

JPHSR 2010, 1: 1–6
 © 2010 The Authors
 Received July 3, 2009
 Accepted September 1, 2009
 DOI 10.1211/jphsr/01.01.00xx
 ISSN 1759-8885

It's time children learned about medicines

Patricia J. Bush^a and Natalia Cebotarenco^b

^aGeorgetown University School of Medicine, Naples, FL, USA and ^bCoalition on Safe and Rational Use of Medicines, Chisinau, Moldova

Abstract

Objective Consensus exists among respected institutions and national and international organizations that the time has come for all the world's children to be taught about medicines. Studies in many countries and cultures have shown that children's knowledge of medicines is poor despite their levels of autonomy in using medicines. Children want to learn more about medicines and their parents want their children to be taught about them.

Method A review of the literature on medicines education programs and research.

Key findings It has been demonstrated that children can be conduits of information about medicines to their families and communities.

Conclusion As children in different cultures are similar in what they know, do and want to know about medicines, a universal curriculum could be readily adapted to local situations. The few innovative school-based programs, especially those in Moldova, which address the global problem of antimicrobial resistance and appear to be cost-effective, could and should be extended to other countries. In addition, information about the freely available internet-based Finnish curriculum should be widely disseminated.

Keywords antimicrobial resistance; children; health education; medicines

Introduction

Appropriate use of medicines is an important life skill that should be acquired before an individual has responsibility for using or buying medicines, or for giving them to others. Currently, children and adolescents have few opportunities to learn how to use medicines appropriately, although use of medicines is a common everyday activity throughout the world. After hygiene, it is perhaps the most common health-related activity over which individuals have control. This reason alone argues for educating children before they have any independence in using medicines.

However, there are many other reasons. Indeed, the rationale for educating children about medicines has been well established during the past 20 years and there is now considerable consensus from respected national and international organizations and institutions that the time has come for all the world's children to be taught about medicines. An underlying premise, recognising that most adults lack the medicine-use skills they should have, is that educating children about medicines is crucial if we want to involve a new generation of consumers in making appropriate decisions concerning their medicines.

This approach is consistent with the World Health Organization's (WHO's) global efforts to fight antimicrobial resistance (AMR). WHO Resolution 58.27 is "Wishing to intensify efforts to contain antimicrobial resistance and to promote rational use of antimicrobial agents by providers and consumers in order to improve global health security." In addition, a recommendation from the 2004 Second International Conference on Improving Use of Medicines (ICIUM) in Thailand was supported by the WHO: "...children can be effective change agents in improving community medicine use. Countries should consider school-based educational programs that involve children as a way for key messages to reach parents."

Advocates

To our knowledge, the first organization to advocate educating children about medicines was the US Pharmacopeial Convention (USP). Stimulated by interviews with school-children about what they knew and did relative to medicines, in 1996 the USP convened the

Correspondence: Patricia J. Bush,
 Georgetown University School of
 Medicine, 6825 Grenadier Blvd,
 #1405, Naples, FL 34108, USA.
 E-mail: PJBushWork@comcast.net

multidisciplinary Ad Hoc Advisory Panel on Children and Medicines to determine what children should know and how they should learn about medicines. This panel promoted further research to learn what children themselves wanted to know about medicines.^[1] Subsequently, the USP sponsored an open conference: Children and Medicines: Information Isn't Just for Grownups.^[2] Recommendations emanating from this conference led the Advisory Panel to conclude that children and adolescents were not receiving the information about medicines that they wanted, needed and deserved.

This medicine information gap led USP to develop a position statement, the ten guiding principles for teaching children and adolescents about medicines^[3] (Table 1). This position statement was also adopted by the American Academy of Pediatrics. In addition to the ten guiding principles, the USP produced a *Guide to Developing and Evaluating Medicine Education Programs and Materials for Children and Adolescents*,^[4] also published by the American School Health Association, which contains recommended medicine-related behaviour competencies for children by their ages (from 3 to 12 years). These competencies are based on health professionals' opinions and what research had shown that children of different ages know, do and want to know about medicines.

Presentations by USP staff on children and medicines at the international conference 'Modern Aspects of Professional Drug Information', held on 22–24 June 1999 in Chisinau, Moldova, revealed the strong interest of doctors and pharmacists.^[5] Conference participants ranked the Children and Medicines Workshop as more useful and interesting than any other they attended. Attendees, including teachers, expressed the necessity and urgency to begin implementing an educational programme on medicines in all Moldovan schools. School education and public health service departments sent letters requesting help in planning and introducing a medicines education programme in their schools.

