

COMMERCIALIZATION OF MEDICAL CARE AND HOUSEHOLD BEHAVIOR IN TRANSITIONAL RUSSIA

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Abstract

This paper investigates the patterns of Russia's out-of-pocket household expenditure on health care using the household and individual data of Rounds 5 to 9 of the Russia Longitudinal Monitoring Survey covering the period of 1994-2000. Over this period, total household monthly expenditure on health care had grown slowly in real terms by about one-third. On average, households were spending about three percent of their income on prescribed drugs and medical services in 1994-1998. In 2000, this percentage suddenly grew to twelve percent due mainly to a drop in the average reported monthly household real income. Most of the household money spent on medical services went to the public medical care system for services that were supposed to be provided for free. The burden of out-of-pocket expenditure was income-regressive. While the households from the top income quintile were spending about two times more in absolute terms than the households from the bottom income quintile, in relative terms, they were spending about ten times less share of their income than the bottom quintile households. Our results, in general, comply with findings of other research that were based on surveys of treatment facilities, and other household data. We conclude that the level of out-of pocket expenditures is substantial and growing, and that the development of a shadow market for publicly provided medical services worsens the population differentiation with respect to the ability to receive high-quality health services.

I. Introduction

The development of a shadow market for publicly provided medical services worsens the population differentiation with respect to the ability to receive high-quality health services. In order to neutralize the negative effects while keeping in place some economic motivation for health care providers, an explicit acknowledgement by the government of the paid character of public health care is needed.

The existence and extent of shadow commercialization in Russia's public medical care system have been studied by several authors (Boikov et al., 1998; Satarov, 2001; Shishkin, 1999; Shishkin et al., 2002). This paper presents a demand-side view on the problem using the household data of the Russia Longitudinal Monitoring Survey. Where it is appropriate, our findings are compared with findings by other authors.

The following section presents a summary of expert views on the causes of the tendency towards shadow commercialization in Russia's public health care system. Section III describes the data set. Section IV analyzes the contribution of private medical care providers and private insurance suppliers to the overall commercialization of Russia's health care sector. Section V describes the patterns of household out-of-pocket expenditure on health care including the expenditures on drugs and medications, outpatient treatment, and inpatient treatment in public health care facilities. In Section VI, we present the results of two logit regressions that determine which household and individual characteristics have a statistically significant influence on the decision by a household or an individual to spend extra money on health care. Section VII concludes the paper.

II. Causes of shadow commercialization

There are two most often cited causes of the tendency towards shadow commercialization in Russia's public health care system. First, the system has not been properly financed from public sources since the time of its creation in the early 1990-s. Persisting overall under-financing from public sources forces patients to compensate health care providers with their own money. Second, the current system does not provide for proper incentives when health care providers interact with the patients. By paying out-of-pocket, patients introduce some kind of economic motivation in order to obtain a guarantee of "quality".

Overall underfinancing

The new Russian State inherited the Soviet-era constitutional guarantees of free high-quality public health care. These guarantees have proven to be too ambitious and at the same time too vague. The misbalance between the declared state guarantees and their funding has been causing a stable deficit at all level of public financing of health care. Figure 1 provides a typical picture using the 2000 data. Since no clear distinction has been made between the responsibilities of the federal and regional budgets, the federal and regional funds for Mandatory Medical Insurance (MMI), and private providers of medical services, it is not even possible to get the precise figure of the overall deficit in the public health care financing. Different experts provide different estimates varying from 11-25% (Shishkin 2000) to 40-65% (Makarova 2000).

From 1991 through 1998, when the federal budget experienced chronic deficits, public spending on health care shrank by 33 percent in comparable terms, while government guarantees of free medical care to citizens remained unchanged (Dmitriev et al, 1999). Even in recent years of stable budget surpluses, President Vladimir Putin calls the government financing of its social obligations "unacceptable" (*"Vedomosti,"* Feb. 20, 2003). The total annual social obligations of Russian governments at all its levels (federal, regional, local)

constitute 6,5 trillion rubles while their total consolidated budget does not exceed 3,5 trillion rubles. While the situation with government spending on health services is less dramatic than one with spending on culture and education, the funding is still too low to support the existing network of medical institutions.

The continuous misbalance between the volumes of federal guarantees for free health services and effective federal funding for these purposes was the main reason for the development of a shadow market in this sector.

