Key facts

- More than 50% of all medicines are prescribed, dispensed or sold inappropriately, and half of all patients fail to take medicines correctly.
- The overuse, underuse or misuse of medicines harms people and wastes resources.
- More than 50% of all countries do not implement basic policies to promote rational use of medicines.
- In developing countries, less than 40% of patients in the public sector and 30% in the private sector are treated according to clinical guidelines.
- A combination of health-care provider education and supervision, consumer education, and an adequate medicines supply is effective in improving the use of medicines, while any of these interventions alone has limited impact.

Rational use of medicines refers to the correct, proper and appropriate use of medicines. Rational use requires that patients receive the appropriate medicine, in the proper dose, for an adequate period of time, and at the lowest cost to them and their community.

Incorrect use of medicines

WHO estimates that more than half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take them correctly. This incorrect use may take the form of overuse, underuse and misuse of prescription or non-prescription medicines.

Common problems include:

- polypharmacy (use of too many medicines);
- overuse of antibiotics and injections;
- failure to prescribe in accordance with clinical guidelines;
- inappropriate self-medication.

In developing countries, the proportion of patients treated according to clinical guidelines for common diseases in primary care is less than 40% in the public sector and 30% in the private sector. For example:
• less than 60% of children with acute diarrhoea receive necessary oral rehydration therapy yet more than 40% receive unnecessary antibiotics;
• only 50% of people with malaria receive the recommended first-line antimalarial;
• only 50–70% of people with pneumonia are treated with appropriate antibiotics, yet up to 60% of people with viral upper respiratory tract infection receive antibiotics inappropriately.

What are the consequences of incorrect use of medicines?
Incorrect use of medicines occurs in all countries, causing harm to people and wasting resources. Consequences include:

• **Antimicrobial resistance.** Overuse of antibiotics increases antimicrobial resistance and the number of medicines that are no longer effective against infectious disease. Many surgical procedures and cancer therapies are not possible without antibiotics to fight infection. Resistance prolongs illnesses and hospital stays, and can even cause death, leading to costs of US$ 4–5 billion per year in the United States of America and €9 billion per year in Europe.²

• **Adverse drug reactions and medication errors.** Harmful reactions to medicines caused by wrong use, or allergic reactions to medicines can lead to increased illness, suffering and death. Adverse drug reactions have been estimated to cost millions of dollars each year.³

• **Lost resources.** Between 10–40% of national health budgets are spent on medicines. Out-of-pocket purchases of medicines can cause severe financial hardship to individuals and their families. If medicines are not prescribed and used properly, billions of dollars of public and personal funds are wasted.

• **Eroded patient confidence.** Exacerbated by the overuse of limited medicines, drugs may be often out of stock or at unaffordable prices and as result erode patient confidence. Poor or negative health outcomes due to inappropriate use of medicines may also reduce confidence.

What factors contribute to incorrect use of medicines?

• **Lack of skills and knowledge.** Diagnostic uncertainty, lack of prescriber knowledge of optimal diagnostic approaches, lack of independent information such as clinical guidelines, lack of opportunity for patient follow-up, or fear of possible litigation, lead to improper prescription and dispensing of medicines.

• **Inappropriate unethical promotion of medicines by pharmaceutical companies.** Most prescribers get medicine information from pharmaceutical companies rather than independent sources such as clinical guidelines. This can often lead to overuse. Some countries allow direct-to-consumer advertising of prescription medicines, which may lead to patients pressuring doctors for unnecessary medicines.

• **Profits from selling medicines.** In many countries, drug retailers prescribe and sell medicines over-the-counter. The more they sell the more income they generate, leading to overuse of medicines, particularly the more expensive medicines.

• **Unrestricted availability of medicines.** In many countries, prescription medicines such as antibiotics, are freely available over-the-counter. This leads to overuse, inappropriate self-medication and non-adherence to dosing regimes.

• **Overworked health personnel.** Many prescribers have too little time with each patient, which can result in poor diagnosis and treatment. In such circumstances prescribers rely on prescribing habit as they do not have the time to update their knowledge of medicines.
• **Unaffordable medicines.** Where medicines are unaffordable, people may not purchase a full course of treatment or may not purchase the medicines at all. Instead they may seek alternatives, such as medicines of non-assured quality from the Internet or other sources, or medicines prescribed to family or friends.

• **Lack of coordinated national pharmaceutical policy.** Less than half of all countries implement the basic policies recommended by WHO to ensure the appropriate use of medicines. These include appropriate measures and infrastructure for monitoring and regulation of medicines use, and training and supervision for prescribing health workers.

**What can be done to improve rational use of medicines?**

WHO advises countries to implement national programmes to promote rational use of medicines through policies, structures, information and education. These include:

- a national body to coordinate policies on medicine use and monitor their impact;
- evidence-based clinical guidelines for training, supervision and supporting decision-making about medicines;
- lists of essential medicines used for medicine procurement and insurance reimbursement;
- drug (medicines) and therapeutics committees in districts and hospitals to monitor and implement interventions to improve the use of medicines;
- problem-based training in pharmacotherapy and prescribing in undergraduate curricula;
- continuing medical education as a requirement of licensure;
- publicly available independent and unbiased information about medicines for health personnel and consumers;
- public education about medicines;
- elimination of financial incentives that lead to improper prescribing, such as prescribers selling medicines for profit to supplement their income;
- regulations to ensure that promotional activities meet ethical criteria; and
- adequate funding to ensure availability of medicines and health personnel.

The most effective approach to improving medicines use in primary care in developing countries is a combination of education and supervision of health personnel, consumer education, and ensuring an adequate supply of appropriate medicines. Any of these alone have limited impact.

**WHO response**

To improve rational medicine use, WHO:

- monitors global medicines use and pharmaceutical policy;
- provides policy guidance and support to countries to monitor medicines use and to develop, implement and evaluate national strategies to promote rational use of medicines;
- develops and delivers training programmes to national health professionals on how to monitor and improve medicines use at all levels of the health system.


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