

# Attitudes to pharmaceutical promotion techniques among healthcare professionals in the Republic of Tatarstan, Russia

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**Abstract.** *Purpose:* To study attitudes of health care professionals towards pharmaceutical promotion.

*Methods:* Intervention study. 161 questionnaires were collected and analyzed after anonymous surveys of health-care professionals (physicians and residents).

*Results:* Nearly half of surveyed participants (53% of physicians and 44% of residents) communicated with pharmaceutical representatives 1–2 times a week. The most widespread marketing technique was pen-gifting: 93.3% of physicians and 94.7% of residents admitted receiving pens at least once a year. 63.3% of physicians and 78.5% of residents had dinners at conferences once or more often during the last year. 3.2% of physicians and 12.5% of residents believed that pharmaceutical representatives had no influence on prescribing practices, about 60% of responders admitted 'minor influence', while 30% reported 'major influence'. However only 10.2% of physicians and 3.8% of residents noted significant influence of pharmaceutical promotion on their own prescribing practice. The majority of responders indicated pharmaceutical advertising materials (information from the last conference, information from pharmaceutical reps) as one of determining factors for their pharmacotherapy choice. 42.9% of physicians and 77.8% of residents considered acceptance of gifts from pharmaceutical representatives to be ethical. About half of responders considered that development of restricting policies on interactions of health care professionals with pharmaceutical representative be not needed. Post-survey of a small proportion of participants revealed two-fold increase in the number of residents who considered pharmaceutical advertising to have major influence on their colleagues' prescribing practice. There was a trend to decrease in the number of residents who considered trade/money agreements between physicians and pharmaceutical industry to be appropriate and to an increase in the number of opponents of trade/money agreements.

*Conclusions:* Promotion techniques are widely and deeply integrated in everyday routine of health care professionals. Physicians are inclined to underestimate influence of pharmaceutical promotion on their own prescribing practice as compared with influence on their colleagues. The majority of responders use promotional information for prescribing decision-making being unaware of ethical implications of promotional interactions and unresponsive to restriction policies. Residents seem to be more responsive to anti-promotional educational intervention.

**Keywords:** Drug promotion, pharmaceutical promotion, pharmaceutical representatives, survey, health professionals, Republic of Tatarstan

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## **1. Introduction**

Pharmaceutical promotion develops aggressively. Pharmaceutical companies spend millions of dollars on promotion of medicines [20]. Pharmaceutical advertisements address to each link of marketing chain: students, residents, physicians, managers and administrators of health care, pharmacists, and consumers of medicines – patients. Significant resources are invested to influence prescribing practices of physicians. Pharmaceutical marketing techniques include distribution of advertising literature, organization of conferences, social or recreational outings and meals, gifts with company's symbol or medicines' trade names, funding for travel to conferences, encouragement for prescribing of promoted medicines and others [1,18]. Restrictive medicines lists are also subject to pharmaceutical promotion influence [3]. It has been well documented that up to 46% of prescriptions are influenced by pharmaceutical representatives [1] and that the more physicians trust commercial information the less rationally they prescribe [2]. All types of physicians' interactions with pharmaceutical industry were shown to be associated with changes towards irrational prescribing in favor of promoted medicines [3,4,10]. Physicians who rely on information, delivered by pharmaceutical representatives, more often prescribe the most expensive medicines inappropriate for a patient's condition [6,12].

Another important aspect of the problem of pharmaceutical promotion is inaccuracy of pharmaceutical information that may have unfavorable effect on patient's health [9,19]. Pharmaceutical representatives exaggerate both established and unproved effects of promoted drugs. At the same time in 3/4 of visits adverse effects were not mentioned [23]. It was also shown that 42% of distributed directly to physicians advertisements did not correlate with official recommendations adopted in the US [15].

Aggressively developing pharmaceutical promotion with incorrect, misleading, unethical pharmaceutical information comprises the mechanisms that increase irrational use of medicines.

