



# Policy

# Brief

Improving the Prescribing  
Quality and Pattern of  
Pharmaceutical Drugs  
in Lebanon

K2P Policy Briefs bring together global research evidence, local evidence and context-specific knowledge to inform deliberations about health policies and programmes. It is prepared by synthesising and contextualizing the best available evidence about the problem and viable solutions through the involvement of content experts, policymakers and stakeholders.



# Policy Brief

+ Included



Description of a health system problem



Viable options for addressing this problem



Strategies for implementing these options

× Not Included



Does not make recommendations



**Faculty of Health Sciences**  
Knowledge to Policy | K2P | Center

**K2P Policy Brief**

# Improving the Prescribing Quality and Pattern of Pharmaceutical Drugs in Lebanon

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# Key Messages

# Key Messages

## **The problem**

The overall problem is the inappropriate prescribing of pharmaceutical drugs in Lebanon which puts patients at risk of serious adverse effects, increases drug resistance, and leads to unnecessary increased costs on patients and the community at large. The current health system arrangements do not promote rational prescribing of drugs in Lebanon.

## **What do we know about four elements of an approach to addressing the problem?**

The elements are derived from high quality evidence and best practices.

**Element 1** ▶ At the regulatory and policy level: Promote measures to support rational drug prescribing.

This element includes policies to regulate health care professionals' interactions with the pharmaceutical industry and policies to ensure the quality of drugs, including generics, available in the market.

**Element 2** ▶ At the organizational level: Implement interventions including standardized clinical guidelines/clinical pathways, systems for prescription audit and feedback, clinical pharmacy services, and antimicrobial stewardship programs to promote appropriate prescribing.

**Element 3** ▶ At the health care professional level: Promote education of health care professionals about conflict of interest, problem-based training in pharmacotherapy and academic detailing to support rational prescribing.

**Element 4** ▶ At the consumer level: Empower consumers on the proper use of medication.

## **What implementation considerations need to be kept in mind?**

The most significant barriers to implementation are likely at the organizational and professional level:

- .....> Reluctance from medical schools and teaching hospitals that rely on industry funding to support their research and educational activities.
- .....> Cost and time-constraints may hinder education and training of clinicians on appropriate prescribing.
- .....> Clinicians who believe there is little evidence of harm from interacting with pharmaceutical industry may resist restriction policies.

Strategies to overcome the barriers are proposed at each level.

# Executive Summary

# Executive Summary

## **The problem**

The overall problem is the inappropriate prescribing of pharmaceutical drugs in Lebanon which puts patients at risk of serious adverse effects, increases drug resistance, and leads to unnecessary increased costs on patients and the community at large. The current health system arrangements do not promote rational prescribing of drugs in Lebanon.

- At the **governance arrangement level**: challenges pertain to the regulation of physician-industry interactions; the implementation of clinical guidelines, clinical pharmacy services and systems for prescription audits and feedback; the integration of professional education about drug promotion and pharmacology in curricula; and the enforcement of systems for monitoring drug quality.
- At the **financial arrangement level**: Out-of-pocket payments constitute a significant proportion of spending on pharmaceuticals. Also, there are no proper incentive systems in place to encourage generic drug prescription.
- At the **delivery arrangement level**: irrational prescribing has been attributed to interactions of the pharmaceutical industry with health care professionals, weak institutional policies on conflict of interest, and poor consumer education on the proper use of medicine.

## **What do we know about four elements of an approach to addressing the problem?**

### **Element 1** ➤ **At the regulatory and policy level: Promote measures to support rational drug prescribing**

This element includes policies to regulate health care professionals' interaction with the pharmaceutical industry and policies to ensure the quality of drugs available in the market.

Table 1 **Key findings** from systematic reviews and single studies

Category of finding	Element 1
<b>Benefits</b>	<p data-bbox="443 293 1142 360"><b>Policies to regulate health care professionals' interaction with the industry</b></p> <p data-bbox="443 383 616 416"><b>Codes of ethics</b></p> <p data-bbox="443 439 1142 663">While no systematic reviews were identified on codes of ethics, several single studies found insufficient evidence on the effectiveness of codes of ethics in halting industries from engaging in unethical actions. Country experiences show that exemptions, loopholes, and enforcement remain the biggest challenges.</p> <p data-bbox="443 685 831 719"><b>Disclosure of industry interactions</b></p> <p data-bbox="443 741 1142 842">Disclosing conflict of interest (COI) is increasingly being promoted by health care accreditation programs as part of the ethical frameworks of health care organizations.</p> <p data-bbox="443 864 1142 1010">1 systematic review found that disclosing conflict of interest allows patients to make informed decisions regarding their care. It may also restrain physicians from forming financial ties as well as fortify physician-patient ties.</p> <p data-bbox="443 1032 1142 1178">2 literature reviews reported that the disclosure of conflict of interest allows consumers to determine whether the physician has any financial relationship with any industry and can be the point of inquiries regarding financial relationship.</p> <p data-bbox="443 1200 858 1234"><b>Management of industry interactions</b></p> <p data-bbox="443 1256 1142 1357">1 systematic review suggested positive effects of policies aiming to reduce the interaction between physicians and pharmaceutical companies on prescription behaviors.</p> <p data-bbox="443 1379 1142 1603">2 systematic reviews found strong associations between the presence of policies restricting industry interactions and medical students' and trainees' negative attitudes and increased skepticism towards the information provided by pharmaceutical representatives. There was evidence of lower mean contact with representatives once trainees graduated.</p> <p data-bbox="443 1671 1129 1704"><b>Policies to ensure the quality of drugs available in the market</b></p> <p data-bbox="443 1727 1142 1872">1 systematic review found positive effects of robust registration systems and WHO-prequalification of drugs in reducing the prevalence of counterfeit and substandard drugs. The review also highlighted the effectiveness of multifaceted interventions.</p> <p data-bbox="443 1895 1142 1962">1 systematic review found that the implementation of national pharmacovigilance systems can help promote drug safety and</p>

<b>Category of finding</b>	<b>Element 1</b>
	detect a host of counterfeit and substandard drugs. However, it is critical to tackle the issue of underreporting.
<b>Potential harms</b>	<p>A potential limitation of implementing complete restriction policies is the creation of an ‘information gap’.</p> <p>A variation in the disclosure process/format may “affect transparency, and hinder consumers’ ability to access, evaluate, and understand data.”</p>
<b>Cost and/ or cost effectiveness in relation to the status quo</b>	Not addressed by any of the identified systematic reviews.
<b>Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted)</b>	<p>1 systematic review pointed to limited data on the long-term effect of restrictive institutional policies on residents’ attitudes and behaviors.</p> <p>1 systematic review found limited evidence on disclosure policies in modifying the negative effects of COI. The evidence is conflicting regarding the patients trust after physician disclosed their financial relationships.</p>

**Element 2› At the organizational level: Implement interventions including standardized clinical guidelines/clinical pathways, systems for prescription audit and feedback, clinical pharmacy services, and antimicrobial stewardship programs to promote appropriate prescribing**

Compelling evidence from systematic reviews and overviews of systematic reviews demonstrate the effectiveness of each of these interventions in promoting appropriate prescribing and use of medications without any reported adverse health effects.

