to customers without prescriptions because there is growing awareness among pharmacy owners about the misuse of drugs. Surinder Singh, who runs a pharmacy in South Delhi, blames doctors for over prescribing antimicrobials. He says as the cold sets in, coughs and colds are usual, but

doctors routinely prescribe heavy doses of high-end antibiotics even to newborns, though there is no real need. Why blame chemists alone?

Sometimes, in low-income areas, chemists do give antibiotics to customers because they cannot afford to pay a doctor’s fees. A chemist in a South Delhi slum plays the resident doctor. He hands out ciplox and tetracycline liberally, and when a customer asks him how long he should take the drug, the chemist tells him to take the pills till he feels better.

*Cutting across all sections of society, antibiotic abuse is common, both by patients and by pharmacies.*

Such gross misuse of antimicrobials has led to a proliferation of drug-resistant pathogens. The “Superbug” showed how a group of bacteria are now resistant to multiple classes of drugs. In India, pathogens that cause tuberculosis, pneumonia and malaria are showing resistance to drugs. There are three key factors. One is micro-biological; when bacteria are under stress or pressure (as from chemotherapy), they are forced to carry out novel mutations in their genetic structure which are responsible for neutralizing the impact of antibiotics.

When penicillin was discovered in the beginning of the twentieth century, the use of chemotherapeutics to kill bacteria was a brand





new concept. It saved many lives and remained a miracle drug for quite a while — till resistance began to emerge. But with long-term, widespread use the bug was no longer vulnerable to penicillin. So it is with a large number of pathogens including MRSA<sup>1</sup>, which causes skin infections, because bacteria are extremely resilient and versatile. Once exposed to a particular drug over a period of time, it initiates changes in its genes, which makes it possible to survive in a chemo-hostile environment. Some strains of TB have also been found to be resistant to the primary drug, rifampacin, while another group with a different genetic mutation does not respond to isoniazid. And if a strain is resistant to both these compounds, then the person who is infected is suffering from multidrug-resistant TB, an increasing phenomenon in India, which has one of the largest burden of TB cases in the world.

Second is the quality of medications. In India, there is a thriving counterfeit or spurious drug market. Hundreds of factories churn out copies of drugs that end

---

<sup>1</sup> Methicillin Resistant Staphylococcus aureus – these are resistant to multiple antibiotics.

up in pharmacies. Since inspection or raids of pharmacies or pharmaceutical factories never take place, the market is flooded with suboptimal medications that lead to poor recovery and provide a window of opportunity for the pathogen to devise a strategy against the antibiotic.

The third and very critical cause of AMR is the role of the community and the environment. Apart from irrational use of antibiotics by patients themselves, doctors (many of them unqualified) prescribe antibiotics frequently, even though it may not be indicated. Sometimes patients suffering from viral fever are put on an antibiotic regimen even though it has absolutely no impact on the pathogen. In cities, where multiple infections can occur simultaneously such as dengue, malaria, chikungunya and influenza, thousands of people are forced to take several rounds of antibiotics, whether they need it or not.

Samridhhi is only three years old but she has had repeated courses of antibiotics though she did not need it. Her parents still do not know why her paediatrician gave antibiotics each time she had cough and cold. She was diagnosed with asthma later. Clearly, her treatment was not only faulty but could lead to resistance to a certain class of antibiotics at a later date.

Social behaviour can also lead to resistance. During outbreaks, people tend to pop antibiotics as prophylaxis. During the SARS and later avian influenza outbreaks, people rushed to stores to buy antibiotics out of panic. However, the biggest source of antibiotic resistance is in hospital settings. Over 80% of health care is provided by the private sector in India. There is no

standardization of hospital services and only a few facilities follow best practices for infection control and patient safety. Hospitals are breeding grounds for bugs, and when these are exposed to bulk doses of a cocktail of antibacterials, resistance results. For instance, the level of resistance found in outpatients is lower than that of those who are admitted for treatment. However, there are other risks involved. Since