Internationally, at its 2001 World Pharmacy Congress, the International Pharmaceutical Federation (FIP) adopted a statement of principle, *The Responsibility and Role of the Pharmacist in Teaching Children and Adolescents about Medicines*.^[6] Among other recommendations, pharmacists were urged to promote school-based medicines education and to work with community opinion leaders to achieve it.

In response to a mandate in Finland to educate children about medicines in January 2004, the Finnish National Board of Education approved instituting a national health education curriculum, which stated that it should include the rational use of medicines, an addition advocated by Finnish physicians. As there were no suitable teaching materials for teachers, a downloadable internet-based curriculum, Education Before Medication, was developed by Katri Hämeen-Anttila as her doctoral thesis.^[7] We know of no other country that has required schoolchildren to be taught about medicines. This curriculum is now available for any teacher in the world to download and adapt to local situations related to medicines (www.uku.fi/medicinescurriculum.fi).

Rationale

Some people might think that educating children about medicines is unnecessary because they have little or no autonomy in using medicines or that their knowledge about medicines is sufficient. After all, isn't children's medicine use under the order of their physicians and under the control of their parents? And of course children do learn about medicines. They daily receive messages about medicines by observing family members, by taking medicines themselves, by watching television and movies, by exposure to media advertising, and through visiting places where medicines are sold. Aren't these messages adequate to teach children what they should know about medicines?

Table 1 Ten guiding principles for teaching children and adolescents about medicines

Principle no.	Principle
1	Children, as users of medicines, have a right to appropriate information about their medicines that reflects the child's health status, capabilities and culture.
2	Children want to know. Health care providers and health educators should communicate directly with children about their medicines.
3	Children's interest in medicines should be encouraged, and they should be taught how to ask questions of health care providers, parents and other care givers about medicines and other therapies.
4	Children learn by example. The actions of parents and other care givers should show children appropriate use of medicines.
5	Children, their parents and their health care providers should negotiate the gradual transfer of responsibility for medicine use in ways that respect parental responsibilities and the health status and capabilities of the child.
6	Children's medicine education should take into account what children want to know about medicines, as well as what health professionals think children should know.
7	Children should receive basic information about medicines and their proper use as a part of school health education.
8	Children's medicine education should include information about the general use and misuse of medicines, as well as about the specific medicines the child is using.
9	Children have a right to information that will enable them to avoid poisoning through the misuse of medicines.
10	Children asked to participate in clinical trials (after parents' consent) have a right to receive appropriate information to promote their understanding before assent and participation.

This is a position statement of the USP (1998).^[3] These principles are intended to encourage activities that will help children, through adolescence, become active participants in the process of using medicines to the best of their abilities (medicines include all types: prescription medicines, non-prescription medicines, herbal remedies and nutritional supplements such as vitamins and minerals). Recognizing that children of the same age vary in development, experience and capabilities, these principles do not specify children's ages.

Fortunately, there is a body of research investigating children's autonomy in medicine use and their knowledge of medicines. A recent review of healthy children's perceptions of medicines^[8] has covered these topics and concluded that "children lack information about medicines, especially in view of their levels of autonomy." Relative to autonomy, this review notes, among other findings, that 44% of 9–16-year-olds had brought a medicine with them to a summer camp, and 8% of those 9–12 years and 28% of those 13–16 years had shared a medicine with another child at the camp; 29–48% of Canadian children (12–15 years) reported they shared or borrowed medicines for pain; 15% of American children (5–12 years) had given a medicine to another child without asking an adult; 36% of American children, 5–12 years, indicated they had taken their last medicine independently without asking an adult and 25% had purchased medicine independently, a situation confirmed by visits to nearby establishments where medicines could be purchased; and 47% of Armenian schoolchildren (10–13 years) said they had purchased a medicine independently. In another American study,^[8] children (10–14 years) reported they had medicated themselves the last time they had taken a medicine; 9% of schoolchildren in Nepal (9–13 years) and 9% of American schoolchildren (9–12 years) had a medicine with them in school the day they were interviewed. The medicine cabinet is not locked when children in the household are of school age. Children of school age in all countries where the question was asked reported having physical access to household medicines, a situation confirmed by household medicine cabinet reviews in eight countries.^[9]

