

# Consumers and providers – Could they make better use of antibiotics?

Per Nordberg<sup>a</sup>, Cecilia Stålsby-Lundborg<sup>b</sup> and Göran Tomson<sup>b,\*</sup>

<sup>a</sup> *Swedish Strategic Programme for The Rational Use of Antimicrobial Agents and Surveillance of Resistance (STRAMA), Swedish Institute for Infectious Disease Control, S-171 82 Solna, Sweden*

<sup>b</sup> *Division of International Health (IHCAR), Department of Public Health Sciences, Karolinska Institutet, S-171 76 Stockholm, Sweden*

## 1. Introduction

Antibiotic use is seen as a critical factor in the emergence of resistant bacteria. The impact of irrational use, including inadequate dosing and poor adherence to therapy, is potentially just as important as high consumption [28]. At the same time, limited access to antibiotics in many parts of the world is contributing to high mortality from bacterial infections.

Often, irrational behaviour from a biomedical perspective may be perfectly logical for the human being and in the context of the cultural sphere surrounding her. Understanding the reasons that individuals use antibiotics in a particular way is crucial if one is to influence their actions.

Containment of antibiotic resistance has been established as a 'Global Public Good for Health' and the rationalising of consumer and provider behaviour is an essential component in achieving this goal [19]. In this article, the aim has been to examine the interplay between prescribers, dispensers and consumers, to visualise incentives for individuals to use antibiotics and to determine how health system factors influence human behaviour. The approach is global, but the main focus is on low- and middle-income countries where the problems are most prominent and where most people live.

## 2. Health systems in transition

Health sector reforms from the late 1980s were driven mainly by the World Bank, with support from a number of bilateral aid agencies, and emphasised the need to redefine the relationship between the state, service providers, users and other health-related organisations [20,24]. Privatisation and deregulation were promoted and focused on private financial and human resources management. Emphasis was laid on mixed public and private mechanisms to improve cost control and increase cost recovery, including user charges, prepayment schemes and insurance. A push for stronger contractual arrangements with private sector providers reflected the prevailing ideological view of the potentially greater quality and efficiency of the private sector.

---

\*Corresponding author. Tel.: +46 8 51770000; Fax: +46 8 311590; E-mail: goran.tomson@phs.ki.se.