Pharmaceutical market in the Russian Federation has been developing at galloping speed during the last decade. At present, there are more than 17,000 of registered trade names and more than 2,000 of International Nonproprietary Names (INN) [8]. Principles and methods of protecting population and health-care professionals from medicines promotion have not been worked out.

Federal-wide priority national project "Health", launched in 2006 is aimed at improvement of quality and accessibility of health care, strengthening primary care and improvement of working conditions for health professionals. In 2006 an educational system was re-enforced for professional training and continuous medical education of primary health care providers. The system concentrates on evidence-informed decision-making skills and rational use of health resources. The key components are the following: to avoid use of ineffective diagnostic and treatment methods, to decrease prescription errors' rate and to improve quality of health care.

Ministry of Health Care of the Republic of Tatarstan actively supports the policy of monitoring use of medicines. The republic-wide Formulary System, developed on the basis of the Essential Medicines Concept of World Health Organization (WHO), was introduced in the Republic of Tatarstan in 1999, being the first in the Russian Federation. Since 2003 ABC/VEN methodology has been introduced as a regular ministerial reporting system of the clinical pharmacology services.

The Department of Clinical Pharmacology and Pharmacotherapy of the Kazan State Medical Academy for continuous medical education delivers specialized teaching courses for health care professionals. In collaboration with European Bureau of WHO the Department provides problem-based teaching in clinical pharmacology and rational pharmacotherapy on the basis of best available evidence. Recently we have introduced a new short course on pharmaceutical promotion, hoping to influence prescribers' attitudes and equip them with skills to critically evaluate promotional techniques.

## 2. Purpose

The present study was undertaken with the aim to evaluate the spread of various pharmaceutical marketing techniques among health professionals and to analyze their attitudes to pharmaceutical promotion. We aimed at looking into potential differences in attitudes to pharmaceutical promotion between experienced physicians and residents. The additional objective of this on-going research project was to field-test the questionnaire and to explore the possibility of influencing health professional attitudes towards pharmaceutical promotion through educational intervention.

## 3. Methods

This is an on-going intervention study. Anonymous survey of health-care professionals (residents and physicians) on attitudes to promotional techniques was carried out in 2006 and early 2007. A questionnaire has been developed to reveal health professionals' attitudes to various promotional techniques. Proportions of positive/negative/specified answers of physicians and residents were compared, 95% confidence intervals for differences in rate of positive/negative/specified answers (as event rate) were calculated [11]. Participants were allowed to answer the survey questions which they felt comfortable with and to skip the questions which they did not feel comfortable with. This resulted in differing numbers of responders for various questions. This study has become the very first attempt to raise awareness of the impact of pharmaceutical promotion on prescribing practice and medicines use in the Republic of Tatarstan.

### 3.1. Participants

Participants of postgraduate teaching courses "Basics of clinical pharmacology and rational pharmacotherapy" have been surveyed. All participants were surveyed at the beginning of a teaching course and some of them were post-surveyed after a series of lectures and seminars on the influence of pharmaceutical advertising on prescribing practices. The lectures were tailored to form critical approach to pharmaceutical promotion. Totally 132 participants were surveyed: 65 residents, 67 physicians of various specialties (infectious diseases specialists, therapists, surgeons, neurologists, psychiatrists, pediatricians, and clinical pharmacologists). Among them, 23 residents and 6 physicians were also surveyed after the training courses; 161 questionnaires were analyzed totally.

### 3.2. Data collection

Data on attitudes of health professionals to pharmaceutical promotion were collected by surveying participants of the study with the help of a self-completed questionnaire. Questionnaire was distributed to all course participants at the first introductory session of the teaching course. Participants filled out the questionnaire at the teaching session in the classroom straightaway. The response rate was 100%. This was named pre-training survey. With a limited number of participants we organized post-training survey: 23 residents and 6 physicians. Coverage of all participants with post-training survey was unfortunately impossible due to organizational difficulties of the teaching courses and tight curriculum. The response rate for post-training survey was also 100%, those participants that were involved in the post-training survey filled out the questionnaire in the classroom after the end of the teaching course.

