Availability and Characteristics of Nonbeverage Alcohols Sold in 17 Russian Cities in 2007

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Background: It is known that a range of nonbeverage alcohols including eau-de-colognes and medicinal tinctures are consumed by sections of the Russian population. Research conducted in a city in the Urals (2003 to 2005) showed that consumption of such products is associated with very high mortality from a wide range of causes. However, there have been no systematic attempts to investigate the extent to which such products are available in other cities of the Russian Federation. There is particular interest in establishing this following the introduction of new federal regulations in January 2006 aimed at restricting the availability of these products.

Methods: In the first half of 2007, we conducted a survey in 17 cities that spanned the full range of city types in the Russian Federation excluding those in the Far East. In each city, fieldworkers visited pharmacies and other types of retail outlets and purchased samples of nonbeverage alcohols. These were defined as being typically 10 to 15 roubles per bottle, with an ethanol concentration of at least 60% by volume.

Results: We were able to purchase samples of nonbeverage alcohols in each of the 17 cities we investigated. The majority of the 271 products included were a cheaper and more affordable source of ethanol than standard Russian vodka. Medicinal tinctures, sold almost exclusively in pharmacies, were particularly common with an average concentration of 78% ethanol by volume. Most importantly, the majority of the products were of a sort that our previous research in 2004 to 2005 had established were drunk by working-age men.

Conclusions: While the 2006 federal regulations introduced in part to reduce the availability and consumption of nonbeverage alcohols may have had some effect on certain classes of nonmedicinal products, up until June 2007 at least, medicinal tinctures as well as some other nonbeverage alcohols that are consumed appear to have been readily available.

Key Words: Nonbeverage Alcohol, Russia, Ethanol.

TREML IN HIS pioneering work on alcohol in the Soviet Union (Treml, 1982), discusses the long established practice of consuming intoxicating nonbeverage liquids, some of which contained only ethanol while others included methanol and long-chain alcohols. Gorbachev's anti-alcohol campaign in the mid-1980s produced many anecdotes about what people drank when beverage alcohols were in short supply including alcohol-based antifreeze from Russian MiG fighter jets (White, 1996). Such practices are also recorded in Russian literature, including the drinking of aftershave in Shostakovich's 1926 libretto for his opera based on Gogol's short story *The Nose* and the excesses of the drunken hero of Erofeev's 1969 novel *Moscow-Petushki* [published in English as *Moscow to the End of the Line* (Erofeev, 1992)].

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Received for publication May 1, 2008; accepted August 19, 2008.

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DOI: 10.1111/j.1530-0277.2008.00813.x

The quantitative study of consumption of nonbeverage alcohols is difficult because they are excluded in the usual source of production or sales figures, which are collected primarily for tax purposes. Indirect methods are thus usually employed to gauge the extent of their production or consumption. The World Health Organization, drawing on a variety of sources, has estimated per capita consumption of "unrecorded" alcohol consumption in different parts of the world, but acknowledges that these data are approximate, subject to definitional problems, and dependent on numerous assumptions (Lachenmeier et al., 2007).

Treml, and later Nemtsov, sought to estimate the amount of home-brewed alcohol in Russia using retail sales of sugar as a proxy. Nemtsov also used data on acute alcohol poisoning as an indicator of total alcohol consumption. He estimated that, in Russia in the 1990s, around half of the total volume of ethanol consumed was from sources other than legally sold beer, wine, and spirits (Nemtsov, 2002). A recent review has suggested that, in Russia, almost one-third of all ethanol consumed was from unrecorded sources (Popova et al., 2007), most of which was identified as home-brewed liquor (samogon).