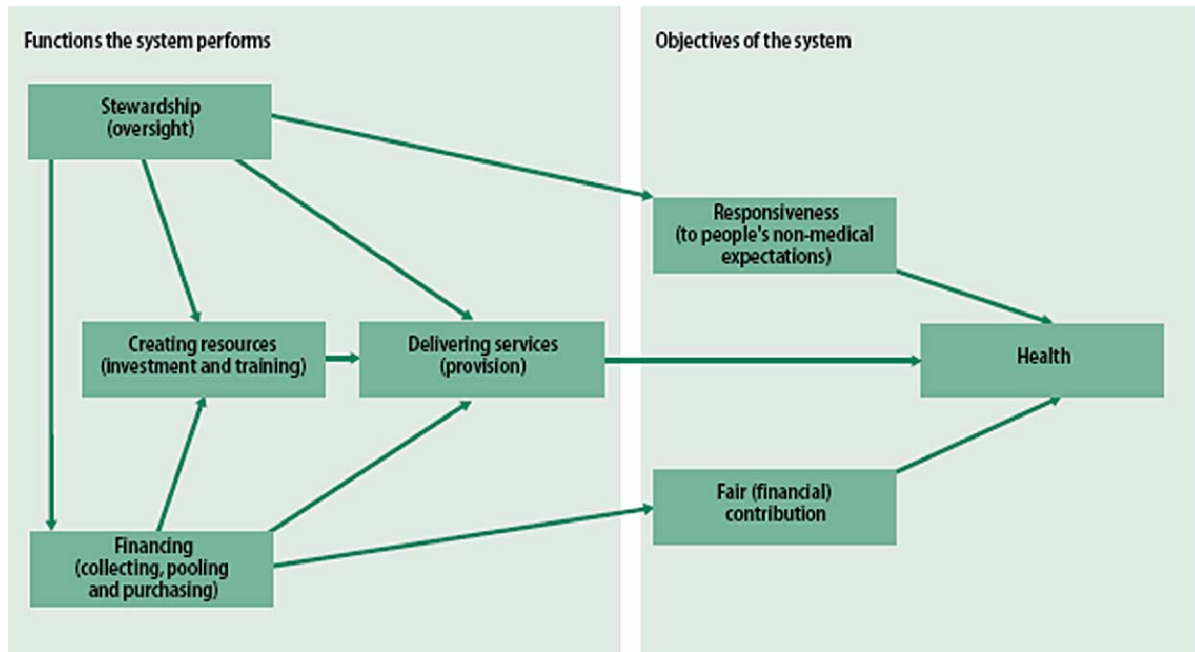


Fig. 1. Adapted from the World Health Report, 2000; Health systems: improving performance.

The complex issue of antibiotic resistance necessitates a systems view, including functions and objectives, where policy makers have the overall role of regulating and prioritising among services (Fig. 1). Major challenges accompanied the health sector reforms. Privatisation of services, drug supply and drug distribution has dramatically increased geographical access to antibiotics without securing their rational use. In many low- and middle-income countries, drug distribution has been taken over almost completely by the private sector. In Vietnam, market-oriented reforms resulted in the number of private pharmacies increasing from none in 1986 to over 6,000 in 1992; during the same period there was a sixfold increase in the annual per capita consumption of pharmaceuticals, with antibiotics representing the highest proportion of the increase [5,7]. Over 50% of the antibiotics globally is estimated to be bought directly from pharmacies or informal sale outlets without prescriptions [26], underlining the increasingly important function of pharmacies or other drug outlets as the first and possibly only contact with health services.

Secondly, health systems in low-income countries often have problems with lack of human resources, an obstacle that is prominent at present in sub-Saharan Africa [27]. Also, few countries have systems in place for knowledge transfer and quality control. Consequently, the quality of both services and medicines varies extensively and problems, including false and substandard antibiotics, continue. A third challenge is the financing of health systems. In industrialised countries financial mechanisms range from general taxation in Scandinavia to private health insurance in the United States. In most developing countries, including the two largest, China and India, the financing of health services mainly, including expenditure on drugs, consists of out-of-pocket payments from patients [8]. In China, reforms have created a situation where prescribing of drugs generates revenues to the 100,000 public hospitals. Additionally, we see the ‘mushrooming’ of private drug outlets and clinics in all continents, where a substantial part of the staffs’ income is generated through prescribing, dispensing and sales of drugs, including antibiotics [15]. The responsiveness of the systems to meet patient expectations is another challenge. In the case of antibiotics, drug policies are intended to restrict unnecessary use, which often

arises from the high patient demand for receiving antibiotics for most infections. In all cases, human beings and their behaviour matter.

### 3. Consumers in the system

In the society of today, where people are becoming increasingly individualistic, health care is considered the same as any other commodity. Through system changes consumers have been given opportunities to act individually in unregulated contexts, which are often profit-driven. In respect of diseases where the emerging resistance is most imminent, e.g. respiratory infections, sexually transmitted infections (STI) and diarrhoeal diseases, there are also parallel, high levels of self-initiated treatment without health personnel being consulted first. What incentives are driving people to direct purchase of antibiotics in pharmacies?

Public health services may be limited owing to shortages of medicines, materials and trained personnel [22,23,27]. Frequently, payments are required for people to get attention from the staff as health providers have developed their own livelihood strategies to compensate for low incomes [20,21]. Lack of drugs results in referral to other dispensary units, possibly far away from the clinic. In actual practice, so-called free services can be quite expensive and time-consuming. Private detailers sometimes provide an easily accessible, low-cost alternative to public or private clinics (Fig. 2). The social distance between the actors is less apparent and it is easier for people to remain anonymous in cases where privacy is important. Certain illnesses, such as STIs, are connected with social stigmatisation and tend to drive people away from regular health services, to pharmacies or even to the local market [25]. This is an unfortunate development as adequate treatment of STIs demands good knowledge on the part of dispensers, so as to limit the spread of highly resistant pathogens as well as reducing the spread of HIV [10].