### 3.3. Questionnaire

Questionnaire contained 29 questions. Age, length of medical/pharmaceutical service, post (position), place of work (hospital, out-patient clinic, pharmacy, etc.) of every participant had to be indicated. Questions were directed to detect the frequency of participants' exposure to various drug marketing techniques; the factors influencing their prescribing decisions; their attitudes towards acceptance of gifts and influence of pharmaceutical advertising on their colleagues and their own prescribing practices; and their attitudes to policies restricting interactions between physicians and pharmaceutical industry. The Questionnaire is presented in Appendix 1.

## 4. Results

The main results are presented in the tables; we picked the answers to the most important survey questions covered by the majority of participants.

Nearly half of surveyed participants (53% of physicians and 44% of residents) communicated with pharmaceutical representatives 1–2 times a week (Table 1). Residents seemed to be less exposed to promotional activities. Residents did not see pharmaceutical representatives every day, while 3% of physicians did this on everyday basis; nearly half of surveyed residents did not communicate with pharmaceutical representatives at all for the last 12 months (47% vs. 16%).

The most common marketing technique reported by the surveyed participants was donation of pens (Table 2). Both physicians and residents attended conferences: residents answered that they attended

Table 1  
Answers to the survey question "How often do you communicate with pharmaceutical representatives?"

	Physicians, % (n = 32)	Residents, % (n = 36)	Difference, % [95% CI]
Every day	3.2	0	3.2 [–2.9; 9.15]
1–2 times a week	53.1	44.4	9.3 [–15.26; 33.5]
Less than once a week	28.1	8.3	19.8 [1.79; 37.8]
I do not interact	15.6	47.3	31.7 [10.97; 52.17]

Table 2

Answers to the survey question "How often did you run into each of these promotion techniques over the past 12 months?" (results represent combined numbers for once, twice . . . and more than 5 times)

	Physicians, % (n = 60)	Residents, % (n = 56)	Difference, % [95% CI]
Pens	93.3	94.7	1.4 [–7.23; 10.03]
Journal article reprints	81.4	73.2	8.2 [–7.02; 23.42]
Meals at conferences	63.3	78.5	15.2 [–1.06; 31.46]
Textbooks	61.7	28.5	33.2 [16.1; 50.3]
Invitation to recreational or social outings	41.6	21.5	20.1 [3.6; 36.6]
Pocket antibiotic guides	28.3	26.5	1.8 [–14.4; 18.0]
Encouragements for prescription of promoted medicines	21.7	0	21.7 [11.3; 32.1]
Attendance of conferences	6.7	33.9	27.2 [17.6; 36.8]
Funding for travel to medical conference	6.7	7.2	0.5 [–8.8; 9.8]
Funding for luggage	6.7	7.2	0.5 [–8.8; 9.8]

conferences more than 5 times more often than physicians for the same period of time (34% of residents vs. 6.7% of physicians). This can be explained by their easier availability and less working load compared with practicing physicians on one hand and audience enrollment procedures employed for the organization of conferences on the other hand. Often promotional conferences replace regular teaching lectures for residents. At the same time physicians more often (41.6% of physicians vs. 21.5% of residents) received invitations to various conferences and entertaining events. This shows the wide spread use in Tatarstan Republic of well characterized promotional tactics aimed at practicing physicians and residents disguised as educational activities. Almost 22% of surveyed physicians reported receiving direct encouragements for prescribing promoted medicines.

It is well known, that pharmacotherapy choice depends on physician's education and availability of medicines at a supply unit. Our analysis of the factors influencing the prescribing decision, showed that the majority of physicians and residents reported (93.4% and 90.3% accordingly) following clinical recommendations or standard treatment guidelines (Table 3). Physicians much more often (65.6% of physicians vs. 21% of residents) relied on their personal experience. Only 2 of 61 physicians (3.3%) and 1 of 62 residents (1.6%) acknowledged pharmaceutical advertising as one of the factors influencing their prescribing practice.