As for medicine knowledge, the review^[8] cited above reports that several studies in the USA, where children's knowledge of medicines has been investigated most often, show that factors associated with medicine efficacy confuse most children. Children, especially young children, often relate medicine efficacy to the medicine's taste, color, dose form, or size. Many older children attribute a medicine's efficacy to its cost and place of purchase with the more expensive medicine and the one purchased in a pharmacy perceived to work best. A 10-item medicine knowledge scale (scored 0–10) administered to schoolchildren (8–12 years), consisting of simple items that anyone using a medicine independently should know (e.g. Which works best, a bad-tasting medicine or a good-tasting medicine?^[8]) found an average correct score of 4.7, with scores correlated with age, and ranging from 3.8 to 5.9. Some of the questions were also answered by schoolchildren in Armenia and Nepal (Table 2). The responses to the same basic medicine knowledge questions argue strongly for

schoolchildren's medicine education. Only 54% of children in a German study knew that contraceptives are medicine, with only 32% knowing what antibiotics are. Only 32% of Greek children studied could correctly describe the role of vaccines in preventing illness. Young children in the USA were often confused by the terms 'drugs' and 'medicines', with some children stating that "bad drugs" come from drug stores. This is understandable in a country where medicines come from drug stores and "Don't do drugs" messages abound. However, and to their credit, most children recognize that medicines can cause harm and they attribute the dangers associated with medicines to taking someone else's medicine (especially an older person's), taking the wrong medicine or taking a medicine for the wrong illness. Children say that medicines should only be taken when they are really needed and only for an illness but they rarely recognize the preventive use of some medicines.

In view of the level of autonomy that children have in medicine use, it is obvious that their level of knowledge is inadequate. However, how can we expect parents to be good medicine educators when they had no medicine education themselves?

The AMR imperative

The global situation where AMR is increasing has provided urgency to the need to teach the world's children about medicines. Most certainly, antibiotics have revolutionized the treatment of common bacterial infections and have had a vital role in reducing child mortality. In the 1940s, the widespread availability of penicillin and the subsequent discovery of streptomycin led to a dramatic reduction in illness and death from infectious diseases. Since the introduction of antibiotics, their consumption has increased dramatically in most parts of the world.^[10–12] However, inappropriate prescribing of antibiotics in the absence of a bacterial infection is a long-standing problem in many countries.^[13–16] Bacteria have a remarkable ability to mutate and acquire resistant genes from other organisms and thereby develop resistance to antimicrobial drugs. This problem of resistance to antimicrobial drugs is particularly prevalent in countries with economic and social problems and where antibiotics may often be acquired without prescriptions.

When an antimicrobial drug is used, the selective pressure exerted by the drug favors the growth of organisms that are resistant to the drug's action. Drug-resistant pathogens are a growing menace to all people, regardless of age, gender or socioeconomic background. They endanger people in

Table 2 Schoolchildren's correct answers to questions about medicines*

Medicine knowledge questions	Correct answers (%)		
	Armenia	Nepal	USA
Which works better, a big pill or a small pill?	35	55	22
Which works better, a good- or bad-tasting medicine?	30	57	27
Can the same medicine be different colors?	61	54	63
Does the medicine a doctor gives you always help?	32	58	69
Can medicine both help and harm you?	71	72	71

*Children's ages in years: Armenia, 10–13 years; Nepal, 9–13 years; USA, 10–12 years.

affluent, industrial societies like the USA, as well as in less-developed nations. In developing countries, relatively high levels of availability and consumption have led to disproportionately higher incidence of inappropriate use and greater levels of resistance compared to developed countries.^[17]

Antibiotic resistance creates a threat to global health, because humanity loses effective antibiotics. Today's reality is that the introduction of new antibiotics is lagging behind the emergence of resistance, increasing the risk of serious health implications. In some cases there are practically no alternatives when it comes to treatment of severe infections caused by certain strains of multidrug-resistant bacteria.

AMR is rapidly reducing effectiveness of these life-saving medicines. This impacts all infectious diseases, including HIV, tuberculosis (TB), malaria and pneumonia. According to new data from the WHO's Fourth Global Report, *Anti-TB Drug Resistance In The World*,^[18] the prevalence of resistance to any anti-TB drug is higher than 40% among new cases in Moldova. Multidrug-resistant TB prevalence is 19.4%. Furthermore, it is known that the incentives are weak to develop new antibiotics to address the global problem of drug resistance. Despite the urgent need for new anti-TB drugs, according to the Stop TB Partnership's Global Plan to Stop TB 2006–2015, the first new anti-TB drug is not expected until 2015.