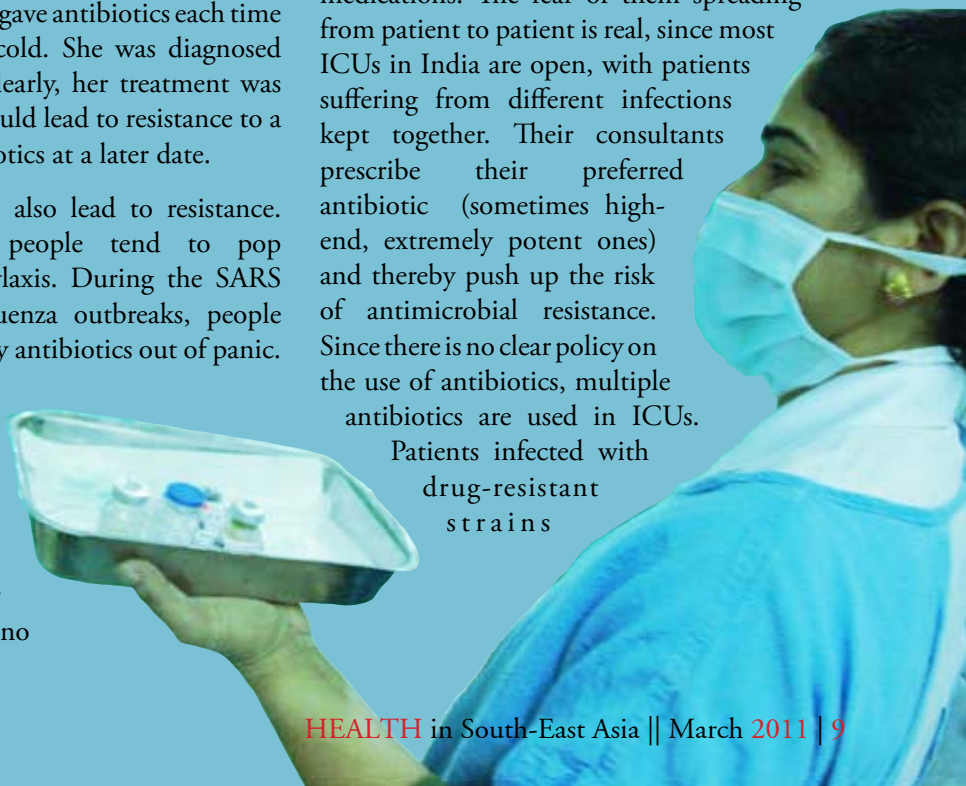
*Sometimes patients suffering from viral fever are put on an antibiotic regimen even though it has absolutely no impact on the pathogen.*

outpatient departments tackle a large volume of patients, drug resistant germs can be transferred from one to the other, even though the person may be asymptomatic. Doctors should therefore impress upon families not to come to hospitals in groups

for visits, in order to control the spread of drug-resistant microbes.

But the real danger lies in ICU settings, where the levels of AMR are much higher. In some cases, patients have stopped responding to most antibiotics. Most of the drug-resistant bugs found in ICUs are gram negative microorganisms that are pan-resistant. They do not respond to *most* of the available line of medications. The fear of them spreading from patient to patient is real, since most ICUs in India are open, with patients suffering from different infections kept together. Their consultants prescribe their preferred antibiotic (sometimes high-end, extremely potent ones) and thereby push up the risk of antimicrobial resistance. Since there is no clear policy on the use of antibiotics, multiple antibiotics are used in ICUs.

Patients infected with drug-resistant strains



are therefore likely to pass on the infection to others who share a room with them. Another route that leads to AMR is poor waste disposal at hospitals. Discharges containing urine and faeces of sick patients also contain large amounts of antibiotics. When this mixes with the sewage water containing colonies of bacteria, resistance develops.

To overcome this, some countries follow a strict antibiotic policy. Waste is treated and ICUs have antibiotic “holidays”, during which no anti-biotics are given, thus limiting the risk of building resistance. In fact, doctors say that if an antibiotic is not used for a long time, then the bacteria no longer has any “memory” of it. Chloramphenicol was considered the gold standard for treating typhoid in the 1970s and 1980s. But after the bug, *Salmonella typhi*, stopped responding to it, second-generation drugs like ofloxacin/ciprofloxacin began to be used. But these too are also showing lower sensitivity. Surprisingly, doctors have now found that chloramphenicol is once again showing good results. Experts believe that this occurs because the drug was not in use for nearly three decades, and the bacteria has mutated several times since then and has no systemic reference to sidestep it.