Our work on nonbeverage alcohol consumption in Russia has taken a different approach. Instead of working with

estimated aggregate consumption data, we have collected information on consumption of nonbeverage alcohols from individuals. In 2003 to 2005, we conducted a population-based study of alcohol and mortality in a typical Russian city (Izhevsk) located to the West of the Ural mountains (Tomkins et al., 2007a,b). We found that it was relatively common for men to drink manufactured ethanol-containing liquids not intended for consumption. These included eau-de-colognes, medicinal tinctures, and antiseptics. They are distinct from home-brewed liquor and other illegal-sources of ethanol as they are legally manufactured and sold in conventional retail outlets, including street kiosks, small shops, and pharmacies. Of 1,750 working-age men (25 to 54 years) living in Izhevsk, 7% were reported by proxy informants to have consumed nonbeverage alcohol in the past year (Tomkins et al., 2007a). Consumption was considerably higher among men in the same age group who had died. Being reported to have drunk nonbeverage alcohol in the previous year was associated with a mortality odds ratio (all causes) of 7.0 (95% CI 5.5 to 9.9) adjusted for smoking, education, and amount of ethanol consumed from beer, wines, and spirits (Leon et al., 2007a).

Until recently, there was little information about what nonbeverage alcohols sold in Russia contain. In 2005, we undertook toxicological analyses of a selection of products bought in Izhevsk (McKee et al., 2005). They were much stronger than legitimate beverages. While spirits such as standard vodka had an average concentration of 43% ethanol by volume, concentration of ethanol in the eau-de-colognes, and medicinal tinctures ranged from 60% to 95% by volume. We also found that these products had zero or very low levels of methanol and long-chain alcohols. Similar findings were reported from a survey in Estonia, one of the former Soviet Baltic states (Lang et al., 2006; Pärna et al., 2007). These studies have led us to suggest that the high mortality associated with drinking nonbeverage alcohols in Russia may be as a result of the toxic effects of high levels of ethanol *per se* (Leon et al., 2007a,b) rather than effects of other toxic chemicals, although more work is needed to confirm this.

The Russian federal government has been concerned about the negative health effects of the consumption of nonbeverage alcohols for a number of years (Putin, 2005). In 2005, they introduced legislation to tighten controls on the manufacture and wholesale and retail sale of ethanol-containing liquids (Levintova, 2007). The new law came into force on January 1, 2006. While it includes a requirement to establish a Federal database on the volume and concentration of ethanol incorporated into products, to our knowledge information from this system is not in the public domain.

Published research on nonbeverage alcohol in Russia is very limited. In an analysis of life in the Russian far north, the authors concluded that it was during Gorbachev's anti-alcohol campaign in the mid-1980s that consumption of eau-de-colognes and other nonbeverage alcohols became established in the Russian Far North (Pika and Prokhorov, 1994). According to a recent paper published in the Russian journal Narkologia, it was suggested that this pattern of consumption still persists (Kozlov, 2006). Our own work in Izhevsk (Leon et al., 2007a) is the only individual-level research that has explicitly looked at the relationship between nonbeverage alcohol consumption and mortality in Russia. To date, no systematic research has been undertaken to investigate the availability of nonbeverage alcohols in a range of Russian cities apart from Izhevsk, particularly in the period following the introduction of the new legislation. To fill this important gap, we undertook such a survey of the availability of nonbeverage alcohols from legal retail outlets in a range of Russian cities.

MATERIALS AND METHODS

We conducted a survey of the availability of nonbeverage alcohols in a range of Russian cities between December 2006 and June 2007. The aims of the survey were to determine (1) whether nonbeverage alcohols were available for sale in each city from legal retail outlets and (2) to characterize the types of nonbeverage alcohols that were sold.

The cities selected (Fig. 1) were spread throughout the most populous parts of the Russian Federation, excluding the Russian Far East. They varied in size from small towns such as Murashy with a population of $<10{,}000$, to the large metropolitan center of St Petersburg. Apart from wishing to include a range of different types of cities, our choice of locations was also informed by being able to identify a local researcher or health professional able to do the fieldwork. These individuals were drawn from a network of contacts: mostly graduates of the Moscow Medical Academy.