Physicians 3 times more often than residents identified materials delivered by pharmaceutical sales representatives as a source of medicines information (27.6% of physicians vs. 9.9% of residents, Table 4). This correlated with our data on greater frequency of physician's communication with sales representatives. Nearly one third of surveyed participants (31% of physicians and 24.6% of residents) used information 'from the last conference' for prescribing decisions. It is necessary to emphasize, that 'conferences' are much too often of purely commercial nature, lecturers are always sponsored and deliver advertising information disguised as evidence-based, as has been described elsewhere [7,16,21, 22].

The majority of surveyed participants (82.5% of physicians and 77.8% of residents) reported benefit of communicating with pharmaceutical representatives in receiving information on new pharmaceuti-

Table 3  
Answers to the survey question "What factors determine your prescribing behavior?"

	Physicians, % (n = 61)	Residents, % (n = 62)	Difference, % [95% CI]
Standard treatment guidelines	93.4	90.3	3.1 [-6.55; 12.75]
Personal experience	65.6	21	44.6 [28.95; 60.25]
National (local) formulary	14.8	22.6	7.8 [-5.9; 21.5]
Influence of pharmaceutical advertising	3.3	1.6	1.7 [-3.76; 7.16]

Table 4  
Answers to the survey question "What sources of medicines information or guidelines do you use in your own practice?"

	Physicians, % (n = 58)	Residents, % (n = 61)	Difference, % [95% CI]
Standard treatment guidelines	91.4	80.3	11.1 [-1.22; 23.4]
Clinical evidence databases	65.5	49.2	16.3 [-1.22; 33.8]
Personal experience	60.3	31.2	29.1 [11.96; 46.24]
Advices of senior colleagues	44.8	37.7	7.1 [-10.56; 24.76]
Information from pharmaceutical reps	27.6	9.9	17.7 [3.97; 31.43]
Information from the last conference	31.0	24.6	6.4 [-9.7; 22.5]

cal products (Table 5). At the same time all the surveyed participants considered the sales medicines information to be not completely true and not of satisfactory quality.

Nearly half of surveyed participants (54.1% of physicians and 52.5% of residents) viewed trade/money agreements with pharmaceutical companies to be inappropriate (Table 6). Those participants, who accepted trade relations of physicians with pharmaceutical industry (18% of physicians and 6.8% of residents), explained this by low physicians' state provided salaries. Interestingly, equal proportion of physicians (42.9%) considered acceptance of any gifts appropriate and inappropriate (Table 7). The majority of residents (77.8% vs. 42.9% of physicians) approved of receiving gifts.

The majority of physicians and residents in our study considered their prescribing practice to be independent of pharmaceutical advertising influence or indicated minor influence (Table 8). Residents more often denied influence of pharmaceutical advertising on both their colleagues (12.5% vs. 3.2% of physicians) and themselves – their own prescribing decisions (see Tables 8 and 9). At the same time

Table 5  
Answers to the survey question "What benefit do you find in interactions with pharmaceutical representatives?"

	Physicians, % (n = 58)	Residents, % (n = 61)	Difference, % [95% CI]
Getting information about new drug	82.5	77.8	4.7 [-19; 9.6]
Getting pens and other gifts	35.0	44.4	9.4 [-8.1; 26.9]
Getting invitation to the conferences	25.0	27.8	2.8 [-13.1; 18.63]

Table 6  
Answers to the survey question "Could physicians have trade/money agreements with pharmaceutical companies?"