Consumers, as well as health care providers, contribute to the problem. Paediatricians report having had the experience of parents demanding antibiotics for illnesses such as viral upper respiratory infections, sore throat, cough, and flu.^[19,20] Many adults do not know that antibiotics do not cure viral infections.^[21] In addition, in some countries, adults believe that injections are more effective than oral medication.^[22] Paediatricians often do not take the time to educate their patients but freely prescribe antibiotics and pharmacists freely dispense them without regard to the cause of the infection.^[23–25]

The WHO Global Strategy for Containment of Antimicrobial Resistance, 2001, recommended that all countries should have national programmes to promote rational use of antimicrobials and contain AMR with multifaceted and coordinated interventions targeting both providers and consumers. Rationalizing consumer and provider behaviour in antibiotic use is an essential component of any national programme. Certainly, schoolchildren can be active players in these programmes.

Innovative programmes

Despite the now considerable body of research and institutional advocacy, few programmes exist to educate children about medicines. However, two innovative programmes in the underdeveloped country of Moldova have been shown to be effective in addressing its AMR problem.^[21,26]

Student peer-taught programme

This first programme,^[21] implemented in 2003–2004, was a school-based peer-taught programme the goal of which was to decrease antibiotic use for colds and flu. A pilot survey of 65 mothers had shown that they had serious misperceptions about antibiotics, that they influenced antibiotic prescribing

by physicians, and that they often gave antibiotics to their children without a physician's advice. Another pilot survey had indicated that almost half of colds and flu were treated with antibiotics.

The student peer-taught programme was developed and implemented in a school district (21 schools) in Chisinau, Moldova, with a second district (20 schools) serving as the control. Sixth-form students (12–13 years) and the adult parent or caregiver most responsible for the student's family's health care completed surveys in the spring of 2003. These pre-intervention surveys strongly supported the need for an intervention. Of those who reported they had had one or more colds and/or flu in the previous winter (73% of students, 57% of adults) 51% of the students and 73% of the adults reported treating the illness with antibiotics. In addition, 74% of students and 89% of adults responded that it is "always" or "sometimes useful" to take antibiotics for colds or flu.

The pre-intervention surveys were replicated in the following spring after the intervention. The surveys determined the reported incidence of colds and flu during the past winter, treatment, beliefs about cause, and usefulness of antibiotics. The intervention included peer-education sessions, parents' meetings, a booklet, a vignette video, newsletters, a poster and a poster contest. Although the intervention emphasized "Don't take antibiotics for colds and flu" it also provided basic information on appropriate use of medicines. Pre-post intervention survey results indicated that the intervention was successful. Adjusted for controls, students who reported they did *not* treat colds or flu with antibiotics increased 34%; the comparable increase for adults was 38%. This translated into intervention students being 3.7 times more likely than control students to indicate they had not taken an antibiotic. The comparable rate for the adults was 5.5. Students and adults in the intervention also were significantly more likely to know whether they had taken an antibiotic. All relative responses related to beliefs about the cause of colds and flu and the usefulness of antibiotics to treat them also changed in a positive direction. For example, the percentage of intervention adults who agreed with the statement "antibiotics treat both bacterial and viral infections" decreased 54% compared to controls and for students the decrease was 26%. For those who responded "yes" to "viruses cause the common cold", the relative rate increased 35% for students and 31% for adults. Inappropriate use of antibiotics to treat colds and flu was strongly correlated with inappropriate beliefs.

An estimate of the cost savings alone in the reduction of antibiotic use for colds and flu from pre-intervention to post-intervention was estimated to be US\$1.94 per student and \$2.01 per adult primary caregiver, based on an estimated \$9 per average antibiotic prescription. Imputing this saving to the national population of seventh-form students (56 090 in 2004–2005) and their primary caregivers resulted in a national estimated savings of \$221 556. This underestimates the actual savings as the cost of reducing physician visits to obtain the antibiotic prescriptions is not included. Also, other family members, in addition to the primary caregiver, were likely to have reduced antibiotic use for colds and flu as well. It appears that this programme was very cost-effective.

Support for a school-based intervention was found, as 88% of adults completing the post-intervention questionnaire indicated they thought students should be taught about antibiotics in school.