A standard fieldwork protocol was developed. It provided guidance on the type of product we wished to identify. These were defined as manufactured ethanol containing liquids not classed as alcoholic drinks (i.e., not subject to excise tax) but which may be consumed. The protocol described examples of such "surrogates" as including eau-de-colognes, antiseptic hand or skin washes, medicinal tinctures and window cleaning fluids that would typically be at least 60% by volume ethanol (indicated on label) and cost <15 roubles (£0.30, €0.40, $0.64). Fieldworkers were instructed not to include samogon (home brewed/distilled alcoholic drinks) or bootleg vodka. The protocol also included a list of specific nonbeverage alcohols that were reported to have been drunk by informants in the Izhevsk case-control study of mortality among working-age men (Leon et al., 2007a; Tomkins et al., 2007b). In the latter part of the Izhevsk case-control study (December 2004 to November 2005), we asked informants to list the specific types of nonbeverage alcohol consumed by the dead cases alternatively by the age frequency matched live controls. Table 1 shows the specific types of nonbeverage alcohols reported to have been drunk in the previous year.

The protocol for the availability survey did not require unequivocal evidence that any particular product was drunk for it to be included. Fieldworkers were nevertheless encouraged to make observations in retail outlets and seek information from local informants (such as shop keepers and street drinkers) about which nonbeverage alcohols were drunk and where they could be bought. However, in the analysis we do distinguish between those products which we know from our earlier work in Izhevsk were actually drunk (Table 1) from the others.

Fieldworkers were instructed to visit a range of retail outlets in their city and were told that they should not spend more than 12 to 15 hours doing so. They were instructed to start in central areas of the city, identified by a bus or train station, and to work outwards to include some outlying residential or industrial districts. At least 5 pharmacies plus other types of retail outlet such as kiosks and markets were to be visited. In every outlet visited, fieldworkers were instructed to purchase a bottle of each sort of nonbeverage alcohol meeting the study criteria.

Fig. 1. Map of Russian Federation showing location of surveyed cities. ▨ – regions that contain surveyed cities.

Table 1. Main Types of Manufactured Nonbeverage Alcohol Reported by Proxy Informants to be Drunk in the Izhevsk Case-Control Study of Men Aged 25 to 54 Years, December 2004 to November 2005

Type	Name	Number of cases and controls
Medicinal tincture	Hawthorn	176
	Red pepper	1
Eau-de-cologne	Troynoy	19
Perfumed water	Composition	160
	Yason	113
Bath additives	Troyar	92
	Juniper	36
Antiseptic		2

Denominator for the percentages are the 453 case and control men reported to have drunk nonbeverage alcohol in the previous year. See text for further details.

Key information about each product found was transcribed onto a pro forma. This included name, type (e.g., medicinal tincture, perfumed water, antiseptic), bottle size, ethanol concentration, price, manufacturer, place of purchase, time and date of purchase, opening hours, and location of the retail outlet (city center or outlying district). Information about the type of retail outlet visited, and its location, was recorded regardless of whether any nonbeverage alcohols were sold.

Some of the products included by fieldworkers were $<60\%$ by volume ethanol or no information about ethanol concentration was provided. All such items were excluded from the analyses, as were the class of retail outlets that specialized in selling substances known to be used as perfumes and cosmetics, as no products meeting our criteria were found in them.

From a purely economic perspective, it can be anticipated that the nonbeverage alcohols most likely to be drunk are those whose unit cost was less than that of standard legitimate vodka. In order to make standardized comparisons between the nonbeverage alcohols and vodka, for each product we calculated an equivalent unit price for 10 ml of pure ethanol, based on stated percent ethanol by volume, bottle size, and price. During the time of the survey, a 500 ml bottle of standard vodka (40% ethanol by volume) was typically sold for around 70 roubles, giving it an equivalent unit price of 3.5 roubles per 10 ml pure ethanol.

The information collected by the fieldworkers was collated centrally and then entered into Excel. Statistical analyses were conducted in SPSS for Windows (SPSS, Inc., Chicago, IL) and STATA version 9 (StataCorp LP, College Station, TX).

RESULTS

A total of 268 retail outlets were visited across the 17 cities. Half of the outlets were in city centers and half in outlying residential or industrial areas. The most common type visited was pharmacies, making up over half of the total (51%). The other outlets were markets (14%), street kiosks (13%), general goods stores (12%), and domestic "chemistry" shops (9%) that specialized in household cleaners, disinfectants, and similar items.