MMI employers' contributions: disincentives to pay

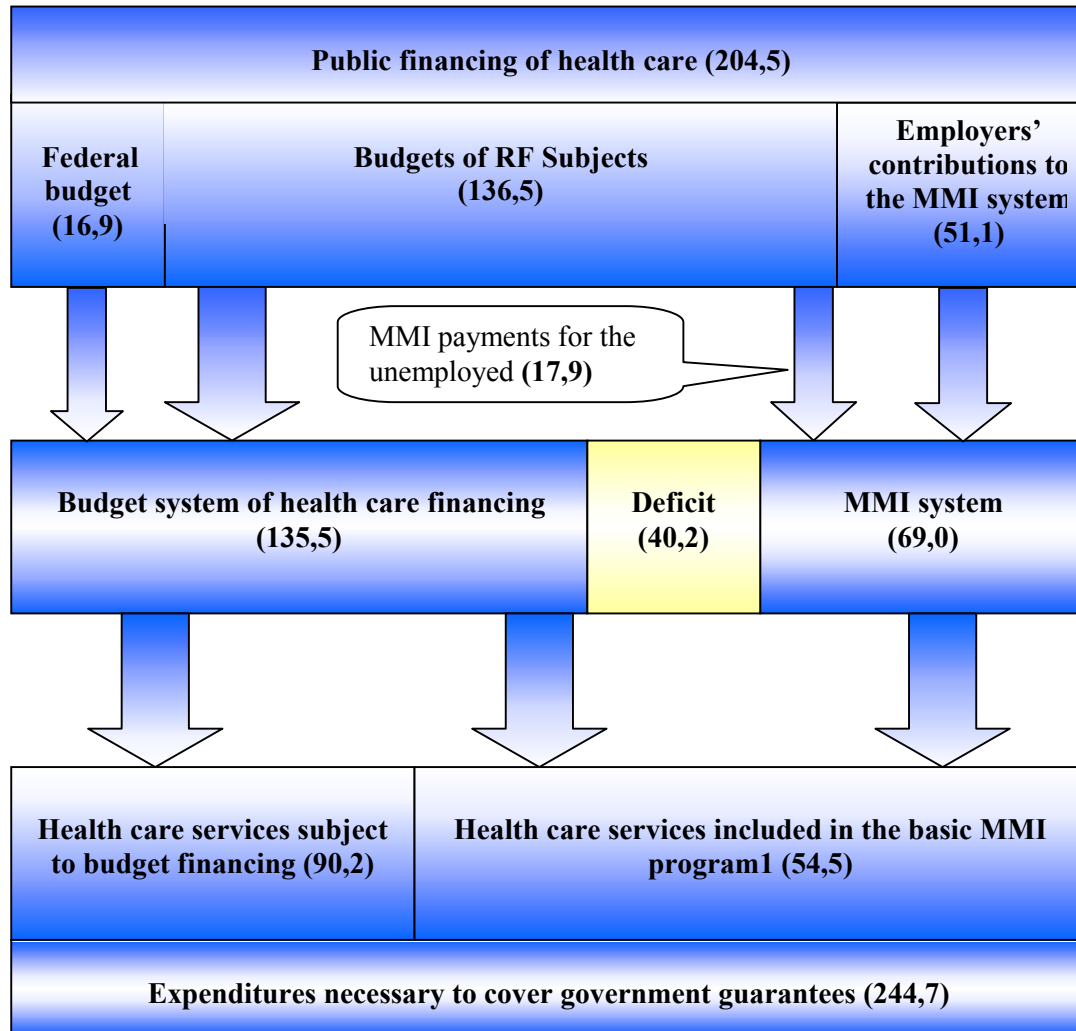
Mandatory medical insurance territorial funds should accumulate employers' contributions to the MMI system on behalf of their employees. In reality, payments are made in such amounts that are insufficient for funding the MMI programs. On average, MMI funds accumulate only about one-third of the costs of a basic MMI program (Dmitriev et al, 1999, and Figure 1).

The MMI contributions constitute a smaller part of the Unified Social Tax, which also includes contributions to the Pension Fund of Russian Federation and to the Social Insurance Fund of Russian Federation. Out of the 35.6% tax rate, only 3.4% go to a regional MMI fund that finances the services of a public health care facility to which a given employee is assigned (0.2% that go to the federal fund are used to compensate for inter-regional differences). There is no clear connection between the volumes of contributions and the volumes of the public services provided. Today's effective average rate of the Unified Social Tax is about 30 - 32% of a firm's total employment compensation fund, and businesses consider it excessive. Hence, there exists a widespread practice of shadow employment compensation that accounts for one-third of the total labor bill, and the *de-facto* effective average rate of the Unified Social Tax is estimated at only 20 - 22% ("Vedomosti," Feb 11, 2003). Moreover, millions of self-employed persons do not pay this tax.

A peculiar equilibrium arises. While the MMI contributions that are meant for employed citizens seem to be insufficient to fully finance the public medical care as should be provided for such insured (Shishkin 2000), the contributors have strong incentives to minimize even these insufficient payments.

Figure 1

**Deficient public financing of health care in Russia
(2000, billion rubles)**



Source: Shishkin et al (2002)

Political struggles over compensation for non-working citizens

At present, the MMI payments compensating for the unemployed are provided at the expense of local and regional budgets. Numerous eclectic regional schemes for funding medical care have arisen, based on very diverse regional taxation systems. These schemes involve large-scale substitution for government financing by private businesses mostly in the form of shadow or quasi-formal payments to regional governments and, sometimes, directly to medical institutions. The federal government stipulates that coverage is to be universal, and is supposed to pay matching contributions to regional budgets in order to ensure “federal entitlements”. The matching contributions have become an object of many political struggles between the levels of the government. Irregular financing by the federal government of its over-stated health care guarantees creates incentives for regional governments to blame all regional health care system problems on the lack of federal funding for such guarantees.

The tax reform of 2000-02 has drastically reduced the share of regional budgets in the total tax revenues from 54% in 1999 to 40% in 2002 (Yasin 2002). At the same time, the compensating transfers from the federal center have been of a general nature, not assigned to a particular program task. In such conditions, regional health authorities have experienced a lack of funds to finance their health care obligations.

In April 2003, the government has decided that the public medical services to the unemployed will be compensated from the Federal Pension Fund according to the standards that are soon to be defined. From the long-run viewpoint, the involvement of the Federal Pension Fund in the financing of the health care is very natural since it is a step to the creation of a transparent unified publicly financed social insurance system with clearly defined government guarantees. However, in the short run it worsens the current non-transparent situation where several independent government bodies on the federal and regional levels are responsible for the provision of the same public guarantees. These short-run measures are clearly a result of the political pressure of regional governments, who seek to get some control over the financial resources of the Federal Pension Fund.

Private insurance companies: hopes unfulfilled

A shift from the budgetary system of financing to the MMI system was the pivot of Russia's health services reform in the 1990-s. A peculiarity of the Russian MMI system is that two types of entities may perform the role of insurance carriers: private health insurance companies and branches of territorial MMI funds. All versions of the Russian Federation Health Development Concept adopted in the 1990-s implied that private insurers should be responsible for health care purchasing for the MM system, while MMI funds' branches might act as substitute insurers only in remote low-populated areas.

While introduction of medical insurance in early 1990-s was viewed primarily as a means of obtaining guaranteed sources of financing, there was another important goal declared, i.e., to create incentives for quality and efficiency of publicly provided medical services. The need for such incentives has been continuously expressed in population polls during the years of the reform. For instance, Ordina et al (1997) report that 85 percent of the respondents accepted the concept of paid health care if such incentives were created. The idea was to introduce institutional separation of those who provide medical services from those who pay for them. The competition between medical service providers for receiving finance was supposed to emerge. The insurance companies were also expected to compete for contracting citizens' money, and act as intermediaries between citizens and medical institutions. Hence, patients' right to choose the doctor, medical institution, and intermediary was to be ensured within the public health care system as well as within the private one.