Table 2 **Key findings** from systematic reviews and single studies

<b>Category of finding</b>	<b>Element 2</b>
<b>Benefits</b>	<p><b>Clinical guidelines/clinical pathways</b></p> <p>2 systematic reviews and 4 high quality single studies found that the use of standard clinical guidelines/clinical pathways is an effective means to promote appropriate prescribing and decrease the use of broad-spectrum antibiotics in a variety of health care setting.</p> <p><b>Systems for prescription audit and feedback</b></p>

<b>Category of finding</b>	<b>Element 2</b>
	<p>2 systematic reviews and 1 overview of systematic reviews found audit and feedback to be highly effective in improving prescribing practices.</p> <p>One systematic review found that audit and feedback are most effective when baseline performance is low; source responsible for audit and feedback is credible; provided more than once; it is delivered verbally and in writing; and incorporates clear targets and action plan.</p> <p><b>Clinical pharmacy services</b></p> <p>2 systematic reviews and 1 overview of systematic reviews found that the addition of clinical pharmacy services in the care of inpatients promotes appropriate prescribing and use of drugs, enhances patient adherence to medication and improves patient outcomes without any adverse health effects. There is evidence of decreased hospital and pharmacy costs.</p> <p><b>Antimicrobial stewardship programs</b></p> <p>4 systematic reviews found that antimicrobial stewardship programs in inpatient and outpatient settings are associated with improved antimicrobial prescribing practices, less inappropriate use of antibiotics and lower total antimicrobial costs without negative effects on patient outcomes.</p> <p>Core elements of stewardship programs include leadership commitment, accountability, drug expertise, action (e.g. antibiotic time out after 48 hours), tracking, and education.</p>
<b>Potential harms</b>	No evidence of harm was identified with clinical pharmacy or antimicrobial stewardship programs.
<b>Cost</b> and/ or cost effectiveness in relation to the status quo	<p>1 systematic review concluded that the limited data did not permit exploring the sustainability of the effects of audit and feedback, cost effectiveness, and patient clinical outcomes.</p> <p>One systematic review of clinical pharmacy services found several studies which reported medication-cost savings.</p>
<b>Uncertainty</b> regarding benefits and potential harms (so monitoring and evaluation could be warranted)	<p>1 systematic review found that audit and feedback varied in effect, from a negative to a very large positive effect on prescribing.</p> <p>The impact of clinical pharmacy services on appropriateness of prescription for elderly patients was inconclusive.</p>

**Element 3› At the health care professional level: Promote education of health care professionals about conflict of interest, problem-based training in pharmacotherapy and academic detailing to support rational prescribing**

Educational interventions can be implemented at the undergraduate level to target students and trainees and at the post-graduate level to target practicing healthcare professionals.

Academic medical centers and teaching hospitals are increasingly recognizing the need to educate faculty, residents and medical students on how to avoid or manage conflicts of interest and interactions with pharmaceutical and medical device industry representatives. There has also been an increased realization of the need to assess undergraduate and postgraduate education in prescribing to determine whether it is attaining the goals of creating safe and rational prescribers. At the practice level, academic detailing or educational outreach visit has emerged as an attractive alternative to industry-dependent drug information.

Table 3 **Key findings** from systematic reviews and single studies

<b>Category of finding</b>	<b>Element 3</b>
<b>Benefits</b>	<p>2 systematic reviews and 1 WHO report found that education about drug promotion in the form of seminars, role playing, and simulation of a sales representative’s sales pitch can be effective in influencing physicians’ attitudes and increasing their skepticism towards industry information as well as affecting their behaviors to some extent.</p> <p>2 systematic reviews found the WHO Guide to Good Prescribing to be effective in increasing prescribing competency among medical students and general practitioners in a wide range of settings. There was evidence of a retention effect several months post intervention.</p> <p>2 Cochrane reviews and 4 overviews of systematic reviews highlighted academic detailing (or educational outreach visits) by trained health professionals, e.g. pharmacists, as one of the most effective strategies for promoting appropriate care and improving prescribing behaviors.</p>
<b>Potential harms</b>	Not addressed by any of the identified systematic reviews.
<b>Cost and/ or cost effectiveness in relation to the status quo</b>	<p>Limited data precluded exploring the cost effectiveness of educational interventions.</p> <p>1 systematic review concluded that although academic detailing is reported to be costly, savings may outweigh costs if targeted at inappropriate prescribing and effects are enduring.</p>

<b>Category of finding</b>	<b>Element 3</b>
<b>Uncertainty</b> regarding benefits and potential harms (so monitoring and evaluation could be warranted if pursued)	2 systematic reviews concluded that it is difficult to ascertain the long-term effects of educational interventions on trainee attitude and behavior due the short follow-up time of studies.  The importance of the number of educational outreach visits is not clear. Also, It is uncertain whether and how performance might deteriorate or improve over time or whether multiple visits are worth additional cost.

**Element 4) At the consumer level: Empower consumers on the proper use of medication**

Consumer education about the appropriate use of medicine influences drug prescribing, since an educated patient population will have less demand for inappropriate medicines, especially antibiotics. In addition, addressing the public or patient’s knowledge and belief on aspects of appropriate medication usage could help break the chain of misconceptions and expectations of antibiotics especially against minor illnesses.

Table 4 **Key findings** from systematic reviews and single studies

<b>Category of finding</b>	<b>Element 4</b>
<b>Benefits</b>	<p><b>Consumer-targeted interventions to improve consumer use of medication</b></p> <p>2 systematic reviews reported the use of patient information leaflets as adjuncts to professional consultation, to be effective in reducing unnecessary antibiotic prescribing and actual antibiotic use by patient. Verbal reinforcement during consultation increased effectiveness.</p> <p>1 systematic review and 2 literature reviews found that public education campaigns may be effective in improving patient education on the use of antibiotics, decreasing their expectations of medication prescription and reducing overall antibiotic use.</p> <p><b>Physician-targeted interventions to manage consumer expectations of medication prescription</b></p> <p>4 systematic reviews pointed to the effectiveness of communication skills training that focused on improving clinician elicitation of patients’ expectations, in reducing antibiotic prescribing and improving antibiotic use.</p> <p>1 Cochrane review and 4 clinical trials found evidence that shared decision-making, in which evidence is brought into the discussion with patients and their concerns and expectations explicitly sought, significantly reduces antibiotic prescribing for</p>

<b>Category of finding</b>	<b>Element 4</b>
	acute respiratory tract infections without increase in repeat consultations for same illness.
<b>Potential harms</b>	1 systematic review did not identify adverse consequences to patients as a result of efforts to reduce antimicrobial use.
<b>Cost and/ or cost effectiveness in relation to the status quo</b>	The national campaigns in France and Belgium were associated with cost savings of €850 million (2002–2007) and €70 million (2000–2006), respectively. However, the authors did not consider indirect effects of reduced prescribing.
<b>Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if pursued)</b>	There was insufficient data to assess the long-term effects of interventions that aim to facilitate shared decision making on sustained reduction in antibiotic prescribing, clinically adverse secondary outcomes or antibiotic resistance.  The public awareness campaigns were conducted in high-income countries which may affect transferability to middle-and low income countries.

### **What implementation considerations need to be kept in mind?**

Barriers to implementation are at the system, organizational, professional, and consumer/patient levels:

- .....> Weak collaborations between the different governmental bodies involved in regulation and enforcement of policies to promote rational prescribing.
- .....> Reluctance from medical schools and teaching hospitals that rely on pharmaceutical industry funding to support their research and educational activities.
- .....> Cost and time-constraints may hinder education and training of clinicians on conflict of interest (COI) and appropriate prescribing.
- .....> Medical hierarchies, limited collaboration with physicians and resource constraints may hinder the effectiveness of clinical pharmacy services.
- .....> Clinicians who believe there is little evidence of harm from interacting with pharmaceutical industry may resist restriction policies.
- .....> Patient and the general public may not be competent enough to interpret or use the COI information to correct for biases.