Antibiotic use is to a great extent influenced also by cultural preferences and beliefs. Even if the settings are dramatically different in industrialised and developing countries, the demands for antibiotics are there in both. Actual and perceived patient demands increase the prescribing of antibiotics. At the

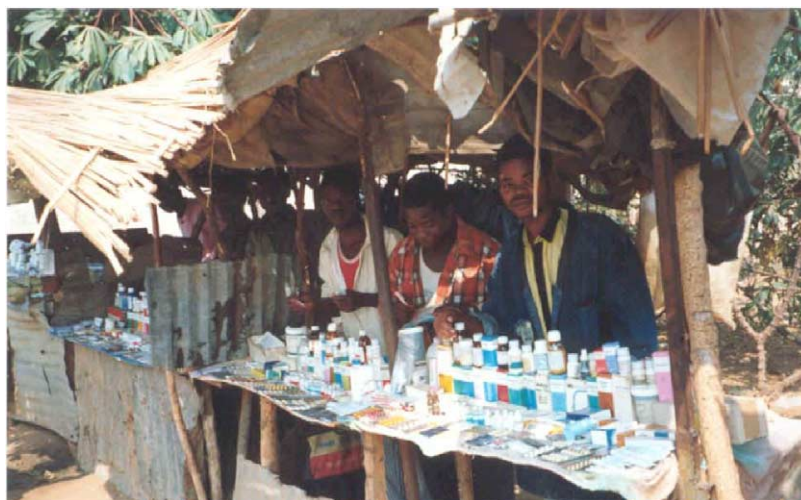


Fig. 2. Indian market place, informal drug vendors: ‘... whenever I get these symptoms and go to a doctor, he gives me the same medicine and charges me 10 rupees. So why not just buy the medicine?’ [9].

same time, patients in some situations accept prescriptions they believe unnecessary, out of politeness towards the physician. Dispensers and prescribers often belong to the same ethnic or geographical groups as their patients or customers, and to a high extent share their perceptions of health, illnesses and antibiotics [16]. In many contexts antibiotics are perceived as ‘strong medicines’, capable of curing almost any kind of disease.

Cultural reinterpretation into traditional medicine is common. Colour, shape and taste are viewed as important qualities in determining drug efficacy. Multi-coloured capsules are perceived as particularly powerful in certain cultures as different colours imply combinations of several medicines. Common for many low-income countries in Africa and Asia is the high use of injections, which are thought to be more potent than pills. Injectable antibiotics are for sale in local shops along with needles and syringes, resulting in unsafe use of high-tech medicines at household level [25]. Newer, more expensive drugs are generally considered more powerful and make people willing to buy them even if they cannot afford a full course.

#### **4. Providers in the system**

The role of the pharmacist has changed over the past two decades, especially in industrialised countries, from being a supplier of drugs to a team member involved in the provision of health care in hospitals and community pharmacies. Pharmacists bridge sectors and in many contexts function like physicians, providing advice along with medicines and taking part in the diagnostic process [3]. However, drug dispensers range from competent, qualified pharmacists to shopkeepers without any formal training, and the quality of services is therefore limited in many settings. Furthermore, antibiotics are frequently available in market places and offered to people by mobile salesmen without any training at all. In some developing countries, such as India, the presence of untrained staff in private drug stores is the norm. Consumers’ lack of knowledge of appropriate antibiotic use translates into low levels of demand on the dispensers’ professional skills, making them vulnerable to the business interests of the salesman [3,15].

Good Pharmacy Practice guidelines from WHO were published in 1996, intended to improve the drug supply, enhance the quality of advice to patients, promote rational and economic prescribing, and increase the appropriate use of medicines. However, to improve practice at private drug outlets where these qualities are frequently absent remains a major challenge. In an Indian setting over 90% of customers did not know the type of medication being prescribed and only 3.5% were aware that an antimicrobial drug was being delivered [9]. Regulatory measures and qualification demands are harder to implement in the private sector, and in many cases drug distributors are without any therapeutic guidelines and monitoring. Ignorance of existing regulatory measures is widespread and enforcement of regulations is often non-existent.