In the 1990-s, when the federal government was steadily violating its obligations to finance health care, and per capita rates at which insurers were funded did not suffice to cover medical costs of benefit plans promised to the insured, the insurance companies survived by transforming their role. In spite of the original intent of the system creators, no visible competition between insurers was achieved. In the majority of cases, regional health authorities did not support the idea of insurers' involvement in health care planning, as they believed it was their prerogative. Regional and local government agencies often forced insurers to contract treatment facilities under their administration in order to keep them running regardless of quality and effectiveness of care they provided. The insurers became simple translators of cash flows. They strove to receive more funds at their disposal and live on their commissions (supposed to cover costs of administration) and profit on legal and illegal short-term investments of spare cash. An optimization of health care structure and higher efficiency of resources' utilization through sophisticated management of patient and cash flows could be hardly seen in their activities. Formal terms of contracts entered into by an insurer, an insured, and a medical institution were, to a great extent, supplemented with informal terms and agreements that involve regional authorities. Many regional authorities argued that operational costs of insurance companies were too high, while their efficacy was doubtful, and chose to eliminate private insurers from their territorial MMI systems completely.

The involvement of private insurers in the MMI system, therefore, has not built a quality-enhancing incentive link between the patient and the health care provider, thus, creating an opportunity for under-the-counter deals.

Inflexible financing of health-care providing facilities

In the 1990-s, public health care providers were transformed from budget organizations into treatment-providing facilities, i.e., state enterprises with no autonomy to manage the resources but with some additional tax liabilities. Federal priorities and requirements to the payment system from a financing party (a regional government or/and a territorial MMI fund) to a treatment-providing facility were poorly specified from the start. In practice, the design of new payment methods was left to the discretion of regional authorities. In most of the payment schemes introduced instead of or along with the former simple line-up budgets, it was the sick patient who was chosen as the basis for costs' calculation. Thus, introduction of new methods usually created perverse incentives making providers economically interested in sick, not healthy patients. For instance, the prevention services listed in the basic MMI package are paid dozens, hundreds times less than therapeutic, surgical and other interventions for critically ill patients or confirmed invalids (Makarova 2000).

Labor remuneration practices in health care providing facilities

An important cause of the shadow commercialization in the Russian public health care system is the lack of economic incentives for the medical staff to work for the salary paid by the government. The medical staff that works directly with the patients in a public health care facility has little economic incentives for efficient performance.

The attempts to introduce incentive mechanisms into the health care provision that took place in the 1990-s dealt mainly with the relationships between a financing party (regional government or MMI fund) and a public treatment-providing facility. Within a public facility, the official system of rewarding and punishing medical staff has remained quite rigid and non-responsive to the needs of a particular patient. Those few incentives that were present in the payment methods used to finance treatment-prevention facilities were minimized by the egalitarian and inflexible remuneration system for the medical staff.

The hired medical staff of public facilities remains entitled to timeless employment contracts and guaranteed wages. The Ministry of Labor and the Health Ministry still regulate the employment and wages procedures introducing small amendments in the current salary

rates for the staff of budget-funded institutions. Attempts to change the wages system for medical professions can be observed only at the level of chief doctors of the treatment-prevention facilities. However, current employment and wages regulations limit such attempts. For example, with the deficit financing and the necessity to preserve wages calculated by hours worked, it is very difficult to discharge unneeded or undisciplined staff and to stimulate good workers.

Introduction of performance-based wages led sometimes to unforeseen medico-organizational consequences. For instance, the first attempts to switch to the efficiency wages in city polyclinics of Moscow and Saratov made the wages of the primary care polyclinic doctors five to twenty times lower than the wages of specialized doctors, causing mass resigning from the polyclinics. It happened because the wages were calculated on the basis of official service listings where the number of services provided by medical specialists far exceeded the number of services provided by general practitioners or pediatricians. Also, specialized services were split into sub-services in such a way that the assumed total workload of medical specialists was much heavier than the actual one.

Since 2002, the newly developed imperfect incentive-based payment methods have been under attack of the new Budget Code. Any incentive-based wage scheme requires that a medical care provider had some freedom of expenditure reallocation within the limits of an adopted budget. The new Budget Code does not allow for such freedom, and requires that cash budget should reflect all kinds of revenues received by an institution. The very status of a public institution, which entails budgeting, fails to provide economic independence for health care service producers to the extent necessary to facilitate rational economic choices.

III. The Data

Most of the findings presented in this paper are based on the primary data of Rounds 5 to 9 of the Russia Longitudinal Monitoring Survey (RLMS). RLMS is a series of nationally representative surveys of the Russian Federation coordinated by a team of researchers from the University of North Carolina at Chapel Hill (USA). The surveys were conducted in December 1994 (Round 5), October 1995 (Round 6), October 1996 (Round 7), November 1998 (Round 8) and October 2000 (Round 9). Two types of questionnaires were filled in, one describing household characteristics, and the other describing individuals. An access to RLMS data is provided at the RLMS Internet home page: <http://www.cpc.unc.edu/rlms>.

We consider only the households included in the original 1994 sample, and the respondents who were at least 18 years old during the year of a survey. That leaves about 7,000 – 8,000 individuals and 3,000 – 4,000 households. The structure of the sample of individuals is presented in Table 5 (see Appendix Two). The average age of the respondents is 45 years, women constitute 58% of the sample, and about 25% of respondents live in a rural area. The geographic distribution of the respondents also can be found in Table 5.