	Physicians, % (n = 61)	Residents, % (n = 59)	Difference, % [95% CI]
Yes	27.9	40.7	12.8 [-4.05; 29.65]
No	54.1	52.5	1.6 [-16.25; 19.45]
In some cases	18.0	6.8	11.2 [-0.39; 22.79]

Table 6a  
Answers to the survey question "Could physicians have trade/money agreements with pharmaceutical companies?" (Pre- and Post-training survey)

	Physicians (n = 6)			Residents (n = 22)		
	Pre-training, %	Post-training, %	Difference, % [95% CI]	Pre-training, %	Post-training, %	Difference, % [95% CI]
Yes	16.7	16.7	0	36.4	13.6	22.8 [-1.9; 47.5]
No	83.3	83.3	0	63.6	86.4	19.8 [-5.6; 45.2]

Table 7  
Answers to the survey question "Is it ethical to accept gifts from pharmaceutical representatives?"

	Physicians, % (n = 42)	Residents, % (n = 36)	Difference, % [95% CI]
Yes	42.9	77.8	34.9 [14.7; 55.1]
No	42.9	11.1	31.8 [13.8; 50.03]
In some cases	14.2	11.1	3.1 [-11.42; 18.02]

Table 8

Answers to the survey question “To what degree do you think pharmaceutical advertisements influence prescribing practices of physicians?”

	Physicians, % ( <i>n</i> = 62)	Residents, % ( <i>n</i> = 56)	Difference, % [95% CI]
No influence	3.2	12.5	9.3 [−0.4; 19]
Minor influence	66.1	57.1	9.0 [−8.5; 26.5]
Major influence	30.6	30.4	0.2 [−16.4; 16.8]

Table 8a

Answers to the survey question “To what degree do you think pharmaceutical advertisements influence prescribing practices of physicians?” (Pre- and Post-training survey)

	Physicians ( <i>n</i> = 6)			Residents ( <i>n</i> = 22)		
	Pre-training, %	Post-training, %	Difference, % [95% CI]	Pre-training, %	Post-training, %	Difference, % [95% CI]
No influence	0	16.7	16.7 [−13.1; 46.5]	18.18	0	18.18 [2.06; 34.3]
Minor influence	33.3	50.0	16.7 [−38.3; 71.7]	59.1	50.0	9.1 [−20.2; 38.4]
Major influence	66.6	33.3	33.3 [−20.05; 86.65]	22.7	50	27.3 [0.04; 54.6]

Table 9

Answers to the survey question “To what degree do you think pharmaceutical advertisements influence your own prescribing practices?”

	Physicians <i>n</i> = 59 (% of <i>n</i> )	Residents <i>n</i> = 53 (% of <i>n</i> )	Difference, % [95% CI]
No influence	25.4	43.4	18 [0.64; 35.4]
Minor influence	64.4	52.8	11.6 [−6.56; 29.76]
Major influence	10.2	3.8	6.4 [−2.88; 15.68]

Table 9a

Answers to the survey question “To what degree do you think pharmaceutical advertisements influence your own prescribing practices?” (Pre- and Post-training survey)

	Physicians ( <i>n</i> = 6)			Residents ( <i>n</i> = 22)		
	Pre-training, %	Post-training, %	Difference, % [95% CI]	Pre-training, %	Post-training, %	Difference, % [95% CI]
No influence	33.3	16.7	16.6 [−31.5; 64.7]	36.4	31.8	4.6 [−23.4; 32.6]
Minor influence	50.0	83.3	33.3 [−16.6; 83.2]	63.6	68.2	4.6 [−23.4; 32.6]
Major influence	16.7	0	16.7 [−13.1; 46.5]	0	0	0

both physicians and residents were inclined to underestimate influence of pharmaceutical advertising on their own prescribing practice as compared with influence on their colleagues’ decision making: 30.6% of physicians and 30.4% of residents reported influence of pharmaceutical advertisements on their colleagues, while only 10.2% of physicians and 3.8% of residents acknowledged that pharmaceutical advertising had major influence on their own prescribing decisions.

Approximately equal proportions of surveyed participants approved and disapproved introduction of policies restricting interactions of pharmaceutical representatives with medical staff (Table 10).