Prescribing of antibiotics is influenced by numerous factors indicating that incentives and barriers may be as important as knowledge in the use of antibiotics (Fig. 3). In practice, barriers in the general environment include financial disincentives such as lack of reimbursement and lack of liability. The prevailing opinion is influenced by opinion leaders, staff knowledge, which is often obsolete, and drug company advocacy. If public services become dependent on fee incomes from patients there may be little to distinguish them from private enterprises, operating in the interest of their owners rather than of the general public [15]. In some countries user fees are directly linked to the salaries of public health care providers, creating unsound incentives for prescribing of antibiotics and other medicines [15,24]. Potential dual roles for the physician, as doctor and dispenser, will further increase the use of costly drugs

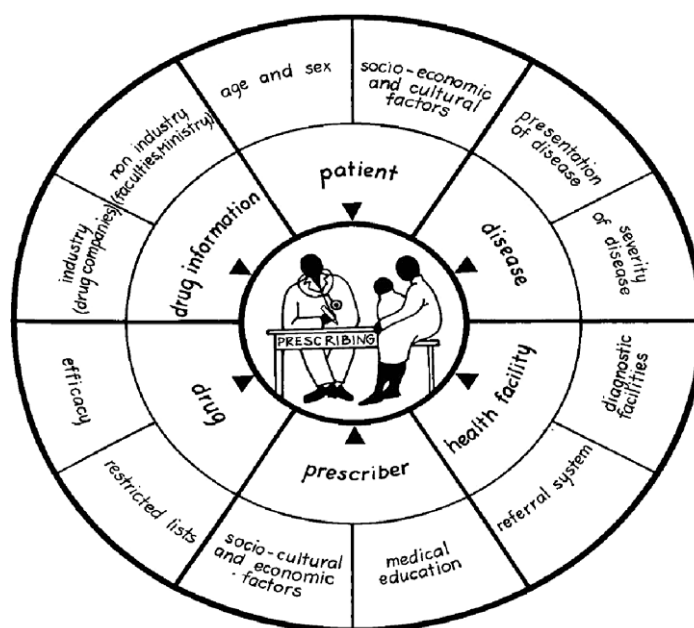


Fig. 3. The complexity of factors influencing prescribing. Source: Tomson, 1990.

and result in treatment where several antibiotics are combined. Examples from sub-Saharan Africa and China show how doctors earn their living by taking advantage of people's beliefs, giving injections with one or several antibiotics to children with common colds.

In the overlap between the public and private sectors, where physicians both work within the public health care system and give private consultations, this problem is clearly demonstrated. As physicians turn aside from their regular practice their way of prescribing antibiotics changes dramatically, in favour of more expensive products. Commitments made to the pharmaceutical industry may be one of several reasons, as companies have been known to pay commissions to prescribers who use their products.

Unfavourable doctor-patient ratios mean that doctors constantly have to deal with an overload of patients. Consequently, no time exists for proper clinical investigations and possible other diagnostics, and this time constraint promotes the use of prescriptions as a means of terminating the consultation [17,25]. These conditions limit the possibilities for rational prescribing and increase the number of drugs prescribed per patient, distorting the value of prescriptions as the correlation to diagnose is low. In a study of public health centres in Ghana the average number of drugs prescribed varied from three to nine per patient, including at least one or two antibiotics [2].

Refusal to prescribe antibiotics, even for non-bacterial diseases, would sometimes be considered highly irrational, according to local cultural criteria [17,25]. Along with the potential loss of clientele there is also the fear among prescribers that the outcome may be poor or even fatal without antibiotic treatment. In industrial countries physicians might fear legal consequences if they fail to secure adequate treatment in every situation, leading to over-prescribing to relieve the doctor of anxiety. Uncertainty in diagnostics, together with limited possibilities to follow up patients' progress, creates further concern over the outcome. This uncertainty leads to 'overkill' in treatment as the fear of not covering the bacteria causing the infection enhances the choice of an antibiotic with a broader spectrum or combinations of

several agents. The lack of diagnostic tools makes it difficult for the prescriber to have the right arguments to convince the patient and himself that antibiotics are not needed in the individual case.