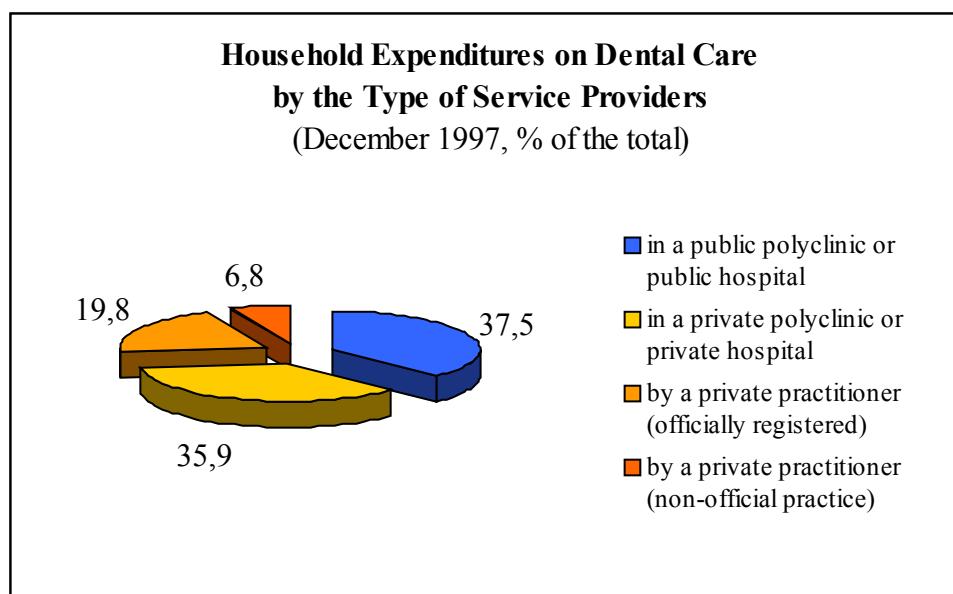
The data contain detailed information on the demographic characteristics of households, their income, earnings, food consumption and prices, etc., as well as medical expenditures during the month before a survey and types of health insurance held by household members. Tables 6 and 7 in Appendix Two provide an overview of the responses to the questions concerning health care expenditures by individuals and households.

IV. Private expenditure on health care: descriptive analysis

Private providers: insignificant role

Commercialization of health care in Russia has not yet led to a booming development of a large-scale private sector. Most of private expenditures on health care go to public medical care providers. Private providers play a noticeable role only in few specialized fields. Of the total number of treatment facilities, only 1% are private. Out of this number, nine-tenth are small medical centers specialized in urology, dentistry, plastic surgery, etc. Dentistry is a typical example. Private dental clinics and officially registered private practitioners supply a little more than a half of dental services in money terms. The other (smaller) half of the money allotted to dental care the population spends in public facilities, officially and non-officially (Figure 2).

Figure 2



Source: Boikov et al., 1998.

There are also few large private multi-purpose clinics build mainly by large corporations for their employees (Moskalenko, 2003). The relative role of these private facilities is almost negligible if one considers the number of patients treated. However, since the services provided in these facilities are considerably more expensive than the ones provided in the public sector, their share in the money spent on medical care is far more pronounced. For example, while private outpatient treatment facilities service less than 3,7%¹ of the total number of patients, they accumulate one-third of the total household expenditures on outpatient care (Figures 3a, b). Private inpatient treatment facilities provide services to less than 4,5 %² of the patients but account for 15,4% of the total household expenditures on this type of medical care (Figures 4a, b).

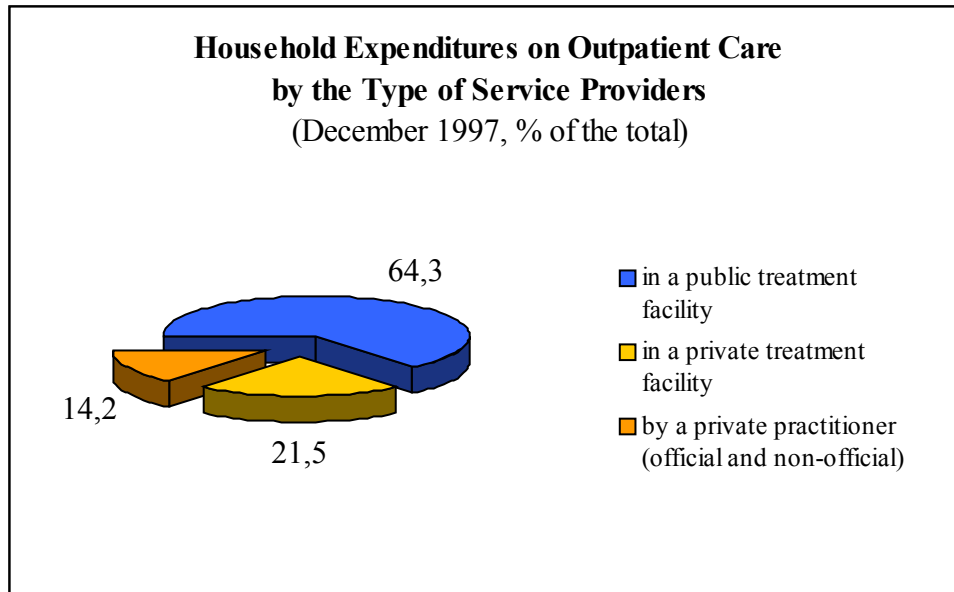
Table 8 (see Appendix Three) presents the RLMS data on the choices made by individuals when selecting a commercial private treatment facility versus a non-commercial one. Some of these data are also used in Figures 3b and 4b. The data are grouped on the basis of the household income distribution. The data clearly suggest that commercial health care in Russia has been a luxury good available mainly for the rich. In 1994, only 2,4 % of the patients from

¹ This estimate is based on the RLMS individual data. Boikov et al (1998) provide another estimate, 7%, based on household data.

² Boikov et al (1998) provide an estimate of 0,4%, based on household data.