As shown in Table 2, nonbeverage alcohols, including those identified in the Izhevsk case-control study as being drunk, were found in every city (Table 2). Of the 268 retail outlets visited, 139 (52%) sold at least 1 product with a minimum concentration of ethanol by volume of 60%. The majority (112 of 139) sold products whose ethanol unit cost was less than that of cheap legitimate vodka (<3.5 roubles per 10 ml pure ethanol), with a similar proportion (107 of 139) selling 1 more of the products reported as being drunk.

From the 139 outlets selling nonbeverage alcohols, we obtained information on 271 nonbeverage alcohol products meeting our criteria. Pharmacies provided the largest number (140), although they were also found in street kiosks (29), markets (22), domestic chemistry shops (15), and general

Table 2. Availability of Nonbeverage Alcohols From Retail Outlets Products in 17 Russian Cities, 2007

City	Number of items 60% or more ethanol purchased	Number of retail outlets			
		Visited	Selling products 60% or more ethanol	Selling products with unit cost <vodka	Selling products reported as drunk in Izhevsk
Chelyabinsk	13	20	6	4	5
Izhevsk	18	10	8	8	8
Korolev	14	12	11	6	1
Kotlos	12	10	5	5	4
Kurgan	18	20	10	9	10
Lukoyanov	10	15	9	8	7
Murashy	9	10	8	6	4
Omsk	16	21	16	11	15
Pskov	34	15	9	9	9
Samara	26	21	11	11	8
St Petersburg	1	14	1	1	1
Tambov	35	14	11	11	9
Tver	2	10	1	1	1
Tyumen	5	24	5	4	5
Viborg	10	16	8	3	4
Voronezh	33	16	12	9	9
Yekaterinburg	15	20	8	6	7
Total	271	268	139	112	107

goods shops (14). The most common type of product identified was medicinal tinctures (135). These were almost exclusively purchased from pharmacies. The majority of the other products were various eau-de-colognes (109). Bottle size varied between 25 and 200 ml, although only 15 products came in bottles larger than 100 ml. Product price ranged from 5 to 30 roubles (mean 13 roubles) per bottle.

The majority (144 of 271) of the nonbeverage alcohol products obtained were of types reported to have been drunk. As shown in Table 3, these tended to be medicinal tinctures, purchased in pharmacies, products in bottles of 100 ml or more and with very low unit cost for ethanol.

Aside from what we know from our research in Ishevsk about which products are drunk, from first principles we would argue that the nonbeverage alcohols with a unit cost of ethanol below that of vodka may well be preferentially chosen by poorer consumers for purely economic reasons. The characteristics of these very cheap nonbeverage sources of ethanol are shown in Table 4. Nearly all of the medicinal tinctures in this class were of the sort reported to have been drunk in our previous work. They were sold in 100 ml bottles, while the vast majority of eau-de-colognes were sold in bottles of 85 or 86 ml. The mean ethanol concentration of the eau-de-colognes (63% by volume) was less than that of medicinal tinctures (78% by volume). Reflecting all of these differences, the equivalent ethanol unit cost for eau-de-colognes (2.4 roubles per 10 ml) was higher than medicinal tinctures (1.9 roubles per 10 ml), although antiseptics were even cheaper per unit ethanol (1.5 roubles per 10 ml).

Of the 90 medicinal tinctures whose unit cost for ethanol was less than vodka, the most common was Hawthorn Tincture ($n = 52$) followed by Red Pepper Tincture ($n = 26$). The most common of the 101 eau-de-colognes with a unit cost less than vodka was the Troynoy brand ($n = 27$). All of these products were reported to have been drunk in the Izhevsk case-control study.

Price did not increase in step with volume of nonbeverage alcohol in each bottle; as bottle volume increased the unit cost of ethanol decreased. As is evident from Fig. 2, the average unit cost of ethanol was around that for vodka (3.5 roubles/10 ml pure ethanol) for all bottles greater than 25 ml in size.