In countries like Sweden, antibiotic holidays and strict infection control measures have shown that AMR can be brought down. But simple practices like segregating infected

patients, hand-washing, minimizing the use of cleaners, detergents and antibacterials have also helped immensely. But in India, the fight is going to be on many more levels.

Antibiotic abuse occurs all around us in nonmedical conditions as well. In the field of agriculture, farmers use antibiotics to prevent fruits and vegetables from rotting. Those engaged in animal husbandry are also liberally using antibacterials to induce growth in cattle and prevent infections in poultry. With avian influenza and Ranikhet disease posing an active threat, poultry owners do not want to risk losing their stock. Hence an assortment of antimicrobials are finding their way through the food chain into the environment.

The threat of AMR is real. With no law to regulate the use and abuse of antimicrobials, the lives of millions of people are at stake. With no new drugs available to combat newer strains of bacteria, the best bet is to use antibiotics optimally. First, the government must frame stringent regulations on the use of antibiotics. Doctors must prescribe judiciously — only when it is really required — and not give low doses. Patients must not demand antibiotics at any cost, and should take them according to the regimen. Chemists must only sell them when it is prescribed by a doctor, and audits must be done on all pharmacies. Only then will the misuse of antibiotics be reduced.

*Antibiotic abuse occurs all around us in nonmedical conditions as well.*

# Containing antimicrobial resistance in Sri Lanka: use of national antibiotic policy and infection control practices

**S.D. Atukorala**, Consultant Clinical Microbiologist, Colombo, Sri Lanka

An antibiotic is a substance that inhibits growth of bacteria or selectively kills them. Since bacteria infect humans and are also living cells that multiply inside the human body, the drug must act on the bacterial cell and cause no harm to human cells. This selective action is achieved by getting the drug to act on sites present on bacterial cells and absent on the human cells, such as the cell wall. When the antibiotic acts on biochemical pathways like protein synthesis, a selective advantage is obtained because the ribosomal components taking part in protein synthesis differ in bacterial cells, as compared with human cells.

When the first antibiotic penicillin was discovered and introduced into the world, the main bacteria causing health problems were those that caused respiratory tract infections and skin and soft tissue sepsis. This prototype penicillin saved millions of lives.

But alongside this beneficial effect, one of the problems encountered was that the ubiquitous *Staphylococcus aureus* started producing the enzyme penicillinase, which destroyed the prototype benzyl penicillin. This was the start of the development of antibiotic or antimicrobial resistance (AMR). This also initiated the development of various types of antibiotics against the changing types of disease-causing bacteria.

This phenomena of antibiotic resistance showed the medical world that they were dealing with a population of living organisms which had immense powers of adaptability for survival. The discovery of the antistaphylococcal penicillin group (like methicillin) followed. Since the killing power of cloxacillin and fluorinated cloxacillin-flucloxacillin was superior, they were used in preference to methicillin, which was the standard or prototype anti-staphylococcal penicillin.

Around this time, another group of bacteria (gram negative bacilli or rods) were posing problems of urinary tract infections and also diarrhoeal diseases. A broad-spectrum penicillin group, the ampicillins, were then developed. Alongside this development of the broad-spectrum ampicillin family, the anti-pseudomonal penicillins and other groups of antibiotics (macrolides, aminoglycosides, cephalosporins and tetracyclines) were developed for clinical use. The cephalosporins give broad spectrum cover against several bacteria.

*Poverty, ignorance  
inadequate access to  
drugs, poor health care  
delivery, have limited the  
control of infections.*

## Management of antimicrobial resistance

Antimicrobial resistance is one of the biggest challenges facing health care globally.



Although antibiotics have saved millions of lives, poverty, ignorance inadequate access to drugs, poor health care delivery, especially in developing countries, have limited the control of infections. Sometimes we cannot provide reliable susceptibility data on which rational use of antibiotics can be based.