Kindergarten programme

In June 2007 children from 18 kindergartens in Tiraspol, Moldova, presented a programme^[26] entitled Don't Take Antibiotics for Colds and Flu, as part of an international conference, *Global Priorities for Children: Medicine Education and Better Medicines*. Tiraspol's community auditorium was filled with parents, teachers, hospital directors, physicians, pharmacists, administrators, the district chairman and the media. Two days later, a similar programme was presented by three kindergartens in Briceni, Moldova.

A questionnaire, previously given to the children's mothers, had indicated that 72% of the children had had a cold or flu the previous winter; of these, 76% had been given an antibiotic with 69% obtained via doctor's prescription. The kindergarten children presented the primary message with some adult participation. Each kindergarten presented its own programme. One of the skits presented a battle. The children were dressed as viruses, bacteria and antibiotics. The largest children were the bacteria. In the battle, however, the antibiotics killed the larger bacteria while the smaller viruses survived. An adult Dr Doolittle figure helped the children and reinforced the message. Early on, some of the children ran through the audience blowing bubbles "to spread their cold and flu viruses." Parents were called to the stage to answer questions by lining up behind signs (yes, no, don't know); for example, do antibiotics kill viruses? Prevention was urged via eating fruits and vegetables, washing hands and using disposable tissues. The message was given over and over: don't take antibiotics for colds and flu. It is highly doubtful that anyone there could ever forget this message.

Clearly, an advantage of doing the programme in kindergarten is that parents will come to see their children perform. In higher grades, parents are less likely to attend. After the programme, which also included presentations on the why, who, how, when and where of teaching children about medicines, the adults met in multidisciplinary groups and planned for the future. All groups wanted to spread the programme to all kindergartens and to teach children about medicines up through the school grades. This successful 'edutainment' indicated that kindergarten is not too young for health messages, that learning can be fun and that children can serve as conduits to carry important public messages to their communities.

Universality

As discussed above, in response to a mandate in Finland to teach schoolchildren about medicines, a website for teachers in Finland was developed during 2003.^[7] This website included a large amount of information about medicines, such as how to use medicines rationally and how medicines work. This information is primarily based on the USP's *Guide to Developing and Evaluating Medicine Education Programs and Materials for Children and Adolescents*.^[4] The curriculum also includes a list of recommendations on

what to teach children of different ages and ideas for teaching activities such as using a game and questions for discussion.

Although this Finnish curriculum is freely available to anyone with access to the internet, some might question how applicable it is to other countries, especially non-Western countries. However, similar questionnaires were given to schoolchildren in Armenia, Nepal, Malaysia and the USA inquiring into their levels of autonomy and knowledge, what they wanted to know and their information sources relative to medicines.^[27] Although variations in methods somewhat limited comparability, the conclusions were that, despite their dissimilar cultures, schoolchildren of similar ages were very similar in their responses to the questions about medicines. This suggested that a medicines education programme, such as the one in Finland, could be readily adapted to local situations, such as differences in where over-the-counter medicines may be acquired. The evidence shows that the children want to know more about medicines. In Armenia 63% responded yes, and this figure was 86% in Nepal, 60% in Malaysia and 100% in the USA.

Summary

Children have a right to basic information about medicines that will better prepare them to use medicines when they become users. Moreover, schoolchildren can become conduits of information about medicines to their families. Considering their desires for information and levels of autonomy in medicine use, children's knowledge about medicines is woefully insufficient. Unfortunately, despite the amount of research and institutional advocacy, there are few programmes in the world to teach children about medicines. The few innovative school-based programmes, especially those addressing the global problem of AMR in Moldova, which appear to be cost-effective, could and should be extended to other countries. In addition, information about the freely available internet-based Finnish curriculum should be widely disseminated.

Declarations

Conflict of interest

The Author(s) declare(s) that they have no conflicts of interest to disclose.

Funding

This research/review received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

References

1. Menacker F *et al.* Children and medicines: what they want to know and how they want to learn. *J Soc Adm Pharm* 1999; 16: 38–52.
2. Bush PJ ed. *Children and Medicines: Information Isn't Just for Grownups*. Open Conference Proceedings. Rockville, MD: US Pharmacopeial Convention, 1996.
3. Bush PJ *et al.* Ten guiding principles for teaching children and adolescents about medicines. *Clin Therap* 1999; 21: 1280–1284.