Finally, the majority of the nonbeverage alcohols included in the survey other than the medicinal tinctures were sold as *perfumed* products. However, a number of fieldworkers reported that a proportion of these products had no discernible smell other than of ethanol and many were also colorless. One could therefore speculate that the manufacturers of these particular products were aware that the main market was for consumption as a beverage substitute rather than as a perfume or cleanser with an appropriate smell.

Table 3. Characteristics of Nonbeverage Alcohols Identified With Minimum Ethanol Concentration of 60% by Volume, Russia, 2007

	Reported as drunk in Izhevsk*	
	No	Yes
Place of purchase within city		
Center	79 (62)	64 (44)
Outlying area	48 (38)	80 (56)
Type of retail outlet		
Pharmacy	40 (31)	103 (72)
Kiosk	21 (17)	8 (6)
Market	32 (25)	12 (8)
Domestic "chemistry"	21 (17)	13 (9)
General goods shop	13 (10)	8 (6)
Type of nonbeverage alcohol		
Medicinal tincture	36 (28)	97 (67)
Eau-de-cologne	81 (64)	28 (19)
Antiseptic and other	10 (8)	19 (13)
Bottle size (mls)		
25	19 (15)	22 (15)
26–99	95 (75)	13 (9)
100+	13 (10)	109 (76)
Bottle price (roubles)		
<10	27 (21)	27 (19)
10–15	54 (43)	81 (56)
>15	46 (36)	36 (25)
Ethanol concentration (% by volume)		
60–69	75 (59)	25 (17)
70–79	33 (26)	70 (49)
80–89	7 (6)	6 (4)
90+	12 (9)	43 (30)
Unit cost per 10 ml pure ethanol (roubles)		
<1.5	6 (5)	45 (31)
1.5–2.4	41 (32)	62 (43)
2.5–3.4	49 (39)	17 (12)
3.5–4.4	16 (13)	9 (6)
4.5+	15 (12)	11 (8)
Total	127 (100)	144 (100)

*See Table 1 for details of nonbeverage alcohols reported as drunk in the Izhevsk case-control study, 2004 to 2005.

Values are given as *n* (%).

Table 4. Characteristics of Medicinal Tinctures and Eau-de-Colognes Identified With Minimum Ethanol Concentration of 60% by Volume With a Unit Cost for Ethanol Less Than Vodka (<3.5 roubles/10 ml), Russia, 2007

	Medicinal tinctures	Eau-de-colognes	Antiseptics and others
Reported as drunk in Izhevsk			
No	12 (13)	74 (73)	10 (34)
Yes	78 (87)	27 (27)	19 (66)
Bottle size (mls)			
25	8 (9)	0 (0)	0 (0)
26–99	10 (11)	78 (77)	5 (17)
100+	72 (80)	23 (23)	24 (83)
Bottle price (roubles)			
<10	12 (13)	10 (10)	2 (7)
10–15	65 (72)	51 (50)	12 (41)
>15	13 (14)	40 (40)	15 (52)
Ethanol concentration (% by volume)			
60–69	0 (0)	89 (88)	1 (3)
70–79	58 (64)	6 (6)	2 (7)
80–89	0 (0)	3 (3)	10 (34)
90+	32 (36)	3 (3)	16 (55)
Unit cost per 10 ml pure ethanol (roubles)			
<1.5	30 (33)	6 (6)	15 (52)
1.5–2.4	41 (46)	48 (48)	14 (48)
2.5–3.4	19 (21)	47 (47)	0 (0)
Total	90 (100)	101 (100)	29 (100)

Values are given as *n* (%).

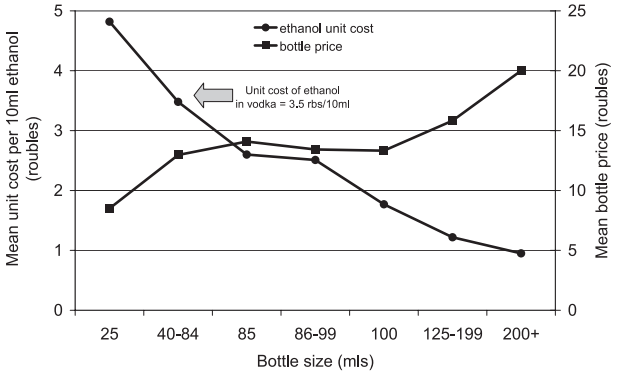

Fig. 2. Relationship of size of bottle to mean unit cost for ethanol and bottle price (based on 271 nonbeverage alcohol products).