Management of antimicrobial resistance requires many skills. Infection control measures would place barriers on the exchange of resistant bacteria from patient to patient, patient to health-care worker (HCW) and HCW to the patient. Skills are needed in the effective use of antibiotics, taking into consideration their pharmacokinetics and pharmaco-dynamics. Laboratory skills are required to identify bacteria, measure their antibiotic resistance and monitor the spread in hospital and in the community. These require integrated teamwork. Attention has to be paid to control the addition of antibiotics to animal feeds as growth promoters, as this also helps in the selection of resistant bacteria.

It is not only drug use but also the dose and duration of use which plays a role in antibiotic resistance. Appropriate antimicrobial use is the use that maximizes therapeutic impact while minimizing toxicity and development of resistance. The appropriate use is facilitated by promoting the use of informed guidelines by clinicians, improving diagnostic techniques, and also informing consumers about the proper use and the limitations of antibiotics.

### **Development of antibiotic policy in Sri Lanka**

In Sri Lanka, at the request of the Ministry of Health, guidelines were prepared for rational use of antibiotics. They were presented in tabular form for easy reading and distributed by the ministry to medical officers. Recently, at the request of the Sri Lanka Medical Association, we developed an updated set of guidelines for which contributions were made by specialists in each field. Although guidelines are available,

good microbiological laboratory backup is not available in many peripheral hospitals. A strict antibiotic policy is not in place at present.

An antibiotic policy would not only prevent the development of antibiotic resistance but also guide the clinician to use the antibiotic only when necessary e.g. the cause of upper respiratory infections is mainly viral and antibiotics are not necessary and symptomatic measures would suffice. Further, the antibiotic policy would help prevent the side effects related to antibiotics and reduce treatment costs. It has been shown that the second-highest expenditure item after payment of salaries of staff is antibiotics. The type of policy could be restrictive – where doctors are not permitted to use reserve antibiotics for minor infections. A restrictive policy would also not permit the use of glycopeptide antibiotics meant for resistant bacteria like methicillin-resistant *Staphylococcus aureus* (MRSA).

Some countries rotate antibiotic use, i.e. use a certain antibiotic for a particular period and replace this with another during the successive period. This type of cyclic policy is not favoured. Some doctors do not like policies in which their prescribing rights are curbed by a set of guidelines drawn by a chosen set of doctors. In developing countries, the availability of over the counter (OTC) antibiotics has been a tremendous impediments to rationalizing antibiotic use. It is felt that an antibiotic policy should be for

a particular hospital or a group of hospitals in a province where there is a consultant microbiologist available, and adherence to this policy has to come through consensus. An antibiotic policy committee needs to be appointed to take decisions on antibiotic use and also to implement the decisions of the committee. Review of the antibiotic-resistance patterns need to be done periodically to change the antibiotics of the guideline accordingly. The provincial committee could monitor the antibiotic use in satellite hospitals in the province. In developed countries each hospital has its own antibiotic policy.