## **5. Improving behaviour**

Successful attempts to rationalise antibiotic use have been carried out in The Netherlands, Australia and Sweden with national programmes focusing on good surveillance of resistance, alert responses to outbreaks, guidelines to prescribers, good pharmacy practice and methods to increase the awareness of all stakeholders. Can one generalise from such experiences? It must be said that too often there is too little information about different interventions in relation to content, context and costs, thereby making it difficult to draw conclusions. Interventions in developing countries have emphasised increased access rather than rational use. Improvements in antibiotic use have been achieved locally in different settings. But how should one proceed so as to implement evidence-based programmes in a larger context based on existing structures within the country? To bridge the gap between scientific evidence and patient care we need an in-depth understanding of the barriers to and the incentives for changing behaviour. In general, the focus has been primarily on prescribers working within public health systems, which we know represent the source of only a small proportion of the drugs delivered to patients worldwide. How do we approach the private sector where irrational use is widespread? And how can we reach individuals and influence their demand for antibiotics? When planning complex changes in practice, we need to take into account the nature of the intervention, the characteristics of the professionals and patients involved and also the social, organisational, economic and political contexts.

## **6. Influencing the professionals**

To address the growing private sector is a major challenge. In a study carried out in 68 pharmacies in Hanoi a cluster-randomised experiment consisting of a multifaceted intervention was applied [6]. Treatment of sexually transmitted infections improved tenfold. The adherence to national treatment guidelines in this field has been easier to implement as the use of a syndromic approach with a combination of several antibiotics actually increased the income for pharmacists. When the same intervention package was applied in Bangkok the improvements were less successful, showing the importance of the context when designing an intervention [4].

Attempts to rationalise prescribing practices through only the provision of correct information about antibiotics, their side effects and proper use, with the intention that prescribers and dispensers will incorporate such knowledge into their practice, have generally been a failure. Printed materials to prescribers have proven remarkably ineffective in changing behaviour. The more active approach – educational outreach with brief, targeted, face-to-face visits to clinicians by specially trained staff – has been more successful. Interactional group discussions, including both prescribers and patients, have shown highly effective in decreasing the overuse of injections in Indonesia [12]. In another study small group face-to-face method was compared with large seminars in improving the appropriate use of drugs in acute diarrhoea. Both ways were effective, and although the small group face-to-face intervention did not appear to offer greater impacts over large seminars, the training is far less costly than the seminar and it might easier be feasibly implemented in the existing supervisory structure of the health system in developing countries [18].

Clinical guidelines have been shown to have little effect on practice unless they are actively disseminated [11]. Local involvement is a way to increase the likelihood of guidelines being adopted as well as giving feedback to the prescriber. In industrialised countries, with functioning and accessible health systems, delayed prescribing techniques where parents are informed about the natural course and advised to use their prescription only if symptoms progress, has been successful in limiting antibiotic use for acute inflammation of the middle ear [14].

## **7. Reaching the consumer**

It might seem unlikely that people will be willing to restrict their individual use of antibiotics in favour of the common good, for example to prevent resistance and safeguard antibiotic treatment for future generations. At the same time the demand from the consumer may be the strongest driving force for change if the arguments for restricting the use of such drugs can be made sufficiently convincing. The perception among patients that most infections require antibiotic therapy is evidently influencing the prescribing practices of providers. This was recognised early on by observers of market forces, and direct-to-consumer marketing by the pharmaceutical industry increasingly influences patient expectations and behaviour. Subsequently, companies are marketing medicines directly to the public via television, radio, print media and the internet. To stimulate demand by playing on the consumer's relative lack of knowledge about the evidence supporting the use of one treatment over another has been shown to be highly effective. Pharmacists have frequently been able to guess the content of a particular day's television advertisements from subsequent daily customer requests for specific medications. Over 70% of the physicians in an US study reported that requests from patients as a result of direct-to-consumer advertisements had resulted in their being given prescriptions for medicines that they might not otherwise have chosen [13]. Can the same power of community members be used to turn back the trend of excessive antibiotic use? Increased knowledge among consumers of the potential future consequences of antibiotic overuse might be a counterbalancing influence and lead to initiatives on their part to restrict the use of antibiotics. Few interventions have addressed antibiotic use from the consumer's perspective. Media campaigns have been used successfully to increase consumer awareness in Australia and Sweden.