DISCUSSION

We have found that in a wide selection of Russian cities in the first half of 2007, it was possible to purchase easily and legally many different sorts of nonbeverage alcohols of a least 60% ethanol concentration by volume from legitimate retail outlets, the majority of which were of a type reported to have been drunk in an earlier study we conducted in 1 of the cities (Izhevsk). This is despite the fact that the 2006 federal regulations, partly aimed at reducing their consumption, had been in operation for a year. Of particular significance is that the majority of nonbeverage alcohols included in the survey had an equivalent unit cost for ethanol below that of standard Russian vodka. From an economic perspective, these products would appeal particularly to relatively poor individuals, who would more easily be able to afford 10 to 15 roubles for a bottle of concentrated ethanol (60 to 95% ethanol by volume) rather than 70 roubles for a bottle of vodka. This is markedly different from the situation in western countries. For example, the cost of 100 ml of ethanol from the cheapest perfume in the United Kingdom is approximately 16 times higher than from vodka.

A number of limitations of this study should be noted. The retail outlets investigated in each city were not randomly drawn from a sampling frame. However, as the main objective of the survey was to determine whether it was possible to buy nonbeverage alcohols in legal retail outlets in each city this lack of representativeness is not a problem. In addition, while the survey cities are not a random sample of all Russian cities, they do span a wide range of types of urban settlements in the Russian Federation (excluding the Far East). To this extent, our results demonstrate that nonbeverage alcohols are indeed widely available throughout the country.

Between-city variation in the proportion of retail outlets selling nonbeverage alcohols meeting our inclusion criteria may reflect differences in the local knowledge and tenacity of the fieldworkers as much as any real differences in availability. For example, the particularly high proportion of retail outlets selling nonbeverage alcohols found in Izhevsk is almost certainly explained by our research teams detailed knowledge of the city and its alcohol outlets. However, there is almost certainly real variation in availability between cities. This will partly be due to differences in the extent to which local city administrations and state surveillance organizations, such as Roszdravnadzor, for example, have actively attempted to enforce the 2006 federal regulations as they apply to retail activities. Further work looking specifically at variation in implementation of federal policy variation would be very valuable.

Finally, we did not perform any independent assessment of the ethanol concentration of the products that we included, and therefore have had to rely upon the concentration as it was stated on the bottle. However, an earlier investigation of a sample of nonbeverage alcohols purchased in Izhevsk found that the stated concentrations did agree with what the label on each bottle stated (McKee et al., 2005).

Turning to our detailed findings, Hawthorn tincture stands out as being both one of the most common of the nonbeverage alcohols drunk, as well as being the most common type of medicinal tincture available from pharmacies. It is interesting to note that in a business report on retail pharmacies in Russia for 2004, Hawthorn tincture was described as being "the leader among trading names on volume of chemists' sales…"(POL, 2005). In contrast, in our case-control study, perfumed waters and bath additives were listed as being commonly consumed, but in this survey only 10 of the 271 nonbeverage alcohols fell into this category.

The eau-de-colognes we found in this availability survey are particularly intriguing. Of those that contained more than 60% ethanol by volume and had a unit cost for ethanol below

that of vodka, 3 quarters were of a sort that were not identified in our previous work as having been drunk. This either suggests that they are new products on the market, or that they are simply not drunk. It should be emphasized, however, that the fact that these have the same profile as the more usual nonbeverage alcohols consumed (high ethanol concentration and low unit cost) makes them plausible candidates for consumption even if the present time they are not preferred sources of ethanol for drinking.