Strategies to overcome the barriers proposed at each level.

# Content

# K2P Policy Brief

## The Problem

The overall problem is the inappropriate prescribing of pharmaceutical drugs in Lebanon which puts patients at risk of serious adverse effects, increases drug resistance, and leads to unnecessary increased costs on patients and the community at large. The current health system arrangements do not promote rational drug prescribing in Lebanon.

## Size of the Problem

### Inappropriate prescribing quality and patterns

A number of local studies conducted in Lebanon pointed to the poor prescribing practices by physicians. One recent study collected data from 16 hospitals over a period of 3 years and concluded that antimicrobial resistance is becoming a major problem in Lebanon (Chamoun et al, 2016). The latter has been attributed to a number of factors including incorrect prescriptions, inappropriate use of antimicrobials, over-use of injections, failure to prescribe in compliance with clinical guidelines, and non-adherence to dosing regimen (MOPH & WHO, 2015). Another study found that primary health care physicians were prescribing high rates of antibiotics for pharyngitis (42% of pharyngitis cases) with a pharyngitis prevalence of only 5% to 30% in Lebanon. Also, 72% of the antibiotic prescriptions were broad spectrum antibiotics compared to a 49% rate in the USA (Abi Rizk et al., 2010). A third study revealed that 72.16% of antibiotic prescriptions did not adhere to the Infectious Diseases Society of America guidelines (commonly taught in Lebanese medical schools) (Saleh et al., 2015).

Moreover, prescription forms were found to contain various errors: for instance, 40% of all prescriptions in seven hospitals in Lebanon contained an error, of which 9% were unnecessary medication prescription, 7% were non-indicated medication, 6% had a deficiency in medication dosage, 2.8% had an inadequate rate and 3.5% had an inadequate duration (Al-Hajje, 2012).

The problem is further aggravated, as pharmacists have been dispensing medications without medical prescriptions (Farah et al., 2015).

# Background to Policy Brief

*A K2P Policy Brief brings together global research evidence, local evidence and context-specific knowledge to inform deliberations about health policies and programs. It is prepared by synthesizing and contextualizing the best available evidence about the problem and viable solutions and options through the involvement of content experts, policymakers and stakeholders.*

## The preparation of the Policy Brief involved the following steps:

- 1) *Selecting a priority topic according to K2P criteria*
- 2) *Selecting a working team who deliberates to develop an outline for the policy brief and oversee the litmus testing phase.*
- 3) *Developing and refining the outline, particularly the framing of the problem and the viable elements*
- 4) *Litmus testing by conducting one to one interviews with up to 15 selected policymakers and stakeholders to frame the problem and make sure all aspects are addressed.*
- 5) *Identifying, appraising and synthesizing relevant research evidence about the problem, elements, and implementation considerations*
- 6) *Drafting the brief in such a way as to present concisely and in accessible language the global and local research evidence.*
- 7) *Undergoing merit review*
- 8) *Finalizing the Policy Brief based on the input of merit reviewers, translating into Arabic, validating translation, and disseminating through policy dialogues and other mechanisms.*

### **Negative implications on patient care**

There is ample evidence that irrational drug use has negative implications on quality and safety of treatment. Specifically, it can lead to adverse drug reactions, increased drug resistance, and prolonged illnesses and hospitalizations, all of which contribute to excess morbidity and mortality (Patterson et al., 2014; Bbosa et al., 2014; Akl et al., 2013; O'Connor et al., 2012, Dong et al., 2011; Yang et al., 2013). Also, infections and complications caused by antibiotic-resistant organisms in Lebanon further add considerable and avoidable costs to the already overburdened Lebanese healthcare system (Chamoun et al., 2016).

### **High expenditures on pharmaceuticals**

According to the National Health Accounts published by the Ministry of Public Health (MOPH) in 2012, an estimated 33% of the total health expenditures is spent on drugs (National Health Account, 2012). The per capita pharmaceutical expenditure in Lebanon (as a percentage of GDP) is the highest in the Middle East and one of the highest globally at 3.1% (The Lebanon Brief, 2012; BMI, 2012). Moreover, 48.17% of households' annual health expenditure is spent on drugs (Ammar, 2009).

In addition, the pharmaceutical sector is dominated by imported medicines and expensive patented brands which constitute more than 80% of the total market in Lebanon (WHO, 2010). For instance, one study found that only 1.8% of prescriptions in two community pharmacies in Lebanon used generic drug names (Raad et al., 2013).

### **Underlying Factors**

At the **governance arrangement level**, challenges pertain to regulation of physician-industry interactions; implementation of clinical guidelines, clinical pharmacy services and systems for prescription audits and feedback; integration of professional education about drug promotion and pharmacology in curricula; and enforcement of national systems for monitoring of drug quality.

Until very recently, health care providers' interactions with the pharmaceutical industry was not subject to any form of regulation (Ammar, 2009; WHO, 2011). This, in turn, has created a culture of acceptance and justification for such interactions (Hajjar et al., forthcoming). This is alarming in light of the evidence from numerous systematic reviews suggesting an impact of all forms of physician-pharmaceutical industry interactions (including drug samples, office and educational gifts, meals and industry-sponsored education) on increased prescribing frequency, "non-rational" prescribing, lower prescribing quality,

Inappropriate prescribing is a manifestation of irrational use of medicine that occurs when medicines are not prescribed in accordance with guidelines and based on scientific evidence to ensure safe, effective and economic use (WHO, 2012).

and unnecessarily increased prescribing costs with negative implication on clinical decisions and quality of care (Wazana, 2000; Zipkin and Steinmen, 2005; Manchanda, 2005; Spurling et al., 2010; Brax et al., forthcoming).

On May 31, 2016, the MOPH launched a Code of Ethics for Medicinal Drug Promotion which provides guidance for health professionals on how to manage their interactions with industry and guidance for industry about how to implement their marketing practices to establish transparency and accountability in pharmaceutical promotion. While the Code of Ethics is an important stepping stone towards the regulation of the pharmaceutical industry, it may not be sufficient on its own; for instance the voluntary adoption of the Code by key stakeholders makes it critical to ensure their genuine commitment and highlights the need for stronger transparency mechanisms to support its implementation. Also, the reliance on the pharmaceutical industry to ensure the materials presented by its sales representatives are accurate and unbiased contradicts the findings from several studies which consistently found biased reporting by sales representatives, whereby risks and harmful effects of drugs were often not stated to physicians (Zetterqvist and Mulinari, 2013; Mintzes et al., 2013; Othman et al., 2010).

Within health care organizations, clinical auditing and documentation are not adequately performed with no accurate assessment of performances and processes (Jamali et al., 2010). In addition, the use of standard clinical guidelines to help prescribers make decisions about appropriate treatments is still limited in healthcare organizations (Maroun et al., 2010). Also, the integration of clinical pharmacy services is underutilized as an important component to promote medication safety.

Importantly, education about drug promotion is not part of the required curriculum at medical, nursing and pharmacy institutions. In addition, the curriculum of undergraduates mainly concentrates on diagnosis, with a very small part on clinical pharmacology. For example, a survey of graduating medical students at the American University of Beirut Faculty of Medicine (AUBFM), conducted in 2007, revealed that only 25% of graduates indicated that they were “confident enough” in the field of clinical pharmacology (Zgheib et al., 2011).

In addition, the laws and regulations pertaining to the dispensing of prescription-only medications have been poorly enforced (MOPH and WHO, 2015).

Moreover, Lebanon lacks adequate systems to monitor the quality of drugs across the formal and informal sector. For instance, it lacks a pharmacovigilance system as part of the Medicines Regulatory Authority mandate (WHO, 2012).