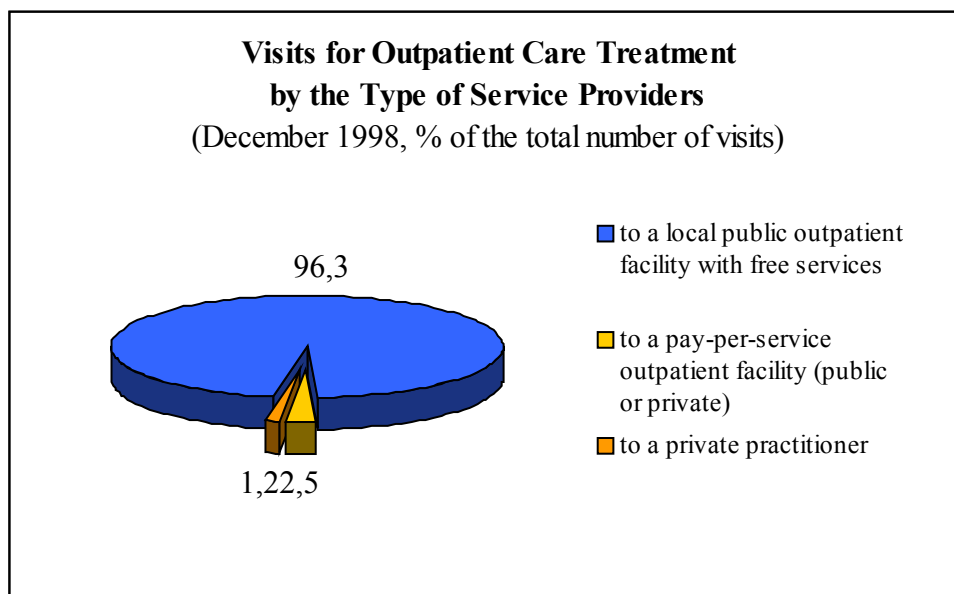
the lowest income quintile chose to go to a commercial treatment facility or a private practitioner while among the patients from the highest income quintile, 9,5% did so. In 2000, these numbers remained qualitatively same: 3,4% and 10,5%. However, it is difficult to see any pronounced time trend in these percentages, from 1995 to 2000 these numbers went up and down quite irregularly. The years under consideration were the years when the new mandatory health insurance system has been establishing itself in Russia. One of its declared aims was to provide a more equal access for the poor to higher-quality commercial health care facilities. The numbers, nevertheless, demonstrate no progress from the viewpoint of equality.

Figure 3a.



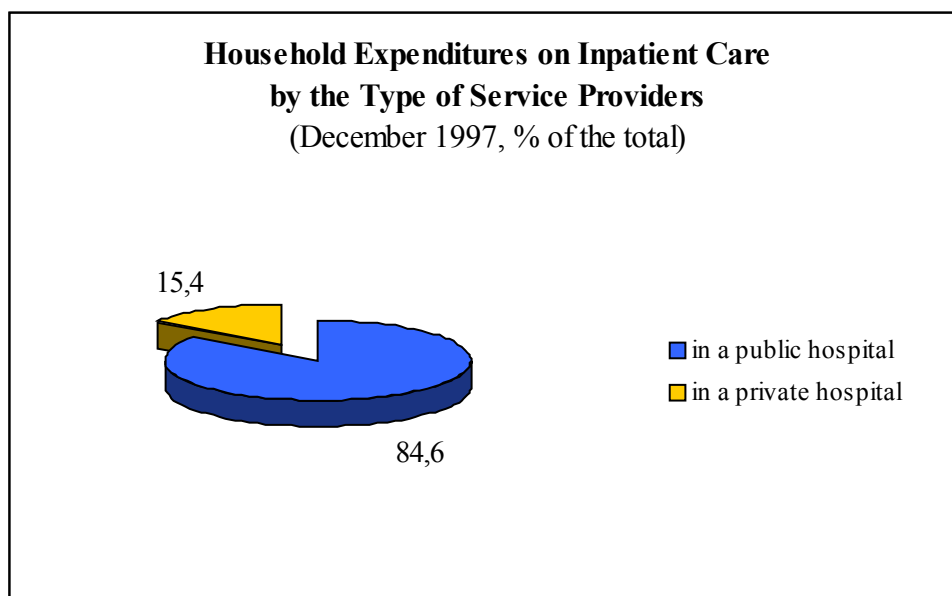
Source: Boikov et al., 1998.

Figure 3b.



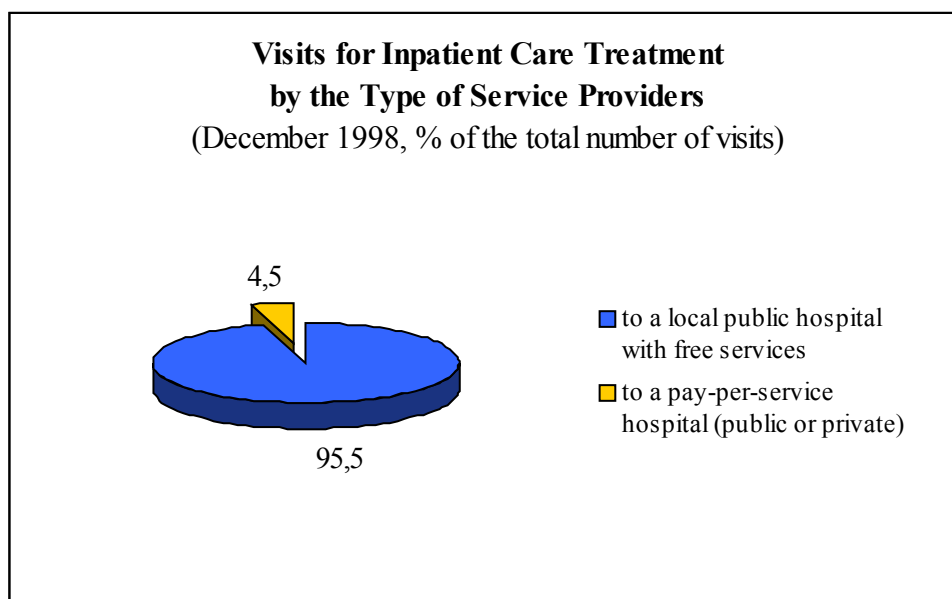
Source: RLMS Individual Questionnaire Data

Figure 4a.