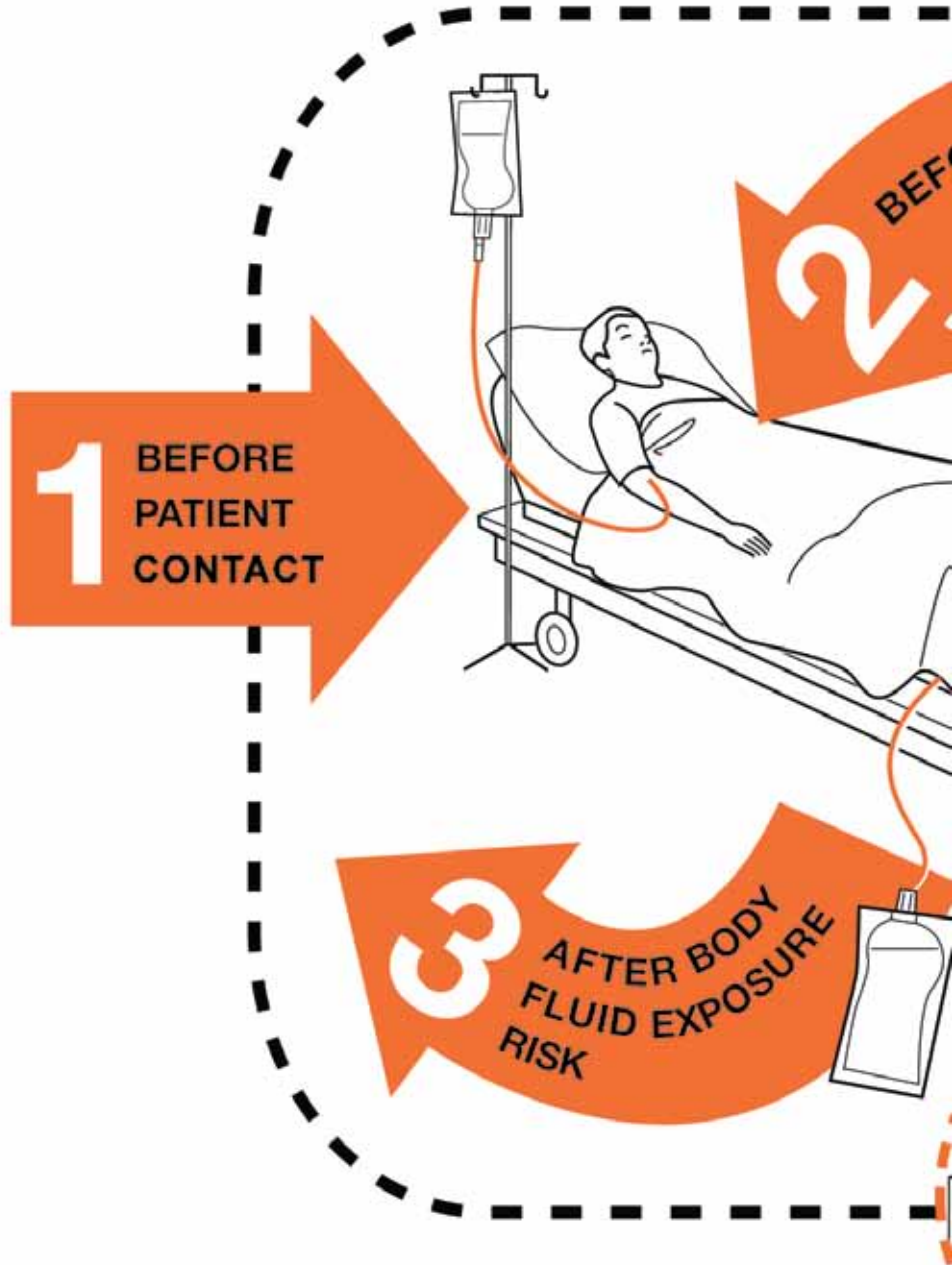
## Role of laboratories in generating evidence

The information needed to manage resistance comes from the microbiologist and the



# Hand-washing

An extract from a poster advocating for hand-washing in health-care facilities at **five key moments** in patient care. Good hand hygiene helps prevent antimicrobial resistance.



*Produced by the Infection Control Unit of NHSL (Sri Lanka) and WHO.*

**MORE ASEPTIC  
TASK**



**4** AFTER  
PATIENT  
CONTACT



**5** AFTER CONTACT  
WITH PATIENT  
SURROUNDINGS

microbiology laboratory. The laboratory will isolate bacteria from clinical samples and identify them to species level. Antibiotic sensitivity testing need be performed to check antimicrobial resistance. The microbiology laboratory could generate the information and use a resistance-monitoring programme like WHONET to store the data. The laboratory can be linked to other WHO Collaborating Centres. Improved diagnostic testing will not only help detect resistance but also enhance correct antibiotic use and patient care. The microbiology laboratory would need to address appropriate specimen collection, performance of accurate testing interpretation, and reporting of antibiotic sensitivity (susceptibility) tests done on clinical samples. There has to be close communication between the microbiologist and clinicians to interpret the significance of isolates, choosing the appropriate antibiotic, investigation of infectious disease outbreaks and infection control measures.