A small fraction of participants has been surveyed twice so far: at the beginning and at the end of a

Table 10

Answers to the survey question "Is there any need to develop policies restricting pharmaceutical representative interactions with medical staff?"

	Physicians, % (n = 58)	Residents, % (n = 58)	Difference, % [95% CI]
Yes	43	55	12 [-6.06; 30.06]
No	57	45	12 [-6.06; 30.06]

Table 10a

Answers to the survey question "Is there any need to develop policies restricting pharmaceutical representative interactions with medical staff?" (Pre- and Post-training survey)

	Physicians (n = 6)			Residents (n = 22)		
	Pre-training, %	Post-training, %	Difference, % [95% CI]	Pre-training, %	Post-training, %	Difference, % [95% CI]
Yes	40	80	40 [-10.6; 90.6]	63.6	72.7	9.1 [-18.3; 36.5]
No	60	20	40 [-10.6; 90.6]	36.4	27	9.4 [-17.9; 36.8]

Table 11

Answers to the survey question "How would you grade quality of medicines information delivered by pharmaceutical sales representatives?" (Pre- and Post-training survey)

	Physicians, n = 4			Residents, n = 8		
	Pre-training	Post-training	Difference, % [95% CI]	Pre-training	Post-training	Difference, % [95% CI]
High quality	–	–	–	–	–	–
Medium quality	3	3	0	8	3	62.5 [28.95; 96.05]
Poor quality	1	1	0	–	5	62.5 [28.95; 96.05]

teaching course in clinical pharmacology and rational prescribing. In the course schedule participants received one academic day of training in critical analysis of promotional materials. We compared answers to the same survey questions of participants before and after the teaching course.

Post-survey revealed two-fold increase in the number of residents who considered pharmaceutical advertising to have major influence on their colleagues' prescribing practice (increase from 22.7% to 50.0%, Table 8a).

After the teaching course there was a trend to nearly 3-fold decrease in the number of residents who considered trade/money agreements between physicians and pharmaceutical industry to be appropriate (from 36.4% to 13.6%) and to a modest increase in the number of opponents of trade/money agreements (from 63.6% to 86.4%, Table 6a). There were no significant changes in attitudes to the need of policies and regulations of interactions between physicians and pharmaceutical industry (Table 10a).

## 5. Discussion

Pharmaceutical promotion has developed progressively in Russia during the last decade. The frequent incorrectness of information about medicines' effects and safety profile coming from pharmaceutical representatives raises major concern of pharmaceutical promotion. Attraction of attention of medical community to ethical aspects of physician-pharmaceutical industry interactions is urgently needed be-

cause of the absence of any normative documents regulating these interactions in Russia. This is the first pilot project aimed at evaluation of attitudes of health care professionals to pharmaceutical promotion.

The analysis of physicians and residents survey has revealed high frequency of various drug marketing techniques occurrence among them. Greater focus of pharmaceutical promotional activities on physicians may be due to their practical involvement with prescribing, their final responsibility for the choice of pharmacotherapy.

The data on high prevalence of various techniques of pharmaceutical promotion and its role in medicines information delivery cry for the urgent need of development and implementation of training programs for health professionals enabling them to identify and use independent medicines information in their prescribing practice.

The participants viewed pens and other stationery goods not being gifts and not affecting their decision making process, which is contrary to the well described data that testify influence of any accepted gifts independently of their pecuniary value on clinical decision [13,17]. Answers to the questions assessing views on the impact of pharmaceutical advertising on clinical practice were in line with earlier described findings by other researchers [1,5,14].