Source: Boikov et al., 1998.

Figure 4b.

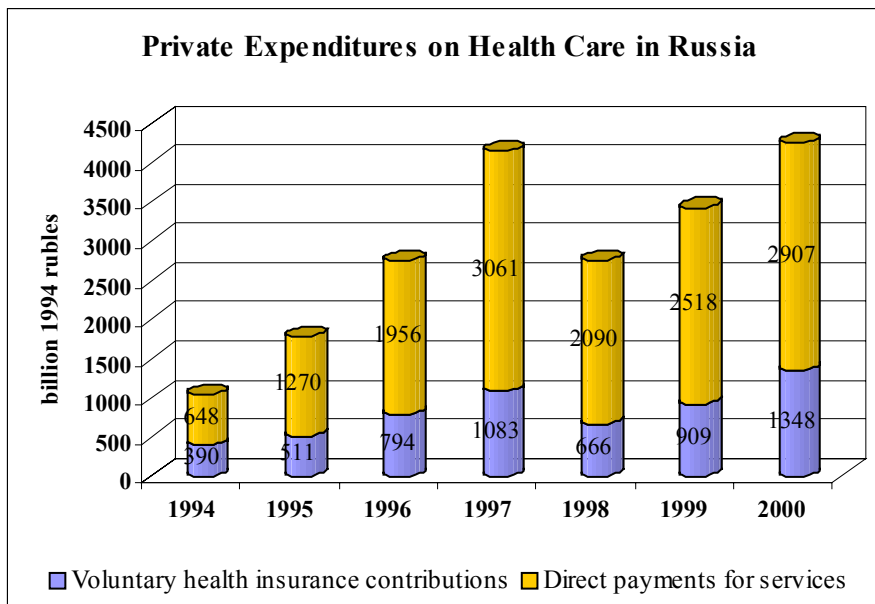


Source: RLMS Individual Questionnaire Data

Voluntary medical insurance

Private expenditures on medical services in Russia are comprised of two main components: the direct payments for services, and the expenditures on voluntary medical insurance. Figure 5 illustrates the dynamics of these two components in real terms since the beginning of the reform using the government statistical data. Both components demonstrate a stable growth in about the same proportion, the direct payments accounting for 70-75% of the total. There was a temporary drop in 1998 associated with a financial crisis in the country.

Figure 5

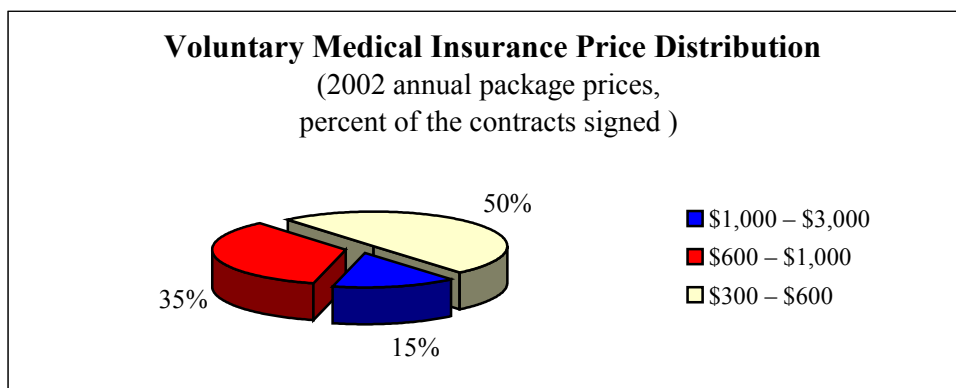


Source: Goskomstat data

A substantial growth in the voluntary medical insurance expenditures may be a surprise for those familiar with the Russian realities. The fact is that only few Russian insurance companies practice health insurance in its “classic” form. These companies service only 2% of the total number of individual patients and 1,5% of Russian-owned enterprises, which provide insurance for their employees. Their most valuable clients are 80% of enterprises owned by foreigners (Moskalenko, 2003).

Although the majority of population (80% by the 2000 poll) regularly reports readiness to pay extra money for more quality of services, only less than 10% express willingness to obtain a voluntary medical insurance at current prices someday. Current price distribution is presented in Figure 6. Indeed, with the average annual wage around \$800, the prices look high. More affordable terms are estimated at \$25-\$30: for the annual price of \$25-30, 67% of population (71% of the employed, and 56% of the unemployed) agreed in 2000 that they would purchase additional voluntary health insurance (Moskalenko, 2003).

Figure 6.



Source: Moskalenko, 2003

The apparent growth of voluntary medical insurance expenditures can be explained by the fact that the majority of such contracts in Russia could be called “insurance” only nominally. For instance, most of the individual voluntary medical insurance contracts are so-called