## **8. Legislation, regulations and enforcements**

Although pharmaceutical regulations represent a powerful tool, implementing these in order to influence patterns of antibiotic use could at the same time limit access to essential therapy in settings where health clinics are distant or unaffordable for most people. However, requiring a prescription from a trained health worker for access to antibiotics hopefully results in a more rational selection of drugs and treatment regimens. In Chile, ever-increasing antibiotic consumption led to a national initiative in the late 1990s where professionals, consumers and policy makers, in cooperation with the industry, gathered around the issue. Regulatory measures, requiring prescriptions for the sale of antibiotics, were followed by a substantial decrease in total antibiotic use in the country [1]. Other examples indicate less success. In all member states of the European Union (EU) antibiotics are 'prescription only' drugs, but over-the-counter sales remain common in some EU countries, reflecting a prevailing insufficiency in enforcement of existing regulations. In the South, in both low- and middle-income countries, pharmacies are often small family businesses and work on minimal profit margins, and regulations on drug distribution may

<b>Orientation</b>	1)	Promote awareness of innovation
	2)	Stimulate interest and involvement
<b>Insight</b>	3)	Create understanding
	4)	Develop insight into own routines
<b>Acceptance</b>	5)	Develop positive attitude to change
	6)	Create positive intentions/decision to change
<b>Change</b>	7)	Try out change in practice
	•	Perception of practical barriers (time, staff, money)
	•	Opportunity to try to change on small scale
	8)	Confirm value of change
	•	Whether first experiences positive or negative
•	Degree of cooperation experienced and reaction of pat. and colleagues	
•	Side effects (e.g. higher costs)	
<b>Maintenance</b>	9)	Integrate new practice into routines
	10)	Embed new practice in organization
	•	Degree of support from management

Fig. 4. A 10-step model for inducing change in professional behaviour. (Grol, Wensing, 2004.)

be overlooked as a way to achieve a reasonable income. Legislation regarding the standard of the outlets where antibiotic distribution is permitted is another critical issue, as is a minimum qualification level for the personnel running them. In these areas too, regulations often exist, but prove ineffective as enforcement is lacking.

## 9. Change

There is a need for better change models to influence consumer or professional behaviour. A 10-step model based on ‘state of change’ has been suggested for inducing change in professional behaviour. A process that begins by creating awareness, interest and understanding among professionals is much more likely to lead to acceptance and integration of the new knowledge into daily practice (Fig. 4.)

Promotion of rational use of antibiotics is still poorly integrated into health systems. To achieve long-term improvements, antibiotic use and resistance must be integrated in the curriculum of medical students, health workers and pharmacists. It is necessary not only to focus on the biomedical perspective of antibiotic resistance but also to address the behavioural aspects of prescribing and dispensing. Careful examination of the theories and practices of change is required in this process of bringing about a better use of antibiotics, and the multidisciplinary meeting at the Dag Hammarsköld Foundation, Uppsala is an important first step in this direction.

## References

- [1] L. Bavestrello and A. Cabello, Impact of regulatory measures on antibiotic sales in Chile, in: *International Conference on Improving Use of Medicines*, Abstract ID: AM003.
- [2] W.K. Bosu, Survey of antibiotic prescribing pattern in government health facilities of the Wassa west district of Ghana, *East African Medical Journal* **74** (1997), 138–142.
- [3] C. Cederlöf and G. Tomson, Private pharmacies and the health sector reform in developing countries – professional and commercial highlights, *Journal of Social and Administrative Pharmacy* **12** (1995), 101–111.
- [4] J. Chalker, S. Ratanawijitrasin, N.T. Chuc, M. Petzold and G. Tomson, Effectiveness of a multi-component intervention on dispensing practices at private pharmacies in Vietnam and Thailand – a randomised controlled trial, *Social Science and Medicines* **60**(1) (2005), 131–141.