At the **financial arrangement level**, pharmaceuticals account for over 25% of the total healthcare expenditure in Lebanon (Blom invest bank 2016; MOPH, 2012). Furthermore, out-of-pocket payments constitute a significant proportion of spending on pharmaceuticals (Ammar, 2009). In addition, there are no proper incentive systems to encourage generic drug prescription.

Nonetheless, Lebanon is currently in a transition phase where attempts are being made to reduce the high expenditures on pharmaceuticals. For instance, the unified medical prescription was recently implemented as a policy instrument to promote generic drug use and alleviate the high cost of pharmaceuticals on households, government, and insurers. An important, albeit, indirect impact of such a policy was a sharp decrease in the prices of several originator drugs to promote competition with their generic equivalents. Nonetheless, evidence from a recent study revealed that the generic drug substitution policy is not being properly implemented, with reported poor adherence of physicians, pharmacists and patients to the policy (El-Jardali et al., forthcoming); for e.g., 84% (out of 153 sampled pharmacists) indicated that physicians are abusing the “non-substitutable” option on the unified medical prescription form and 76% indicated that consumers still show up with the old prescription form. The participants highlighted physicians’ relationship with the pharmaceutical industry as an important factor hampering proper implementation of the generic drug substitution policy (El-Jardali et al., forthcoming).

At the **delivery arrangement level**, the interaction of pharmaceutical representatives with health care providers has been reported to contribute to over-prescribing of unnecessary and expensive drugs (Hajjar et al., forthcoming). While the main purposes of such interactions are educational and marketing, one recent study conducted in Lebanon found that they are also intended to monitor the prescribing patterns of physicians, in some cases using tactics that jeopardize patients’ confidentiality. Physicians, pharmacists and pharmaceutical representatives engaged in these interactions seem to benefit from a variety of incentives, some of which are characterized as unethical. These include gold coins, car loans, unrestricted grants and special favors either through the representatives themselves or through nightclub invitations or room service during travel (Hajjar et al., forthcoming). There was also evidence of pharmaceutical companies being able to give prominence to selected physicians. Interestingly, such problematic behaviors seem more common among representatives of local pharmaceutical companies compared to international companies (Hajjar et al., forthcoming).

Furthermore, there are no policies within academic medical centers and medical/pharmacy schools to restrict or regulate the interaction of

pharmaceutical industry with physicians, trainees and students (Ammar, 2009; WHO, 2011). Moreover, disclosing industry interaction is not required as part of the ethical framework of health care organizations, the latter which is increasingly being promoted by healthcare accreditation programs (Nicklin, 2015; JCI, 2013; Grady et al., 2006).

In addition, there are limited numbers of drug inspectors, insufficient trainings on inspection and quality control, and a lack of routine good manufacturing practice (GMP) audits for local manufacturers to monitor drug quality (WHO, 2011). These, in turn, exacerbate the poor attitudes of providers, pharmacists and consumers towards generic drugs (El-Jardali et al., forthcoming).

Finally, non-biomedical aspects such as poor awareness and education of consumers about provider-industry interaction and appropriate use of medicines affect drug prescribing. For instance, a recent study conducted in Lebanon found that, although the majority of participants were aware of pharmaceutical company presence (or absence) in physicians' office, smaller percentages were aware of gift-related practices of physicians, and only 40% thought that accepting small gifts or meals is wrong/unethical (Ammous et al., forthcoming). That study highlighted the need to raise the awareness of the Lebanese population of the potentially negative impacts of physician-industry interactions on the quality and cost of their health care. Similarly, physician perceptions of patient expectation for medication has been shown to play an important role in overprescribing (Cabral et al., 2014), the latter aggravated by the oversupply of physicians in Lebanon.

# Elements

# Policy Elements and Implementation Considerations

## Element 1

*At the regulatory and policy level: Promote measures to support rational drug prescribing*

**Element 1.1.** Promote policies to regulate health care professionals' interactions with the pharmaceutical industry

Regulatory measures cover codes of ethics, disclosure of industry interactions and management of industry interactions (e.g. total ban of interactions or restriction of some interactions), respectively.

### Codes of ethics

Although no systematic reviews were identified, several primary studies found insufficient evidence on the effectiveness of codes of ethics in halting industries from engaging in unethical actions (Zetterqvist et al, 2015; Francer et al, 2014; Greenberg, 2012; Grande 2010; Carandang, 1995; Langman, 1988).

Country experiences show that exemptions, loopholes, and enforcement remain the biggest challenges (Francer et al., 2014). The implementation of the 'Australian Pharmaceutical Manufacturers Association Code of Conduct' provides useful insights to strengthen the implementation of the Lebanese Code of Ethics. Some of the key lessons learned include: the need for a co-regulatory approach whereby governments must take an active stance in regulating promotional practices where the codes appear to be failing; the involvement of an active third party operating a "watchdog" role; the active participation of health care professionals; and the implementation of appropriate sanctions to act as a barrier to inappropriate promotional practices (Roughead, 1999; WHO, 2002).

### Disclosure of industry interactions

Disclosure of relationships with industry has become increasingly common in medical schools, journals, and continuing medical educations (CME), and is now regulated by federal and state governments (Francer, 2014). One systematic review found that disclosing financial ties allows patients to make informed decisions regarding their care and may restrain physicians from

## S U M M A R Y

### Element 1

At the regulatory and policy level: Promote measures to support rational drug prescribing.

### Element 2

At the organizational level: Implement interventions including standardized clinical guidelines/clinical pathways, systems for prescription audit and feedback, clinical pharmacy services, and antimicrobial stewardship programs to promote appropriate prescribing.

### Element 3

At the professional level: Promote education of health care professionals about conflict of interest, problem-based training in pharmacotherapy, and academic detailing to support rational prescribing.

### Element 4

At the consumer level: Empower consumers on the proper use of medication.

forming financial ties. Additionally, the review showed that disclosure of physician-industry ties may fortify the physician-patient ties (Licurse et al., 2010). Two literature reviews reported that the disclosure of conflict of interest allows consumers to determine whether the physician has any financial relationship with industry and can be the point of inquiries regarding financial relationship (Kirkpatrick, Kadakia and Vargas, 2012; Greenberg, 2012).

Health care accreditation programs are increasingly promoting disclosure of interactions between physicians and the industry as part of the ethical framework of health care organizations (Nicklin, 2015; Joint Commission International, 2013; Lo and Field et al, 2009; Hampson et al., 2006; Grady et al., 2006). The current revamping of the hospital accreditation program in Lebanon presents an opportunity to incorporate disclosure of conflicts of interest as part of the ethical framework of health care organizations.

The Sunshine Act enacted in the USA in 2010 marks the first Congressional involvement in regulating the disclosure by pharmaceutical and device companies of payments made to physicians and teaching hospitals. Manufacturers must annually report on payments or transfers of values exceeding \$10 per instance or \$100 per year along with the receiver's identity and the payment purpose on a publicly accessible website (Rosenthal, & Mello, 2013). While the impact of such law has not been rigorously assessed, one literature review showed that disclosing such information online can permit easier access to significant information and reveal that those financial relationships are not concealed (Greenberg, 2012). However, variations in the disclosure process/format may “affect transparency, and hinder consumers’ ability to access, evaluate, and understand data” (Hwong, et al. 2014).

### **Management of industry interactions**

Prohibition of some types of relationships with the industry has become an increasingly common response to conflicts of interest (Lo and Field, 2009).