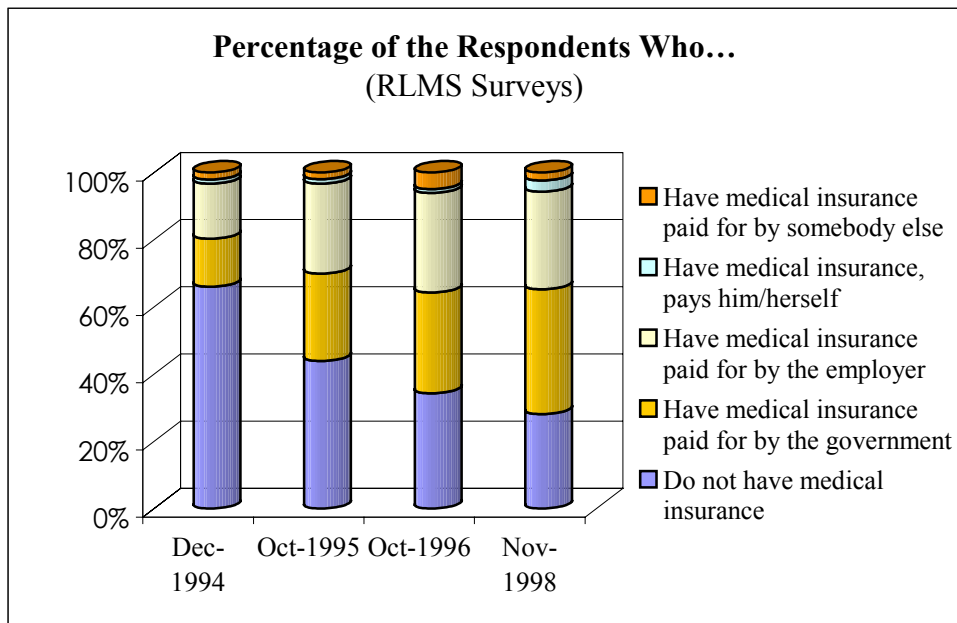
“mono-policy” agreements, also called “deposit insurance schemes”. The scheme is designed to mask the paid character of the provision of supposedly free-of-charge services, and means that the recipient of a medical service pays to the service provider indirectly, signing a “deposit insurance scheme” with an insurance company associated with the provider. The sum of “insurance deposit” includes the full cost of the service plus the insurer’s fee. Unlike in a standard insurance contract, no risk in the traditional sense is involved here; all the participants of the agreement know beforehand what kind of treatment for which disease is to be provided. However, since such contracts commonly violate the legal norm that voluntary health insurance programs may cover only services not included in the federal Mandatory Medical Insurance program, the insurance company essentially takes on the risk of legal charges for violating the law. Several court trials have taken place in Russia on this subject, the results being ambivalent (Kamyshenko 2002).

The RLMS data provides an alternative view at this problem. The number of individuals who reported having a medical insurance demonstrates a steady growth in 1994 – 2000. Their share in the total number of the respondents had grown from 34% in 1994 to 87,7% in 2000. In 1994, when the questionnaires included the question, *Do you know what "medical insurance" means*, only 77,5% of the respondents answered positively. Most of the growth is obviously due to the introduction of the government MMI program but the way the questionnaires formulated this question in 1994-1998 does not allow for the exact comparison. The option *My insurance is paid for by my employer* does not tell the difference between the participants of the mandatory program and the providers of a supplementary insurance (Figure 7a). In 2000, the question was stated differently (Figure 7b). We estimate that the share of the MMI recipients in the total number of the insured exceeded 90% in all the rounds of the survey (Figures 7a, b).

The sample share of the individuals who declared that they paid for the medical insurance themselves varied insignificantly around 1,2 – 1,3% during 1994-1996, had grown to 3,3% in 1998, and then dropped to the negligible 0,4% in 2000. The decline may be explained by a contemporary change in the tax legislation that closed a loophole that allowed employers to use voluntary individual insurance agreements in tax minimization schemes.

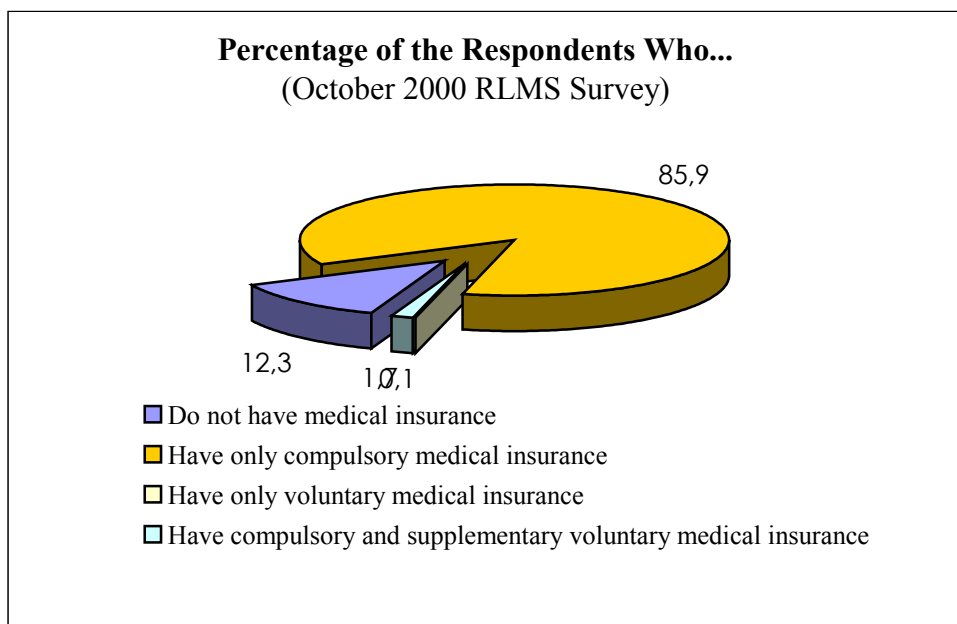
The insurance price data provided by the individual RLMS respondents support this opinion. Figures 9a, b present the mean and standard deviation data on the reported monthly costs of voluntary medical insurance in terms of 1994 rubles and US dollars. Since the costs reported in 1994-1996 included several suspiciously high values, the corresponded standard deviations are several times larger than the 1998 and 2000 standard deviations. A qualitative decline in the reported costs is visible starting 1998, the year of a financial crisis in Russia.

Figure 7a.



