



WEEKLY EPIDEMIOLOGICAL REPORT

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Antimicrobial Resistance - Part II

Part I of this article was published in the last issue of the Weekly Epidemiological Report.

FACTORS THAT ENCOURAGE THE SPREAD OF RESISTANCE

The emergence and spread of antimicrobial resistance are complex problems driven by numerous interconnected factors, many of which are linked to the misuse of antimicrobials and thus amenable to change. In turn, antimicrobial use is influenced by an interplay of the knowledge, expectations, and interactions of prescribers and patients, economic incentives, characteristics of a country's health system, and the regulatory environment.

Patient-related factors are major drivers of inappropriate antimicrobial use. For example, many patients believe that new and expensive medications are more efficacious than older agents. In addition to causing unnecessary health care expenditure, this perception encourages the selection of resistance to these newer agents as well as to older agents in their class.

Self-medication with antimicrobials is another major factor contributing to resistance. Self-medicated antimicrobials may be unnecessary, are often inadequately dosed, or may not contain adequate amounts of active drug, especially if they are counterfeit drugs. In many developing countries, antimicrobials are purchased in single doses and taken only until the patient feels better, which may occur before the pathogen has been eliminated. Inappropriate demand can also be stimulated by marketing

practices. Direct-to-consumer advertising allows pharmaceutical manufacturers to market medicines directly to the public via television, radio, print media, and the Internet. In particular, advertising on the Internet is gaining market penetration, yet it is difficult to control with legislation due to poor enforceability.

Prescribers' perceptions regarding patient expectations and demands substantially influence prescribing practice. Physicians can be pressured by patient expectations to prescribe antimicrobials even in the absence of appropriate indications. In some cultural settings, antimicrobials given by injection are considered more efficacious than oral formulations. Such perceptions tend to be associated with the over-prescribing of broad-spectrum injectable agents when a narrow-spectrum oral agent would be more appropriate. Prescribing "just to be on the safe side" increases when there is diagnostic uncertainty, lack of prescriber knowledge regarding optimal diagnostic approaches, lack of opportunity for patient follow-up, or fear of possible litigation. In many countries, antimicrobials can be easily obtained in pharmacies and markets without a prescription.

Patient compliance with recommended treatment is another major problem. Patients forget to take medication, interrupt their treatment when they begin to feel better, or may be unable to afford a full course, thereby creating an ideal environment for microbes to adapt rather than be killed. In some countries, low quality antibiotics (poorly formulated or manufactured, counterfeited or expired) are still sold and used for

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Hospitals are a critical component of the antimicrobial resistance problem worldwide. The combination of highly susceptible patients, intensive and prolonged antimicrobial use, and cross-infection has resulted in nosocomial infections with highly resistant bacterial pathogens. Resistant hospital-acquired infections are expensive to control and extremely difficult to eradicate. Failure to implement simple infection control practices, such as hand washing and changing gloves before and after contact with patients, is a common cause of infection spread in hospitals throughout the world. Hospitals are also the eventual site of treatment for many patients with severe infections due to resistant pathogens acquired in the community. In the wake of the AIDS epidemic, the prevalence of such infections can be expected to increase.

Veterinary prescription of antimicrobials also contributes to the problem of resistance. In North America and Europe, an estimated 50% in tonnage of all antimicrobial production is used in food-producing animals and poultry. The largest quantities are used as regular supplements for prophylaxis or growth promotion, thus exposing a large number of animals, irrespective of their health status, to frequently subtherapeutic concentrations of antimicrobials. Such wide-spread use of antimicrobials for disease control and growth promotion in animals has been paralleled by an increase in resistance in those bacteria (such as *Salmonella* and *Campylobacter*) that can spread from animals, often through food, to cause infections in humans.

THE NEED FOR A GLOBAL RESPONSE

In September 2001, WHO launched the first global strategy for combating the serious problems caused by the emergence and spread of antimicrobial resistance. Known as the WHO Global Strategy for Containment of Antimicrobial Resistance, the strategy recognizes that antimicrobial resistance is a global problem that must be addressed in all countries. No single nation, however effective it is at containing resistance within its borders, can protect itself from the importation of resistant pathogens through travel and trade. Poor prescribing practices in any country now threaten to undermine the potency of vital antimicrobials everywhere.

The strategy recommends interventions that can be used to slow the emergence and reduce the spread of resistance in a diverse range of settings. The interventions are organized according to groups of people whose practices and behaviours contribute to resistance and where changes are judged likely to have a significant impact at both national and international levels. These include consumers, prescribers and dispensers, veterinarians, and managers of hospitals and diagnostic laboratories as well as national governments, the pharmaceutical industry, professional societies, and international agencies. Global principles for the containment of antimicrobial resistance in food-producing animals were issued by WHO in June 2000.