*By far the single most important aspect of controlling of HAI is hand washing.*

## **Impact on patient care and hospital-associated infections (AAI)**

An HAI is an infection which the patient acquires after 72 hours of hospital stay and which he did not have at the time of admission to hospital. HAI is a challenge to patient safety. If a patient acquires an infection while in hospital it is going to increase his hospital stay or make him more ill, or he may even die of the HAI. Gram negative bacteria have features which are of main concern to health care providers. These organisms are highly efficient

at acquiring genes that code for drug resistance, particularly in the presence of antibiotic selection pressure. They have available a range of resistance mechanisms against the same antibiotic, or a single mechanism to affect multiple antibiotics.

Since HAI cannot be totally eliminated, all hospitals in Sri Lanka have embarked on methods to control HAI. This is done through an Infection Control Committee, which is headed by the hospital's microbiologist and would have infection control nurses (ICN) and other consultants. Pharmacists are also included to help in implementing antibiotic policies.

Among the main measures is the reduction of the "bio-burden" or the quantum of microorganisms in all areas of the hospital. General measures would include hand-washing, safety precautions made up of universal precautions plus body substance isolation (BSI), patient isolation policies and laundry care. By far the single most important aspect of controlling of HAI is hand washing. Whenever we speak of curtailing the spread of resistant bacteria like MRSA or multidrug resistant (MDR) gram negative rods, hand-washing will hold top position. Although hand-washing with soap was the time-tested method, alcoholic rubs have made this task easier. Posters have been developed at the National Hospital of Sri Lanka (NHSL) as per WHO guidelines to insist on the five moments for hand hygiene (see page 16). There is little doubt that hand-washing is at the top of list of priorities in a health care setting; it is a simple, effective way to reduce HAI and combat the development and spread of antibiotic resistant bacteria.

# Perceptions of communities and physicians in use of antibiotics

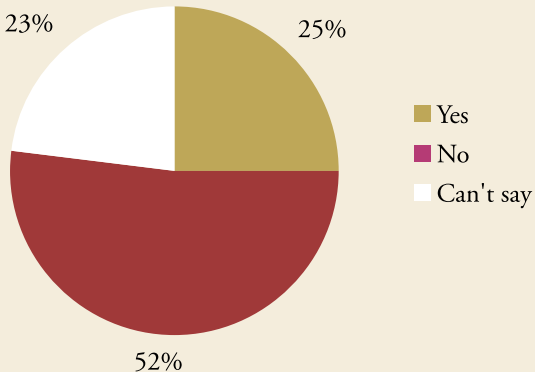
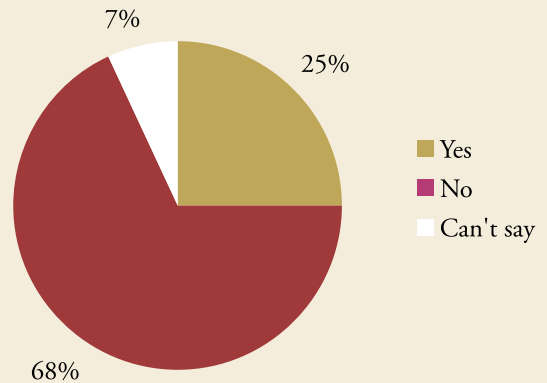
WHO/SEARO commissioned a preliminary study in and around New Delhi to generate some data regarding perception of communities and physicians on use of antibiotics. The initial findings are summarized here.

The sample size was 150 members of community and 150 physicians. The survey is being expanded to other geographical areas and populations to make it truly representative.

**Q:** Should antibiotics be discontinued by the patient when he starts feeling better, even before completion of recommended course?