The 2006 Federal Regulations

New federal regulations, introduced on January 1, 2006, were aimed at tightening up ethanol manufacture, use, distribution and sale in products (Levintova, 2007). One of the main features of the new regulatory system was the establishment of a federal-level alcohol production and use database system (EGAIS; Russian Unified State Automated System of Alcohol Record). All manufacturing facilities are required to install electronic recording equipment to monitor the amount of ethanol produced, in terms of both volume and concentration, and to report this on a regular basis to the federal authorities. The cost of mandatory registration with this system for any company wishing to continue to manufacture or incorporate ethanol into their products has been relatively high, and certainly beyond what many small manufacturers could afford. The regulations also required the denaturing of alcohol products not intended for internal use with agents such as bitrex and croton aldehyde.

Inevitably with such an ambitious system, there were substantial delays in installing the monitoring equipment and in making the federal database operational. In addition, there were major problems in making available to manufacturers new excise stamps, now required to be affixed to all products destined for the Russian domestic market. The combination of cost, bureaucracy, and delays led many manufacturers to cease production, resulting in a reduction in the amount of beverage and nonbeverage alcohols available in the retail market in 2006.

It seems likely, that the major impact of these regulations on nonbeverage alcohols would have been to reduce the production and sale of eau-de-colognes and household goods such as antiseptics and cleaning agents which were not intended for internal consumption. In contrast, medicinal tinctures would have been less affected. This is for a number of reasons that include that they could not be denatured, precisely because they are ostensibly produced to be taken internally as medicines. In addition, pharmacies were not covered by the restrictions placed on other forms of retail outlet selling alcohol-containing products. Finally, the manufacturers of medicinal tinctures were more likely to have been large-scale, established companies well-integrated with pharmaceutical retail chains, and as such more able to comply with the requirements of the new regulations as they affected the manufacturing process itself.

Until December 2006, according to State Registry of Medicines of the Ministry of Health and Social Development, Hawthorn tincture was allowed to be sold in bottles with volumes of 25, 40, 50, and 100 ml, while tincture of red pepper could be sold in 50 and 100 ml bottles. However, on December 1, 2006, the Federal Service on Surveillance in Health Care (Roszdravnadzor) issued an Order on September 7, 2006 N 2005-Pr/06 "On organization of work in the field of turnover of alcohol containing medicines" which restricted registration and certification of alcohol containing medicines to those sold in bottles of no more than 25 ml of volume.

Despite these regulations, our survey showed that fewer than 10% of the medicinal tinctures were in bottles of 25 ml or less, with 80% being in bottles of 100 ml or more. Although these figures do not necessarily represent the real distribution of tinctures by volume of bottle sold by pharmacies, the fact of the pervasive availability of these larger bottles is indisputable. The year of production on the labels of all purchased samples of bottles of these tinctures was stated as 2006. As these larger bottles were available in the vast majority of pharmacies until the end of the survey in June 2007, this suggests either that wholesalers and/or retailers had very large remaining stocks from 2006 or that some companies were producing these larger bottles contrary to federal regulations.

In conclusion, we have shown that in the first half of 2007, nonbeverage alcohols were available in a wide range of cities of the Russian Federation. The majority of these products were a cheaper and more affordable source of ethanol than standard Russian vodka and most were of a type reported to have been drunk by working-age men in our earlier study in Izhevsk (2004 to 2005). While the 2006 federal regulations introduced in part to reduce the availability and consumption of nonbeverage alcohols may have had some effect on certain classes of nonmedicinal products, at least until June 2007, medicinal tinctures as well as other types of nonbeverage alcohols appear to have been readily available. Further work needs to be done in 2008 and subsequently to assess whether restrictions introduced at the end of 2006 on the size of bottles allowed for medicinal tinctures have been effective.

The very high mortality associated with consumption of the nonbeverage alcohols surveyed in this study means that continued attempts to regulate and reduce their availability must be a continuing public health priority. The fact that there appears to have been an improvement in life expectancy in 2006 and 2007, with mortality directly related to alcohol falling particularly rapidly, should provide a positive incentive to do even more. However, such moves must be part of a comprehensive, multisectoral strategy for the reduction of the enormous burden of alcohol-related harm and mortality in the Russian Federation today. The problem of nonbeverage alcohols, and of samogon and other illegal alcohols cannot be tackled without simultaneously taking steps to reduce the consumption of legitimate beverages, especially spirits.