4. Bush PJ ed. *Guide to Developing and Evaluating Medicine Education Programs and Materials for Children and Adolescents*. 1998. Rockville, MD: US Pharmacopeial Convention.
5. Cebotarenco N, ed. *Proceedings Modern Aspects of Professional Drug Information Conference*. Chisinau, Moldova. 1999. Chisinau, Moldova: DrugInfo Moldova.
6. International Pharmaceutical Federation. *The Responsibility and Role of the Pharmacist in Teaching Children and Adolescents about Medicines*. Statement of Principle. Pharmacy and Pharmaceutical Sciences World Congress, Singapore, 2001.
7. Hämeen-Anttila K. *Education Before Medication: Empowering Children as Medicine Users*. Dissertation. Faculty of Pharmacy, University of Kuopio, Finland, 2006.
8. Hämeen-Anttila K, Bush PJ. Healthy children's perceptions of medicines: a review. *Res Soc Admin Pharm* 2008; 4: 985–1114.
9. Sanz E *et al.* Medicines at home: the contents of medicine cabinets in eight countries. In: Bush PJ *et al.*, eds. *Children, Medicines, and Culture*. Binghamton, NY: Pharmaceutical Products Press, 1996: 77–104.
10. Mtango FD, Neuvians D. Acute respiratory infections in children under five years. Control project in Bagamoyo District, Tanzania. *Trans Roy Soc Trop Med Hyg* 1986; 80: 851–858.
11. Ringertz S *et al.* Prevalence of potential respiratory disease bacteria in children in Ethiopia. Antimicrobial susceptibility of the pathogens and use of antibiotics among the children. *Acta Paed* 1993; 10: 843–848.
12. Stratchounski L *et al.* The usage of antibiotics in Russia and some countries in Eastern Europe. *Int J Antimicrob Agents* 2001; 18: 283–286.
13. Goossens H *et al.* ESAC Project Groups. Outpatient antibiotic use in Europe in association with resistance: a cross-national database study. *Lancet* 2005; 365: 579–587.
14. Sanz E *et al.* Drug utilisation in outpatient children. A comparison among Tenerife, Valencia, and Barcelona (Spain), Toulouse (France), Sofia (Bulgaria), Bratislava (Slovakia) and Smolensk (Russia). *Euro J Clin Pharm* 2004; 60: 127–134.
15. Sanz E *et al.* Prescriber's indications for drugs in childhood: a survey of five European countries (Spain, France, Bulgaria, Slovakia and Russia). *Acta Paed* 2005; 11: 1784–1790.
16. Wachter DA *et al.* Antibiotic dispensing by drug retailers in Kathmandu, Nepal. *Trop Med Internat Health* 1998; 4: 782–788.
17. World Health Organization. *Global Tuberculosis Control - Epidemiology, Strategy, Financing*. WHO Report. WHO/HTM/TB/2009.411. Geneva: World Health Organization, 2009.
18. World Health Organization. *Anti-TB Drug Resistance in the World*. WHO Report. WHO/HTM/TB/2008.394. Geneva: World Health Organization, 2008.
19. Mangione-Smith R *et al.* The relationship between perceived parental expectations and pediatrician antimicrobial prescribing behaviour. *Pediatrics* 1999; 103: 711–718.
20. Palmer DA, Bauchner H. Parents' and physicians' views on antibiotics. *Pediatrics* 1997; 99: E6.
21. Cebotarenco N, Bush PJ. Reducing antibiotics for colds and flu: a student taught program. *Health Educ Res* 2007; 23: 137–145.
22. World Health Organization. *Injection Use and Practices in Uganda*. WHO Report. WHO/DAP/94.18. Geneva: World Health Organization, 1996.
23. DrugInfo Moldova. *Rational Antibiotic Use in Moldova*. APUA Conference Report. Chisinau, Moldova: DrugInfo Moldova, 1999.
24. DrugInfo Moldova. *Networking Meeting on Essential Drugs in New Independent States*. Conference Report. Chisinau, Moldova: DrugInfo Moldova, 2000.
25. Cebotarenco N. *Buletinul Institutului National De Farmacie* 1999; 5: 53–56.
26. Bush PJ. Can kindergartners help decrease inappropriate antibiotic use? *J School Health* 2007; 77: 650.
27. Bush PJ, Joshi M. *Towards a Universal Curriculum for Teaching Children about Medicines*. Presented at the 62nd Pharmacy and Pharmaceutical Sciences World Congress, Nice, France, 2002.