**25%** of responders said Yes

But stopping antibiotics before the course is finished leads to antibiotic resistance



**Q:** Should antibiotics be given to a child with any fever?

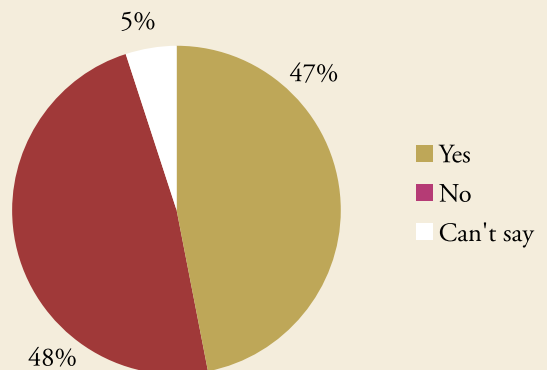
**25%** said Yes

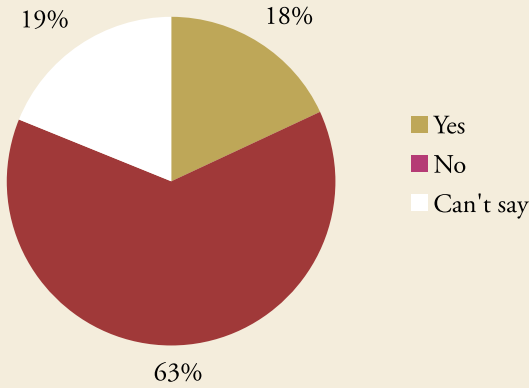
But antibiotics have no effect on viral fevers

**Q:** Will you wish to change your doctor if he fails to prescribe antibiotics for your common cold?

**47%** of patients said Yes

But antibiotics cannot cure the common cold!





**Q:** Will you save unused antibiotics for later use by yourself or by other family members?

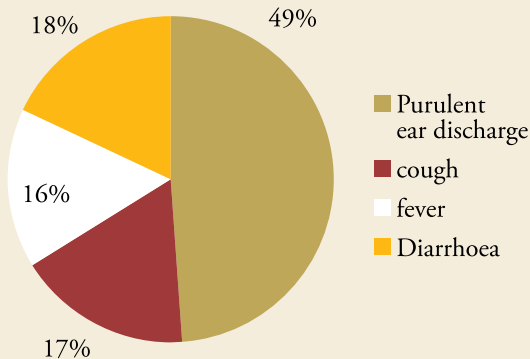
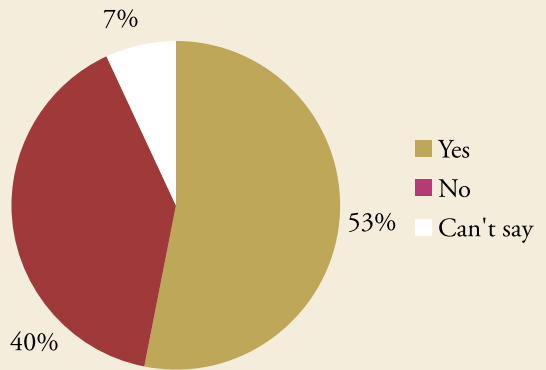
**18%** of people said Yes

Re-using medicines prescribed for previous illnesses can be dangerous and leads to antibiotic resistance

**Q:** Would you prescribe antibiotics for your own use or that of your family members?

**53%** of people would self-prescribe antibiotics

Self-medication leads to antibiotic resistance



**Q:** Would physicians prescribe antibiotics for non-specific fever, cough, purulent ear discharge and diarrhoeas?

**16%** of physicians will prescribe antibiotics to a patient with non-specific fever

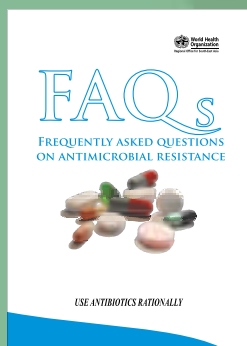
**17%** of physicians feel that all patients with cough need antibiotics

**18%** of physicians recommend antibiotic therapy for diarrhoea

**49%** of physicians treat purulent ear discharge with antibiotics

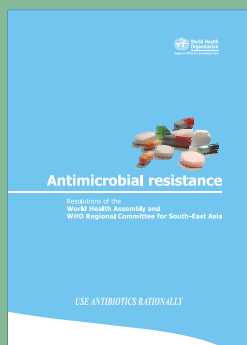
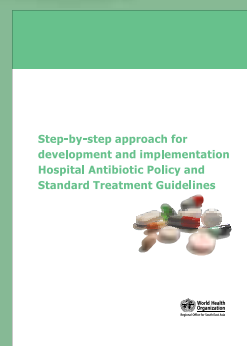
Overprescribing and overuse of antibiotics leads to antibiotic resistance.