ACKNOWLEDGMENTS

We would like to thank Lyudmila Saburova, Nikolay Kiryanov, Alexey Orolov, and Vladimir Shkolnikov for their contribution to the earlier work on nonbeverage alcohol drinking in Izhevsk. Vladimir Shkolnikov, Denny Vågerö, and Alexey Oralov also provided helpful input to previous drafts.

This study was funded by a Wellcome Trust programme grant. The Wellcome Trust had no involvement in the study design, data collection, analysis, interpretation of results, the writing of this paper, or in the decision to submit it for publication.

REFERENCES

Erofeev V (1992) Moscow to the end of the Line. Northwestern University Press, Evanston, IL.

Kozlov AI (2006) Consumption of alcohol and its association with alcohol problems among aboriginal population of Russian North [in Russian]. Narologia 10:22–29.

Lachenmeier DW, Rehm J, Gmel G (2007) Surrogate alcohol: what do we know and where do we go? Alcohol Clin Exp Res 31(10):1613–1624.

Lang K, Vali M, Szucs S, Adany R, McKee M (2006) The composition of surrogate and illegal alcohol products in Estonia. Alcohol Alcohol 41(4): 446–450.

Leon DA, Saburova L, Tomkins S, Andreev E, Kiryanov N, McKee M, Shkolnikov VM (2007a) Hazardous alcohol drinking and premature mortality in Russia: a population based case-control study. Lancet 369(9578):2001–2009.

Leon DA, Saburova L, Tomkins S, McKee M, Shkolnikov VM (2007b) Alcohol consumption and public health in Russia (letter). Lancet 370:561.

Levintova M (2007) Russian alcohol policy in the making. Alcohol Alcohol 42(5):500–505.

McKee M, Szucs S, Sarvary A, Adany R, Kiryanov N, Saburova L, Tomkins S, Andreev E, Leon DA (2005) The composition of surrogate alcohols consumed in Russia. Alcohol Clin Exp Res 29(10):1884–1888.

Nemtsov AV (2002) Alcohol-related human losses in Russia in the 1980s and 1990s. Addiction 97(11):1413–1425.

Pärna K, Lang K, Raju K, Väli M, McKee M (2007) A rapid situation assessment of the market for surrogate and illegal alcohols in Tallinn, Estonia. Int J Public Health 52(6):402–410.

Pika AI, Prokhorov BB (1994) Neotraditsionalizm na Rossiiskom Severe (Neotraditionalism in the Russian North). Institute of National Economic Forecasting, RAN, Moscow.

POL (2005) The Pharmaceutical Market of Russia – Results for 2004. Available at: http://www.rol.ru/news/med/news/05/03/18_006.htm. Accessed April 7, 2008.

Popova S, Rehm J, Patra J, Zatonski W (2007) Comparing alcohol consumption in central and eastern Europe to other European countries. Alcohol Alcohol 42:465–473.

Putin V (2005) Annual Address to the Federal Assembly of the Russian Federation, 25 April 2005. Government of the Russian Federation, Moscow.

Tomkins S, Saburova L, Kiryanov N, Andreev E, McKee M, Shkolnikov V, Leon DA (2007a) Prevalence and socio-economic distribution of hazardous patterns of alcohol drinking: study of alcohol consumption in men aged 25–54 years in Izhevsk, Russia. Addiction 102(4):544–553.

Tomkins S, Shkolnikov V, Andreev E, Kiryanov N, Leon DA, McKee M, Saburova L (2007b) Identifying the determinants of premature mortality in Russia: overcoming a methodological challenge. BMC Public Health 7(1):343.

Treml VG (1982) Alcohol in the USSR. A statistical study. Duke Press Policy Studies, Durham, NC.

White S (1996) Russia Goes Dry. Cambridge University Press, Cambridge, UK.