- [5] J. Chalker, N.T.K. Chuc, T. Falkenberg, N.T. Do and G. Tomson, STD management by private pharmacies in Hanoi: practise and knowledge of drug sellers, *Sexually Transmitted Infections* **35** (2000), 299–302.
- [6] N.T.K. Chuc, M. Larsson, N.T. Do, K.V. Diwan, G. Tomson and T. Falkenberg, Improving private pharmacy practice: a multi-intervention experiment in Hanoi, Vietnam, *Journal of Clinical Epidemiology* **55**(11) (2002), 1148–1155.
- [7] N.T.K. Chuc, M. Larsson, T. Falkenberg, N.T. Do, N.T. Binh and G. Tomson, Management of childhood acute respiratory infections at private pharmacies in Vietnam, *The Annals of Pharmacotherapy* **35** (2001), 1283–1288.
- [8] Dong et al., Association between health insurance and antibiotics prescribing in four counties in rural China, *Health Policy* **48** (1999), 29–45.
- [9] Dua et al., The use of antimicrobial drugs in Nagpur, India. A window on medical care in a developing country, *Social Science and Medicine* **38** (1994), 717–724.
- [10] L. Gilson et al., Cost-effectiveness of improved treatment services for sexually transmitted diseases in preventing HIV-1 infection in Mwanza Region, Tanzania, *Lancet* **350** (1997), 1805–1809.
- [11] J.M. Grimshaw and I.T. Russell, Effect of clinical guidelines on medical practice: a systematic review of rigorous evaluations, *Lancet* **342** (1993), 1317–1322.
- [12] J.E. Hadiyono, S. Suryawati, S.S. Danu, Sunartono and B. Santoso, Interactional group discussion: results of a controlled trial using a behavioural intervention to reduce the use of injections in public health facilities, *Soc. Sci. Med.* **42** (1996), 1177–1183.
- [13] L.A. Lipsky and C.A. Taylor, The opinions and experiences of family physicians regarding direct-to-consumer advertising, *Journal of Family Practice* **45** (1997), 495–499.
- [14] Little et al., Pragmatic randomised controlled trial of two prescribing strategies for childhood acute otitis media, *BMJ* **322** (2001), 336–342.
- [15] Mills et al., What can be done about the private health sector in low-income countries?, *Bulletin of the World Health Organization* **80** (2002), 325–330.
- [16] A. Radyowijati and H. Haak, Determinants of antimicrobial use in the developing world, USAID, Bureau of Global Health, The Child Health Research Project Special Report, 2002.
- [17] L. Sachs and G. Tomson, Medicines and culture – a double perspective on drug utilisation in a developing country, *Social Science and Medicine* **34** (1992), 307–315.
- [18] B. Santoso, S. Suryawati and J.E. Prawaitasari, Small group intervention vs formal seminar for improving appropriate drug use, *Soc. Sci. Med.* **42** (1996), 1163–1168. Erratum in: *Soc. Sci. Med.* **43** (1996), I.
- [19] R. Smith, R. Beaglehole, D. Woodward and N. Drager, *Global Public Goods for Health*, Oxford University Press, 2003.
- [20] H. Standings, An overview of changing agendas in health sector reforms, *Reproductive Health Matters* **20** (2002), 19–28.
- [21] H. Standings, WHO, Health systems: improving performance, World Health Report, 2000.
- [22] S. Van der Geest and S.R. Whyte, *The Context of Medicines in Developing Countries*, Kluwer Academic Publishers, 1988.
- [23] G. Velásquez, Y. Madrid and J. Quick, *Health Reform and Drug Financing: Selected Topic-Health Economics and Drugs*, DAP Series No. 6, WHO/DAP/98.3, action programme on essential drugs, WHO, Geneva, 1998.
- [24] M. Whitehead, G. Dahlgren and T. Evans, Equity and health sector reforms: can low-income countries escape the medical poverty trap?, *Lancet* **358** (2001), 833–836.
- [25] S.R. Whyte, S. Van Der Geest and A. Hardon, *Social lives of Medicines*, Cambridge University Press, 2002.
- [26] WHO-EMRO, Agenda item 11(a): 'Antimicrobial resistance and rational use of Antimicrobial agents', WHO website: [www.int/medicines/organization/par/cd\\_25th\\_anniversary/4-rational/amr.ppt](http://www.int/medicines/organization/par/cd_25th_anniversary/4-rational/amr.ppt). Accessed 30 June 2004, 49th Session of the Regional Committee for the Eastern Mediterranean; 30 September–3 October 2002, Cairo, Egypt.
- [27] WHO, Shaping the future, World Health Report, 2003.
- [28] WHO, WHO Global strategy for containment of antimicrobial resistance, WHO/CDC/CSR/DRS/2001.2, Geneva, 2001.