# Recent publications from SEARO on antimicrobial resistance



Antimicrobial resistance (AMR) has assumed serious proportions. The life-saving impact of antimicrobial agents, as well as considerable economic benefits, are being negated by increasing resistance to these “wonder drugs”. AMR can be minimized by collective action by all — physicians, health administrators, regulators, manufacturers and the general public, especially patients. These FAQs explain in simple terms the reasons for the emergence of AMR and possible mechanisms by which it can be prevented and contained.

AMR has assumed greater importance in health-care settings. Preserving the efficacy of antimicrobial agents is considered a critical step in fighting communicable diseases. One of the approaches is to have evidence-based antibiotic usage policy in hospital and standard treatment guidelines for common infectious diseases. This document focuses on the mechanism to develop a practical hospital antibiotic policy and standard treatment guidelines. It also contains information on various effective strategies for implementation of standard treatment guidelines. A suggested model hospital STG for community-acquired pneumonia in adults is included.



The World Health Assembly and the WHO Regional Committee for South-East Asia have endorsed several resolutions on antimicrobial resistance (AMR). These resolutions reflect the commitment of all Member States and also provide a roadmap for combating AMR. The resolutions contained in this compilation provide guidance for initiating activities to prevent and contain AMR.

Antimicrobial resistance has been an unrecognized and neglected problem which is not only cross cutting but also has far reaching implications as an emerging public health problem with huge risk to international health security. The consequences of resistance are severe and several. Resistance in microorganisms costs money, livelihood and lives and threatens to undermine the effectiveness of health delivery programmes. The emergence and spread of antimicrobial resistance are complex problems fuelled by the knowledge, expectations, and interactions of prescribers and patients, and regulatory environment. A strategic approach has been described in this document to combat this burgeoning problem.



# Use antibiotics rationally

Take antibiotics only as prescribed and in the recommended dose and duration.

- Ask your doctor which prescriptions include antibiotics.



If misused, antibiotics will lose effectiveness.

They will no longer kill germs.

This is called "antibiotic resistance".



Many germs are *already resistant* to most antibiotics.



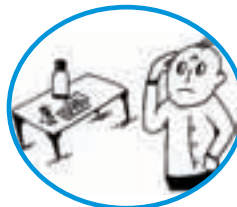
Colds, coughs and most diarrhoeas don't need antibiotic treatment.

- Instead, drink fluids and get plenty of rest.



Don't reuse antibiotics that have been prescribed for previous illnesses. This is called "self-medication". It may lead to resistance or unwanted effects.

- See a doctor if you have fever or are sick for more than three days.



It takes a lot of time and money to develop new antibiotics.

- Help preserve the effectiveness of the ones we have.

Make sure germs don't become resistant to them.



Don't misuse antibiotics.

Future generations will need them too!



**USE ANTIBIOTICS RATIONALLY**

**SAVE LIVES**

For more information visit the website at: [www.searo.who.int/worldhealthday2011](http://www.searo.who.int/worldhealthday2011)



**World Health Organization**

Regional Office for South-East Asia  
World Health House  
Indraprastha Estate,  
Mahatma Gandhi Marg,  
New Delhi-110002, India

Editorial Board : Dr Poonam Khetrpal Singh, Deputy Regional Director, WHO-SEARO  
Dr Rajesh Bhatia, Regional Advisor, BLT/WHO-SEARO  
Mr Bruce Murphy, Reports Officer, DOC/WHO-SEARO  
Ms Vismita Gupta-Smith, Information Officer, PIA/WHO-SEARO

Produced by : Reports and Documents Unit and  
Public Information and Advocacy Unit,  
WHO-SEARO

Photo credit : WHO/SEARO