As much of the responsibility for containing resistance rests with national governments, the strategy gives particular attention to interventions involving the introduction of legislation and policies governing the development, licensing, distribution, and sale of antimicrobial agents. The strategy is sufficiently flexible to be applied in poor and wealthy nations alike. The process for selecting the necessary interventions to limit emerging antimicrobial resistance can be based on the diseases most prevalent in a given country. In advocating widespread adoption of this strategy, WHO aims to encourage the urgent actions needed to reverse or at least curtail trends which have major economic as well as health implications. Moreover, in view of the global nature of the antimicrobial resistance problem, the efforts of any nation to implement the WHO Global Strategy are likely to be felt worldwide. The strategy builds on a number of WHO activities aimed at both monitoring the global emergence and spread of antimicrobial resistance and extending direct support to countries. WHO helps countries establish laboratory-based networks for the surveillance of resistance. Specific activities include staff training, support in methods for the quality assurance of laboratory tests, and provision of laboratory reagents. In addition, WHO distributes a computer software program, WHONET. Microbiologists, clinicians, and infection control workers may use this software to improve the systematic monitoring of drug resistance in their hospitals and communities and to share their data in a common format among national networks.

Since 1977, WHO has produced Model Lists of Essential Drugs in order to help governments select the most effective and appropriate drugs in line with priority needs. The lists, which are regularly revised, also contribute to the rational purchasing and use of drugs. Studies have demonstrated that in those areas in which an essential drugs programme is in operation, significantly more essential drugs are available, significantly fewer injections and antimicrobials are utilized, and drug stocks last about three times longer than in regions without such a programme. At present over 120 countries have implemented an essential drugs list. With the first global strategy for containment of antimicrobial resistance now available, WHO is also in a position to advise health policy-makers and managers on the specific interventions needed to safeguard the effectiveness of vital drugs and thus ensure that their life-saving capacity remains available to future generations.

Source :

Antimicrobial Resistance, WHO Fact sheet

[<http://www.who.int/mediacentre/factsheets/fs194/en/>]

15th - 21st December 2007 (51st Week)

Table 1: Vaccine-preventable Diseases & AFP

Disease	No. of Cases by Province								Number of cases during current week in 2007	Number of cases during same week in 2006	Total number of cases to date in 2007	Total number of cases to date in 2006	Difference between the number of cases to date between 2007 & 2006
	W	C	S	NE	NW	NC	U	Sab					
Acute Flaccid Paralysis	00	00	01 MT=1	00	00	00	00	00	01	01	85	120	-29.2%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00.0%
Measles	00	00	01	00	00	00	00	00	01	00	80	39	+105.1%
Tetanus	00	00	01 MT=1	02 TR=2	00	00	00	01 KG=1	04	01	38	49	-22.4%
Whooping Cough	00	00	00	00	00	00	00	00	00	02	47	71	-33.8%
Tuberculosis	72	12	10	10	10	00	03	31	145	138	9664	9896	-2.3 %

15th - 21st December 2007 (51st Week)

Table 2: Diseases under Special Surveillance

Disease	No. of Cases by Province								Number of cases during current week in 2007	Number of cases during same week in 2006	Total number of cases to date in 2007	Total number of cases to date in 2006	Difference between the number of cases to date between 2007 & 2006
	W	C	S	NE	NW	NC	U	Sab					
DF/DHF*	85	06	09	04	75	20	08	16	221	169	7061	11668	-39.5%
Encephalitis	02 GM=1 KL=1	02 KD=2	00 GL=1	00	01 KU=1	00	01 BD=1	00	07	06	201	119	+68.9%
Human Rabies	00	01 KD=1	00	00	00	00	00	00	01	02	59	72	-18.1 %

Table 3: Newly Introduced Notifiable Diseases

15th - 21st December 2007 (51st Week)

Disease	No. of Cases by Province								Number of cases during current week in 2007	Total number of cases to date in 2007	*DF / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever. NA= Not Available. Sources: Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Whooping Cough, Human Rabies, Dengue Haemorrhagic Fever, Japanese Encephalitis, Chickenpox, Meningitis, Mumps. Special Surveillance: Acute Flaccid Paralysis. National Control Program for Tuberculosis and Chest Diseases: Tuberculosis. Details by districts are given in Table 5.
	W	C	S	NE	NW	NC	U	Sab			
Chickenpox	13	05	04	12	05	02	02	07	50	3380	
Meningitis	03 GM=1 KL=1 CB=1	00	05 HB=3 GL=2	02 AM=2	01 PU=1	00	00	01 KG=1	11	762	
Mumps	05	04	03	15	05	02	03	02	39	2218	