One systematic review suggested positive effects of policies aiming to reduce the interaction between physicians and pharmaceutical companies (by restricting free samples, promotional material, and meetings with pharmaceutical representatives) on physician prescription behaviors (Al-Khaled et al, 2014). Two systematic reviews focusing on medical trainees and students found strong associations between the presence of restrictive policies and trainees’ and students’ negative attitudes and increased skepticism towards the information given by pharmaceutical representatives. The reviews also found that restrictive policies could result in lower mean contact with pharmaceutical representatives once the trainees graduated (Carrol et al, 2007; Zipkin and Steinman 2005). However, one of the reviews pointed to the limited data on the long-term effect of restrictive policies (Carrol et al, 2007).

Many major academic medical centers have enacted policies that restrict certain types of relationships with industry or of participation by physicians in such relationships (Raad and Appelbaum, 2012; Lo and Field, 2009). For example, The Stanford University took the initiative to ban pharmaceutical sales representatives from its hospitals (Stanford University, 2006). The University of Michigan, the Memorial Sloan Kettering Cancer Center and the Brody School of Medicine at East Carolina University have banned all industry involvement (including funding) in CME with success (Spithoff, 2014).

At the national level, some US states have imposed mandatory restrictions on certain pharmaceutical marketing activities (Grande 2010). For example, Minnesota has enacted a statute that prohibits pharmaceutical manufacturers from giving gifts to physicians with a total annual combined retail value exceeding \$50 (Grande 2010).

**Element 1.2.** Promote policies to ensure the quality of drugs, including generics, available in the market

Ensuring the quality of drugs circulating the market is critical to promote their acceptance and use by healthcare providers and consumers. In fact, the percentage of drugs prescribed by generic name has been listed as one of the core indicators of rational prescribing by the WHO (WHO, 1993; 2004).

One systematic review found positive effects of regulatory measures such as robust drug registration systems and WHO-prequalification of drugs in reducing the prevalence of counterfeit and substandard drugs. The review also found that multifaceted interventions which included a mix of regulations, training of inspectors, public-private collaborations and legal actions against counterfeiters were effective in decreasing the prevalence of counterfeit and substandard drugs (El-Jardali et al., 2015).

Another systematic review found that the implementation of national pharmacovigilance systems can help promote drug safety and detect a host of counterfeited and substandard drugs at the national level (Fadlallah et al., 2016). To enhance the success of pharmacovigilance systems, it is critical to tackle the issue of underreporting, ensure ongoing training, monitoring and feedback, strengthen the legal framework and structures for pharmacovigilance activities and improve the coordination of stakeholders countrywide (Fadlallah et al., 2016).

Table 1 **Key findings** from systematic reviews and single studies

Category of finding	Element 1
<b>Benefits</b>	<p data-bbox="464 293 1043 367"><b>1.1 Policies to regulate health care professionals' interactions with the industry</b></p> <p data-bbox="464 389 868 418"><b>Disclosure of industry interactions</b></p> <p data-bbox="464 445 1139 636">1 systematic review showed that disclosing financial ties with the industry allows patients to make informed decisions regarding their care and may restrain physicians from forming financial ties. Additionally, such disclosure may fortify the physician-patient ties (Licurse et al., 2010).</p> <p data-bbox="464 660 1134 927">1 literature review reported that disclosure of COI allows consumers to determine whether the physician has any financial relationship with any industry. The review claims that the main argument for disclosure is that it allows the patients to decide for themselves if the conflict of interest would in fact effect the recommendations provided by the physician (Kirkpatrick, Kadakia and Vargas, 2012).</p> <p data-bbox="464 952 1150 1182">1 literature review reported that financial disclosure can be the point of inquiries regarding financial relationship. Moreover publishing this information online can allow easier access to significant information and reveal that those financial relationships are not concealed (Greenberg, 2012).</p> <p data-bbox="464 1207 895 1236"><b>Management of industry interactions</b></p> <p data-bbox="464 1263 1134 1494">1 systematic review suggested a positive effect of policies aiming to reduce the interaction between physicians and pharmaceutical companies (by restricting free samples, promotional material, and meetings with pharmaceutical company representatives) on prescription behavior (Al-Khaled et al., 2014).</p> <p data-bbox="464 1518 1161 1823">2 systematic reviews found strong associations between the presence of policies restricting industry interactions and trainees' and students' negative attitudes and increased skepticism towards the information provided by sales representatives (Carrol et al., 2007; Zipkin and Steinman 2005). They also found that restrictive policies could result in lower mean contact with representatives once they graduated.</p> <p data-bbox="464 1906 1139 1973"><b>1.2 Policies to ensure the quality of drugs available in the market</b></p>

<b>Category of finding</b>	<b>Element 1</b>
	<p>1 systematic review found positive effects of robust drug registration systems (complemented by post-market surveillance) and WHO-prequalification of drugs in reducing the prevalence of counterfeit and substandard drugs. The review also highlighted the effectiveness of multifaceted interventions which included a mix of regulations, training of inspectors, public-private collaborations and legal actions against counterfeiters (El-Jardali et al., 2015).</p> <p>The effectiveness of drug regulatory measures can be enhanced by minimizing drug diversion; strengthening communication between manufacturers, providers and regulatory authorities; ensuring feedback on drug quality complaints post-registration, and promoting unambiguity and strict criteria for licensing wholesalers (Fadlallah et al., 2016).</p> <p>1 systematic review found that the implementation of national pharmacovigilance systems can help promote drug safety and detect a host of counterfeited and substandard drugs. However, it is critical to tackle the issue of underreporting (Fadlallah et al., 2016).</p>
<b>Potential harms</b>	<p>A potential limitation of implementing complete restriction policies is the creation of an ‘information gap’ (Al-Khaled et al., 2014).</p> <p>Disclosure may provide implicit permission or “moral licensing” for COI, as long as it is disclosed.</p> <p>Variations in the disclosure process/format may “affect transparency, and hinder consumers’ ability to access, evaluate, and understand data” (Hwong, et al. 2014).</p>
<b>Cost and/ or cost effectiveness in relation to the status quo</b>	<p>Not addressed by any of the identified systematic reviews.</p>
<b>Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the approach element were pursued)</b>	<p>1 systematic review pointed to limited data on the long-term effect of restrictive institutional policies on residents’ attitudes and behaviors (Carrol et al., 2007).</p> <p>1 systematic review found limited evidence on disclosure policies in modifying the negative effects of COI. The evidence was also conflicting regarding patients’ trust after physician disclosed their financial relationships (Barry et al., 2013).</p>

## **Element 2**

*At the organizational level: Implement interventions including standardized clinical guidelines/clinical pathways, systems for prescription audit and feedback, clinical pharmacy services and antimicrobial stewardship programs to promote appropriate prescribing*

### **Clinical guidelines/clinical pathways**

The availability of clinical guidelines has been identified by the WHO as a core facility indicator of rational drug use (WHO, 1993; 2004).

An overview of 50 intervention studies to improve drug use in developing countries revealed that the use of standard treatment guidelines dropped unnecessary 'Quinine' use in Kenya, decreased antibiotic use by 50% in Fiji, and showed short-term improvements for diarrhea treatment in Indonesia and Kenya (Le Grand, Hogerzeil and Haaijer-Ruskamp, 1999). Another systematic review of 59 studies reported significant improvements in the process and outcome of care after the introduction of guidelines. In one of the studies, abidance by antibiotic restriction guidelines reduced the prescription of antibiotic injections by 60% (Grimshaw and Russell, 1993). The guidelines were most effective when disseminated through specific educational intervention and involved patient-specific reminders at time of consultations.