The numbers of participants who answered the survey questions in a pre- and post-training mode was small to draw reliable conclusions. Yet, noteworthy is the fact that at the pre-training level residents demonstrated significantly more favorable attitudes to promotional techniques (gift acceptance, trade/money relationship, etc.) and at the same time residents were more prepared to change their attitudes after the training sessions. These observations are of particular importance because of the following reasons. These are the residents who look out for job opportunities and often choose a career of a pharmaceutical sales representative. These career choices represent the major loss for the society of the most important potential for development of medical profession. At the same time the residents are much more responsive to educational anti-promotional interventions. Anti-promotional educational intervention is urgently needed to counterbalance the aggressive promotion disguised as “medicines use education”. Anti-promotional interventions need to be targeted at residents and tailored to their needs with special emphasis on the change of their attitudes described in this study.

Educational programs for health professionals including practicing physicians, junior graduates and students, teaching them to critically assess medicines' information, to check it against the best available evidence and to form independent opinion and evidence-informed decisions, are critically important. The problem needs to be addressed at the state level to introduce legislation forbidding misleading or unethical pharmaceutical promotion, to monitor advertising of medicines, to raise awareness of medical profession and community of potential harm of pharmaceutical promotion to the society. Educational anti-promotional interventions targeted at experienced physicians need to be developed as a separate programme which needs to be incorporated into regular continuing medical education teaching module on clinical pharmacology and rational prescribing on the basis of the best available evidence.

## **6. Limitations of the study**

These were due to the limited number of participants who took part in the post-training survey, which made impossible reliable conclusions on the effectiveness of educational interventions.

## **7. Conclusion**

Promotion techniques are widely and deeply integrated into everyday routine of health professionals. Physicians are inclined to underestimate influence of pharmaceutical promotion on their own prescribing practice. The majority of surveyed participants use promotional information for prescribing decisions being unaware of ethical implications of promotional interactions and unresponsive to restriction policies. There are differences in attitudes to various promotional/marketing techniques between physicians and residents. Residents seem to be more enthusiastic and naïve about wide range of promotional techniques and more responsive to anti-promotional educational intervention. The questionnaire enabled us to analyze the spread of promotional activities and to detect the differences between physicians and residents. It should be further improved through structuring separate aspects of techniques, ethics, attitudes and skills, and using more precise and sharp language.

## **Conflict of interest**

We declare that we have no conflict of interest.

## **Competing interests**

I.S.B., A.U.Z. and L.E.Z. work for the Formulary Committee of the Ministry of Health of the Republic of Tatarstan and actively participate in development of the national formulary list.

## **Authors' contributions**

I.S.B. participated in the study design, collected data, performed analysis and wrote the initial draft of the manuscript. A.U.Z. offered technical support to the principle investigator during implementation, contributed to the analysis and helped to prepare the draft manuscript. L.E.Z. conceived the study, participated in its design, checked the analysis, and drafted the submitted version of the manuscript. All authors read and approved the final submitted manuscript.

## **Appendix 1. Questionnaire**

1. How often do you communicate with pharmaceutical representatives?
  - (a) every day
  - (b) 1–2 times a week
  - (c) less than once a week
  - (d) do not interact
  
2. How many times a week do you interact with pharmaceutical representatives?
  - (a) 1–2
  - (b) every day
  - (c) I do not interact with them

3. How many times a day do you interact with pharmaceutical representatives? (Please choose)
  - (a) 1–2
  - (b) 2–5
  - (c) more than 5 times
  - (d) I do not interact with them
  
4. How often did you run into each of these promotion techniques over the past 12 months?
  - (a) “never” – 1
  - (b) “once” – 2
  - (c) “2–5 times” – 3
  - (d) “more than 5 times” – 4
  - (e) pocket antibiotic guides
  - (f) meals at departmental conferences
  - (g) dinner lectures with a faculty speaker
  - (h) journal article reprints
  - (i) pens
  - (j) invitation to social or recreational outings
  - (k) textbooks
  - (l) funding for travel to a continuing medical education conference
  - (m) funding for luggage
  - (n) encouragement for prescribing the promoted drug
  
5. To what degree do you think pharmaceutical advertisements influence prescribing practices of physicians?
  - (a) no influence
  - (b) minor influence
  - (c) major influence
  