Provinces: W=Western, C=Central, S=Southern, NE=North & East, NC=North Central, NW=North Western, U=Uva, Sab=Sabaragamuwa.
DPDHS Divisions: CB=Colombo, GM=Gampaha, KL=Kalutara, KD=Kandy, ML=Matale, NE=Nuwara Eliya, GL=Galle, HB=Hambantota, MT=Matara, JF=Jaffna, KN=Killinochchi, MN=Mannar, VA=Vavuniya, MU=Mullaitivu, BT=Batticaloa, AM=Ampara, TR=Trincomalee, KM=Kalmunai, KR=Kurunegala, PU=Puttalam, AP=Anuradhapura, PO=Polonnaruwa, BD=Badulla, MO=Moneragala, RP=Ratnapura, KG=Kegalle.

Table 4: Laboratory Surveillance of Dengue Fever 15th - 21st December 2007 (51st Week)

Samples	Number tested	Number positive *	Serotypes				
			D ₁	D ₂	D ₃	D ₄	Negative
Number for current week	03	02	00	00	02	00	00
Total number to date in 2007	472	54	01	25	18	00	09

Source: Genetech Molecular Diagnostics & School of Gene Technology, Colombo. * Not all positives are subjected to serotyping.

Table 5: Selected notifiable diseases reported by Medical Officers of Health

15th - 21st December 2007 (51st Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Returns Received Timely**
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	%
Colombo	44	1820	05	356	00	11	04	121	04	96	05	159	00	05	06	154	77
Gampaha	31	942	03	321	01	30	00	85	03	64	05	310	00	19	02	211	64
Kalutara	10	406	05	482	01	06	02	63	00	43	03	203	01	03	00	64	82
Kandy	04	407	06	315	02	06	02	66	01	16	10	147	03	87	02	1967	68
Matale	01	115	05	250	00	06	02	39	00	13	07	153	00	05	01	140	25
Nuwara Eliya	01	41	00	236	00	02	01	121	01	369	00	14	00	36	06	560	71
Galle	03	99	03	172	01	13	00	25	00	42	18	165	00	27	00	23	56
Hambantota	02	98	07	198	00	06	01	22	00	20	05	56	04	73	00	29	82
Matara	04	233	02	296	00	10	02	52	01	25	07	285	05	217	00	35	88
Jaffna	02	234	01	173	00	02	01	438	00	13	00	00	08	129	00	29	25
Kilinochchi	00	01	00	01	00	00	00	06	00	00	00	00	00	02	00	04	00
Mannar	00	07	00	32	00	00	06	112	00	00	00	02	00	00	01	26	25
Vavuniya	00	40	01	83	00	04	00	21	00	65	00	03	00	00	00	14	100
Mullaitivu	00	00	00	41	00	08	00	21	00	02	00	00	00	00	00	17	40
Batticaloa	01	79	01	477	00	11	00	24	00	10	00	00	00	22	03	1174	36
Ampara	00	05	06	189	00	00	00	06	00	02	00	08	01	04	00	37	29
Trincomalee	01	62	06	324	00	04	00	30	00	25	00	12	00	21	00	118	22
Kurunegala	21	772	12	524	01	09	04	72	00	37	01	84	05	45	01	105	83
Puttalam	54	341	07	214	00	17	00	98	00	09	00	31	00	07	01	83	67
Anuradhapura	18	264	00	204	00	10	00	22	00	17	01	41	00	20	02	46	37
Polonnaruwa	02	69	06	170	00	03	00	14	00	64	00	22	00	00	01	52	100
Badulla	03	78	08	635	01	07	02	97	00	13	03	49	00	169	05	397	87
Monaragala	03	54	07	356	00	02	01	57	02	39	05	55	03	93	01	47	70
Ratnapura	07	443	01	598	00	20	02	78	00	24	00	82	00	32	00	105	63
Kegalle	09	442	03	308	00	11	02	69	01	10	09	246	01	46	04	266	55
Kalmunai	00	09	04	242	00	03	00	10	00	14	00	02	00	02	00	133	31
SRI LANKA	221	7061	99	7197	07	201	32	1769	13	1032	79	2129	31	1064	36	5836	60

Source: Weekly Returns of Communicable Diseases (WRCD).

*Dengue Fever / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever.

**Timely refers to returns received on or before 29 December, 2007. Total number of reporting units =290. Number of reporting units data provided for the current week: 238

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