Clinical pathways complement local treatment guidelines, often taking into account diagnostic algorithms and risk scores. Several high quality single studies highlighted the effectiveness of clinical pathways in reducing antibiotic prescriptions for acute respiratory infections and use of broad-spectrum antibiotics over the first year. However the impact over a longer study period is warranted (Jenkins et al., 2013; Chalmers et al., 2011; Lancaster et al., 2008; Marrie et al., 2000).

### **Systems for prescription audit and feedback**

Prescription audit and feedback consists of analyzing prescription appropriateness and then giving feedback. Prescribers may be told how their prescribing compares with professional standards or targets. In hospitals, such audit and feedback is known as drug use evaluation.

An overview of systematic reviews found audit and feedback to be consistently effective, with 12 of 14 systematic reviews supporting the impact of those interventions on improving prescribing practices (Grindrod et al., 2006). Three additional systematic reviews found that audit and feedback were

among the most effective in improving prescribing practices (Ostini et al., 2009; Jamtvedt et al., 2006; Davey et al., 2005). One systematic review found that audit and feedback may be most effective when the baseline performance is low; the source responsible for the audit and feedback is a supervisor or colleague or a respected opinion leader; it is provided more than once; it is delivered both verbally and in writing; and it incorporates clear targets and an action plan (Ivers et al., 2012).

### **Clinical pharmacy services**

Clinical pharmacy services are well established in both developed and developing countries (Pande et al., 2013; Pedersen et al., 2011; Musing 2013). In China, clinical pharmacy services have become mandatory in all secondary and tertiary hospitals (Ryan et al., 2008).

An overview of systematic reviews (not focused on elderly patients) found positive results of clinical pharmacy services in improving medication appropriateness. Specifically, services such as medication review, medication follow-up and patient education showed a positive impact on improving prescribing practices, optimizing antimicrobial prescriptions, reducing the number of prescribed medications, improving medication use in children, enhancing patient safety and patient satisfaction, as well as promoting cost avoidance (Rotta et al., 2015). The evidence was mixed for systematic reviews focusing on elderly patients.

Two additional systematic reviews found that the addition of clinical pharmacist services in the care of inpatients improved appropriate prescribing and use of medication as well as improved patient adherence to medication and patient outcomes without any adverse effects (Penm et al., 2014; Kaboli et al., 2006). One of the reviews also reported decreased hospital and pharmacy costs.

### **Antimicrobial/antibiotic stewardship programs**

In 2014, the Centers for Disease Control and Prevention (CDC) recommended that all acute care hospitals implement Antibiotic Stewardship Programs (CDC, 2014).

Four systematic reviews found low to moderate quality evidence suggesting that antimicrobial stewardship programs (in both inpatient and outpatient settings) are associated with improved antimicrobial prescribing practices, less inappropriate use of antibiotics and lower total antimicrobial costs without negative effects on patient outcomes. Core elements of stewardship programs included leadership commitment, accountability, drug expertise, action (e.g. formulary/restriction, antibiotic time out after 48 hours), tracking, and education (Drekonja et al., 2015; Filice et al., 2013; Wagner, 2014; Kaki et al., 2011).

Table 2 **Key findings** from systematic reviews and single studies

Category of finding	Element 2
<b>Benefits</b>	<p data-bbox="432 331 868 358"><b>Clinical guidelines/clinical pathways</b></p> <p data-bbox="432 414 1227 640">An overview of 50 intervention studies to improve drug use in developing countries revealed that the use of standard treatment guidelines dropped unnecessary ‘Quinine’ use in Kenya, decreased antibiotic use by 50% in Fiji, and showed short term improvements for diarrhea treatment in Indonesia and Kenya (Le Grand, Hogerzeil and Haaijer-Ruskamp, 1999).</p> <p data-bbox="432 667 1227 853">A systematic review of 59 studies reported significant improvements in the process and outcome of care after the introduction of guidelines. In one of the studies, abidance by antibiotic restriction guidelines reduced the prescription of antibiotic injections by 60% (Grimshaw and Russell, 1993).</p> <p data-bbox="432 880 1227 1106">Several high quality single studies highlighted the effectiveness of clinical pathways in reducing antibiotic prescriptions for acute respiratory infections and use of broad-spectrum antibiotics over the first year. However the impact over a longer study period is warranted (Jenkins et al., 2013; Chalmers et al., 2011; Lancaster et al., 2008; Marrie et al., 200o).</p> <p data-bbox="432 1133 807 1160"><b>Prescription audit and feedback</b></p> <p data-bbox="432 1189 1227 1339">An overview of systematic reviews found audit and feedback to be consistently effective, with 12 of 14 systematic reviews supporting the impact of those interventions in improving prescribing practices (Grindrod et al., 2006).</p> <p data-bbox="432 1366 1227 1473">4 systematic reviews found that audit and feedback were among the most effective in improving prescribing practices (Ivers et al., 2013; Ostini et al., 2009; Jamtvedt et al., 2006; Davey et al., 2005).</p> <p data-bbox="432 1500 746 1527"><b>Clinical pharmacy services</b></p> <p data-bbox="432 1556 1227 1823">An overview of 9 systematic reviews focusing on non-elderly patients found positive effects of clinical pharmacy services (such as medication review, medication follow-up, and patient education) in improving prescribing practices, optimizing antimicrobial prescriptions, reducing number of prescribed medications, enhancing patient safety and satisfaction and promoting cost avoidance (Rotta et al., 2015).</p> <p data-bbox="432 1850 1227 1993">2 systematic reviews found that the addition of clinical pharmacy services in the care of inpatients improved appropriate prescribing and use of medication as well as improved patient adherence to medication and patient outcomes without any adverse effects. One</p>

<b>Category of finding</b>	<b>Element 2</b>
	<p>of the reviews also reported decreased hospital and pharmacy costs (Penm et al., 2014; Kaboli et al., 2006).</p> <p><b>Antimicrobial/antibiotic stewardship programs</b></p> <p>4 systematic reviews found that antimicrobial stewardship programs in inpatient, outpatient and critical care setting are associated with improved antimicrobial prescribing practices, less inappropriate use of antibiotics, and lower total antimicrobial costs without negative effects on patient outcomes such as mortality, length of hospital stay, Clostridium difficile Infection, and readmissions (Drekonja et al., 2015; Filice et al., 2013; Wagner, 2014; Kaki et al., 2011).</p> <p>Components of effective antimicrobial stewardship included consistent and persistent effort from qualified personnel, effective communication skills, and support from electronic medical records or computerized decision support (Filice et al., 2013).</p>
<b>Potential harms</b>	No evidence of harm was identified with clinical pharmacy or antimicrobial stewardship programs (Filice et al., 2013; Kaboli, 2006).
<b>Cost</b> and/ or cost effectiveness in relation to the status quo	<p>1 systematic review concluded that the limited data did not permit exploring sustainability of the effects of audit and feedback, cost effectiveness, and patient clinical outcomes (Grindrod et al., 2006).</p> <p>A systematic review of clinical pharmacy services identified 2 studies which reported reduced hospital and pharmacy costs; 1 which showed a significant decrease in total average care costs and a non-significant decrease in drug costs; 3 which reported antibiotic cost-savings associated with clinical pharmacists; and 1 which showed no difference in medication costs (Kaboli et al., 2006).</p>
<b>Uncertainty</b> regarding benefits and potential harms (so monitoring and evaluation could be warranted if the approach element were pursued)	<p>1 systematic review found that audit and feedback varied in effect, from a negative to a very large positive effect on prescribing (Jamtvedt et al., 2006).</p> <p>The impact of clinical pharmacy services on appropriateness of prescription for elderly patients was inconclusive (Rotta et al., 2015).</p>

### **Element 3**

*At the health care professional level: Promote education of health care professionals about conflict of interest, problem-based training in pharmacotherapy, and academic detailing to support rational prescribing*

Academic medical centers and teaching hospitals are increasingly recognizing the need to educate faculty, residents and medical students on how to avoid or manage conflicts of interest and interactions with pharmaceutical and medical device industry representatives. This is paralleled by an increasing call for accrediting organizations to develop standards that require formal education on these topics (Lo and Field, 2009). A global WHO survey of 137 medical school and 91 pharmacy schools found that nearly three-quarters of respondents reported that education about drug promotion is part of the required curriculum at their institution, and over half reported more than one type of course on promotion (WHO, 2005).