6. To what degree do you think pharmaceutical advertisements influence your own prescribing practices?
  - (a) no influence
  - (b) minor influence
  - (c) major influence
  
7. How do you understand “conflict of interests”?
  - (a) inward human conflict
  - (b) interested motives to influence results of discussion/conclusions
  - (c) conflict between public benefit and interested motives
  - (d) I don’t know
  - (e) other (specify)
  
8. What factors determine your prescribing behavior?
  - (a) personal experience
  - (b) standard treatment guidelines
  - (c) national (local) formulary

- (d) pharmaceutical advertising
  - (e) other (specify)
9. Do you think that information, delivered by pharmaceutical sales representatives, is always true and complete?
- (a) yes
  - (b) no
  - (c) other (specify)
10. What sources of medicines information or guidelines do you use in your own practice?
- (a) personal experience
  - (b) clinical evidence databases
  - (c) information of pharmaceutical companies
  - (d) standard treatment guidelines
  - (e) advices of senior colleagues
  - (f) information from the latest conference
11. Could physicians have trade/money agreements with pharmaceutical companies?
- (a) yes
  - (b) no
  - (c) in some cases (specify)
12. Is there any difference in appropriateness of pharmaceutical sales representative interactions with students and residents compared to that with physicians and pharmacists?
- (a) yes (substantiate your answer if you can)
  - (b) no (substantiate your answer if you can)
13. Is there any need to develop policies restricting pharmaceutical sales representative interactions with medical staff?
- (a) yes
  - (b) no
14. Is there a restricting policy in your institution?
- (a) yes
  - (b) no
15. How often do you receive training on ethics of physician-industry relationships?
- (a) never
  - (b) seldom
  - (c) often
16. What proportion of your working day time would you be willing to give to pharmaceutical representatives?
- (a) one half
  - (b) one third
  - (c) a few minutes

- (d) I cannot give any time
  - (e) as much as it may require
17. What benefit do you find in interaction with pharmaceutical representatives? (Please choose)
- (a) getting information about new drug
  - (b) getting invitation to the conferences
  - (c) getting pens and other gifts
18. What percentage of money pharmaceutical companies invest in research versus promotion (advertising, marketing activities)?
- (a) 50/50
  - (b) much more in research
  - (c) much more in promotion
19. Do you think that the proportion of money invested in promotion is acceptable?
- (a) yes
  - (b) no
20. How often colleagues from your institution/hospital (and yourself) are sent to conferences?
- (a) once a week
  - (b) twice a month
  - (c) once a month
  - (d) once in half a year
  - (e) once in three months
21. How would you grade quality of medicines information delivered by pharmaceutical sales representatives?
- (a) high
  - (b) medium
  - (c) poor
22. Do you think that the direct-to-consumer advertising influences physicians' choice of medicines?
- (a) yes
  - (b) no
  - (c) other (describe your opinion)
23. Is it ethical to accept gifts from pharmaceutical representatives?
- (a) yes
  - (b) no
  - (c) in some cases (specify)
24. Do you think that physicians differentiate gifts into those, which it is ethical to accept and not?
- (a) yes
  - (b) no
  - (c) other (specify)

25. What gifts do physicians consider to be less appropriated to accept?
  - (a) expensive
  - (b) cheap
26. What gifts do physicians consider to be less appropriated to accept?
  - (a) of educational value
  - (b) of no educational value
27. Do you agree that pharmaceutical advertising decreases probability of rational prescribing by physicians?
  - (a) yes
  - (b) no
28. Do you agree that pharmaceutical advertising decreases probability of generic prescribing by physicians?
  - (a) yes
  - (b) no
29. Do health managers and administrators undertake actions to influence gift acceptance by physicians?
  - (a) forbid relations with pharmaceutical representatives
  - (b) encourage physicians
  - (c) organize education
  - (d) do nothing
  - (e) other (please specify)

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