Two systematic reviews and one WHO report found that education about drug promotion in the form of seminars, role-playing, simulation of a sales representative's sales pitch, and evaluations of presentations by sales representatives can be effective in influencing physicians' attitudes, increasing their skepticism towards information provided by industry, and improving their skills in detecting biases (Carrol et al., 2007; Zipkin and Steinman, 2005; Norris et al., 2005). One of the reviews also found that these interventions affect trainees' behaviors to some extent.

The WHO Guide to Good Prescribing describes the problem-based approach which is widely used in medical education to teach rationale prescribing to physicians (Scordo, 2014). Two systematic reviews found evidence on the effectiveness of the WHO Guide to Good Prescribing in increasing prescribing competency among medical students and practitioners in a wide variety of settings including Turkey and Yemen (Kamarudin et al., 2013; Ross and Loke 2009). There was also evidence of a retention effect several months post intervention (Kamarudin et al., 2013; Ross and Loke 2009). The WHO Guide to Good Prescribing provides a six-step guide to choose, prescribe and monitor a suitable medicine for an individual patient (Ross and loke, 2009).

At the practice level, academic detailing (or educational outreach visits) has emerged as an attractive alternative to industry-dependent drug information. Academic detailing is a form of continuous medical education in which a trained health care professional (e.g. a pharmacist) visits physicians in

their offices to provide evidence-based information on a selected topic (Chhina et al., 2013). Three systematic reviews (Kamarudin et al., 2013; Nkansah, 2010; Obriene 2007) and four overviews of systematic reviews (Ostini et al., 2009; Grimshaw, 2001; Bloom 2005; Sohn 2004) highlighted academic detailing as one of the most effective strategies to improve appropriate care and prescribing behaviors.

Some states in the USA and Canada have established nationally-funded academic detailing programs that draw on the same sales tactics utilized by the pharmaceutical industry to influence physician prescribing according to evidence-based guidelines (The Hilltop Institute, 2009).

**Table 3 Key findings** from systematic reviews and primary studies

<b>Category of finding</b>	<b>Element 3</b>
<b>Benefits</b>	<p>2 systematic reviews and one WHO report found that education about drug promotion in the form of seminars, role-playing, simulation of a sales representative’s sales pitch, and evaluations of presentations by sales representatives can be effective in influencing physicians’ attitudes, increasing their skepticism towards information provided by industry, and improving their skills in detecting biases (Carrol et al., 2007; Zipkin and Steinman, 2005; Norris et al., 2005). One of the reviews also found that these interventions affect trainees’ behaviors to some extent.</p> <p>2 systematic reviews found evidence on the effectiveness of the WHO Guide to Good Prescribing in increasing prescribing competency among medical students and general practitioners in a wide variety of settings including countries like Turkey and Yemen. There was also evidence of a retention effect several months post intervention and evidence that the students were able to perform better in applying correct prescribing principles when faced with case scenarios assessing a different disease topic (Kamarudin et al., 2013; Ross and Loke 2009).</p> <p>Problem-based training in pharmacotherapy in undergraduate curricula is more successful if it is problem-based, takes into account students’ knowledge, attitudes and skills, and targets the students’ future prescribing requirements (WHO, 2002).</p> <p>2 Cochrane systematic reviews and 4 overviews of systematic reviews highlighted academic detailing or educational outreach visits by trained health care professionals as one of the most effective strategies for improving appropriate care and prescribing behaviors</p>

<b>Category of finding</b>	<b>Element 3</b>
	<p>(Obriene, 2007; Nkansah et al., 2010 Ostini et al., 2009; Bloom 2005; Sohn 2004; Grimshaw, 2001).</p> <p>1 systematic reviews highlighted the effective role of pharmacists in educational outreach visit (Grindrod, 2006).</p>
<b>Potential harms</b>	Not addressed by any of the identified systematic review
<b>Cost</b> and/ or cost effectiveness in relation to the status quo	<p>Limited data precluded exploration of the cost effectiveness of educational interventions (Grindrod et al., 2006).</p> <p>1 systematic review concluded that although academic detailing is reported to be costly, savings may outweigh costs if targeted at inappropriate prescribing and the effects are enduring (O'Brien et al., 2007).</p> <p>1 primary study reported that academic detailing intervention was cost-effective, with a savings of \$478 (USD) per physician over seven months after considering the salary of the pharmacist visitor (Steele, 1989).</p>
<b>Uncertainty</b> regarding benefits and potential harms (so monitoring and evaluation could be warranted if the approach element were pursued)	<p>2 systematic reviews concluded that it is difficult to ascertain the long-term effects of educational interventions on trainee attitude and behavior due the short follow-up time (Carrol et al., 2007; Zipkin and Steinman 2005).</p> <p>Little consideration seems to have been made on the relative importance of each of the WHO guide principles as an assessment criterion. Also, one study pointed to potential conflict of interest as the author of the WHO guide was an author in five of the six trials reported (Ross and Iloje, 2009).</p> <p>The importance of the number of educational outreach visits is not clear. Also, It is uncertain whether and how performance might deteriorate or improve over time or whether multiple visits are worth additional cost (Obrien et al., 2007).</p>

#### **Element 4**

*At the consumer level: Empower consumers on the proper use of medication*

#### **Consumer-targeted interventions to improve consumer use of medication**

The first step to involve patients is through education aimed at enhancing patients' drug literacy. Four systematic reviews found that well-

designed written information (such as leaflets) are useful adjuncts to professional consultation and can improve health knowledge and recall of patients ((Eefje and de Bont, 2015; Andrews et al., 2012; Bes et al., 2011; Johansson et al., 2005). Two of the reviews focused on patient information leaflets to ‘adjust the widespread beliefs of patients or parents that antibiotics are a solution for all infections’, and found them to be effective in reducing unnecessary antibiotic prescription, actual antibiotic use by patients, and intention to re-consult for future similar episodes of illness. The usage of plain language reinforced with pictorial representations as well as verbally during consultation increased the utilization of the educational material (Eefje and de Bont, 2015; Andrews et al., 2012).

One systematic review and two literature reviews analyzed over 20 national public campaigns to promote appropriate use of antibiotics. The evidence suggested that public campaigns may be effective in improving patient education on the use of antibiotics, decreasing their expectations of medication and reducing overall antibiotic use (McDonagh et al., 2016; Filippini et al., 2013; Huttner et al., 2010).

**Physician-targeted interventions to manage consumer expectations of medication prescription**

Physician-targeted interventions designed to elicit consumers’ expectations of medication prescription and increase their participation in treatment decisions have been shown to be effective. Four systematic review pointed to the effectiveness of communication skills training that focused on improving clinician elicitation of parents’ or patients’ concerns and expectations, in reducing antibiotic prescribing and improving antibiotic use (Cabral et al., 2014; van der Velden et al., 2012; Stevenson et al., 2004; Cox et al., 2004 ). One Cochrane review and four clinical trials found that shared decision making, in which evidence is brought into the discussion with patients and their concerns and expectations explicitly sought, significantly reduced antibiotic prescribing for acute respiratory tract infections without any reported increase in repeat consultations for the same illness (Coxeter et al., 2015 Legare et al., 2012; Butler et al., 2012; Little et al., 2013; Cals et al., 2013).

Table 4 **Key findings** from systematic reviews and single studies

<b>Category of finding</b>	<b>Element 4</b>
<b>Benefits</b>	<b>Consumer-targeted interventions to improve consumer use of medication</b>
	2 systematic reviews found that the use of well-designed written information (such as leaflets) is a useful adjunct to professional consultation and can improve health

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knowledge and recall of patients (Bes et al., 2011; Johansson et al., 2005).

2 systematic reviews focused on the use of patient information leaflets to ‘adjust the widespread beliefs of patients or parents that antibiotics are a solution for all infections’, and found that these were effective in reducing unnecessary antibiotic prescription and actual antibiotic use by patients and their intention to re-consult for future similar episodes of illness. Verbal re-enforcement during consultation increased utilization (Eefje and de Bont, 2015; Andrews et al., 2012).

1 systematic review and 2 literature reviews highlighted the effectiveness of public education campaigns in improving patient education on the use of antibiotics, decreasing their expectations of medication and reducing overall antibiotic use (McDonagh et al., 2016; Filippini et al., 2013; Huttner et al., 2010). The systematic review found that public education campaigns were more effective when combined with clinician education (McDonagh et al., 2016).

**Physician-targeted interventions to manage consumer expectations of medication prescription**

4 systematic reviews pointed to the effectiveness of communication skills training that focused on improving clinician elicitation of parents’ or patients’ concerns and expectations, in reducing antibiotic prescribing and improving antibiotic use (Cabral et al., 2014; van der Velden et al., 2012; Stevenson et al., 2004; Cox et al., 2004).

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<b>Potential harms</b>	1 systematic review did not identify adverse consequences to patients as a result of efforts to reduce antimicrobial use (Ranji et al., 2008).
<b>Cost and/ or cost effectiveness in relation to the status quo</b>	1 systematic review reported that broad-based interventions extrapolated to larger community-level, impacts on total antibiotic use, with savings of 17–117 prescriptions per 1000 person-years (Ranji et al., 2008).

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The national campaigns in France and Belgium were associated with cost savings of €850 million (years 2002–2007) and €70 million (years 2000–2006), respectively (Huttner et al., 2010). However, authors did not consider the indirect effects of reduced prescribing.

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<b>Uncertainty</b> regarding benefits and potential harms (so monitoring and evaluation could be warranted if the approach element were pursued)	<p>There was insufficient data to assess the long-term effects of interventions that aim to facilitate shared decision making on sustained reduction in antibiotic prescribing, clinically adverse secondary outcomes (such as hospital admission, incidence of pneumonia) or antibiotic resistance (Coxeter et al., 2015).</p> <p>The public awareness campaigns were conducted in high-income countries which may affect their transferability to middle-and low income countries. (Huttner et al., 2010).</p>
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### Implementation considerations

Barriers to implementation are at the consumer/patient, professional, organizational and system levels. Counterstrategies are proposed at each level.

Level	Barriers	Counterstrategies
<b>Consumer/ Patient</b>	Recipients may not be competent enough to interpret the conflict of interest (COI) information displayed, or use disclosure information to correct for bias (Licurse et al., 2010; Grande et al., 2010).	Ensure data is presented in a searchable and understandable format (Perry 2014). The active use of disclosure data by expert intermediaries such as health insurers and media could make a big difference in doing what patients could not or are not willing to do and raising the stakes for healthcare professionals (Cain et al 2005).
	Patient refusal to be involved in shared decision-making due to their low health literacy rate and lack of encouragement by healthcare workers (Davis et al., 2011; Wallace & Sembi, 2008; Marella et al., 2007; Waterman et al., 2006).	Launch campaigns such as the National Health Services “it’s ok to ask” campaigns to encourage patient involvement in care (National Institute for Health Research, 2015).

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<b>Level</b>	<b>Barriers</b>	<b>Counterstrategies</b>
<b>Professional</b>	Physicians who believe there is little evidence of harm from interacting with pharmaceutical industry may resist restriction policies (Raad and Appelbaum, 2012).	Educating providers about the effects of relationship with industry has been shown to modify their attitudes and, in some instances, behaviors (Yeh et al., 2014; Agrawal et al., 2004).  Assign physicians who are concerned about industry COI to serve in a leadership capacity to promote the implementation of regulatory policies (Brennan et al., 2006; Angell, 2004).
	Changing clinicians' prescribing behavior is a complex matter (Ostini et al, 2009).	Systematic reviews have found that successful interventions are most likely to be multifaceted, based on an assessment of barriers to change, responsive to local circumstances, focused, incorporate an active education component including skills development and resonate with clinicians' values (Johnson and May 2015; Ostini et al., 2009)
	Resistance of providers to adopt guidelines due to lack of agreement with recommendations, lack of time, knowledge and financial incentives as well as a reluctance to change practice (Brusamento et al., 2012).	Reduce complexity of guideline recommendations; ensure robust and active dissemination strategies that target physician attitudes; and promote interactive educational meeting including reminders (Spallek et al., 2010; Brusamento et al., 2012).
<b>Organizational</b>	Reluctance from medical schools and teaching hospitals that rely on pharmaceutical industry funding to support their research and educational activities (Studdert et al., 2004).	Instill professional ethics and strong professional norms to respond to complex and changing relationships and promote a stronger ethical foundation to enhance social trust. Practices achieving a level of compliance could receive special professional recognition

<b>Level</b>	<b>Barriers</b>	<b>Counterstrategies</b>
		that would be on public display (Grande, 2010).
	Medical hierarchies, limited collaboration with physicians and resource constraints may hinder the effectiveness of clinical pharmacy services (Broom et al., 2015).	Reposition pharmacy contributions in positive inter-professional terms (Broom et al., 2015).
	Cost and time-constraints may hinder education and training of health care professionals (Boivin et al., 2014; Domecq et al., 2014; Aggarwal et al., 2010; Wachter, 2010).	Allocate specific funds for trainings and staffing (Wachter, 2010; Devers et al., 2004). Organizations that accredit medical schools and residency programs to develop standards to reinforce education on COI and appropriate prescribing (Lo & field, 2009).
	Institutional commitment to promote appropriate prescribing and use of medication.	Adopt interventions like The UK Start Smart Then Focus campaign which aims to achieve optimum antimicrobial stewardship (Mendelson et al., 2016).
<b>System</b>	Administrative and enforcement burdens (Francers et al., 2014; Raad et al., 2012).	Strengthen regulation through an active third party who operate a "watchdog" role (WHO, 1993; 2004).
	Weak collaborations between the different governmental bodies involved in regulation and enforcement of policies to promote rational drug use (Twitchell et al., 2007; Martín-Rodríguez et al., 2005).	Ensure the presence of strong leadership; a willingness to collaborate; a common goal; trust in each other; mutual respect; communication; capacities and incentives (Martín -Rodríguez et al., 2005).

# Next Steps

## Next Steps

The aim of this policy brief is to foster dialogue informed by the best available evidence. The intention is not to advocate specific policy options/elements or close off discussion. Further actions will flow from the deliberations that the policy brief is intended to inform. These may include:

- Deliberation amongst policymakers and stakeholders regarding the policy elements described in this policy brief.
- Refining elements, for example by incorporating, removing or modifying some components

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