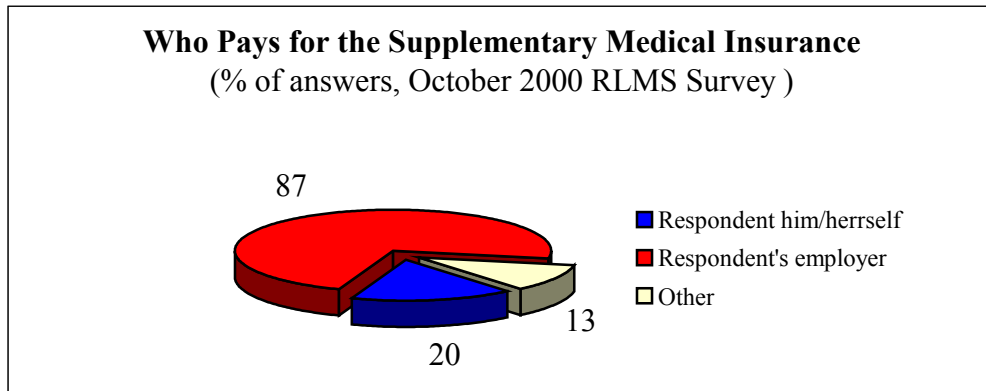
Source: RLMS Individual Questionnaire Data

Figure 7b.



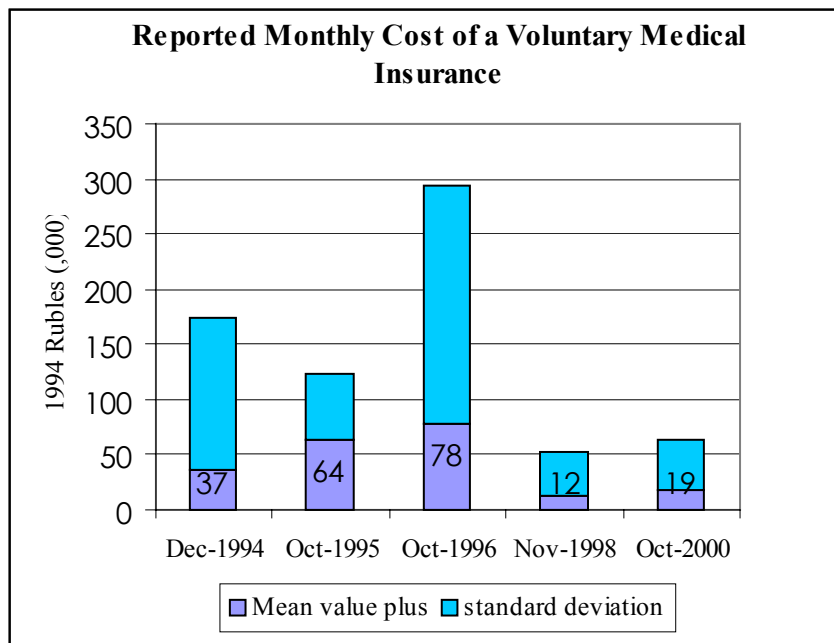
Source: RLMS Individual Questionnaire Data

Figure 8.



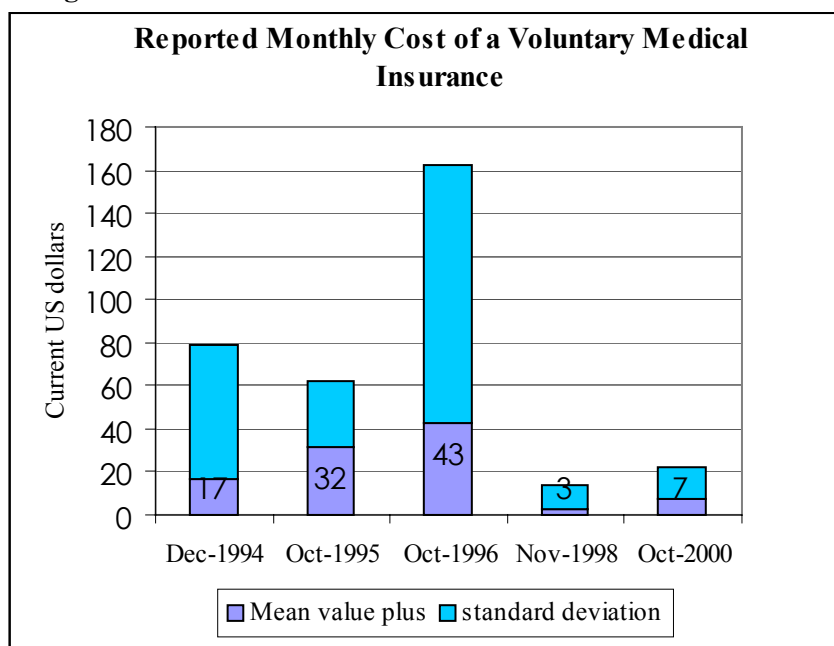
Source: RLMS Individual Questionnaire Data

Figure 9a.



Source: RLMS Individual Questionnaire Data

Figure 9b.

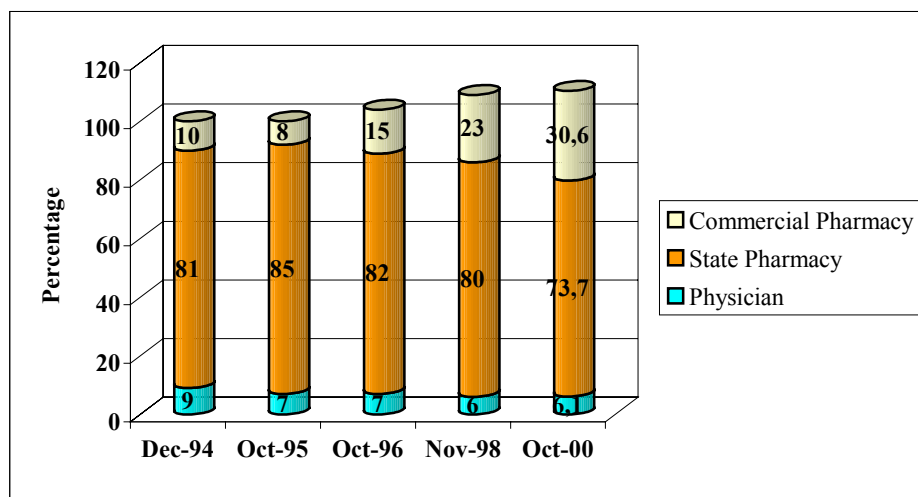


Source: RLMS Individual Questionnaire Data

Private Pharmacies

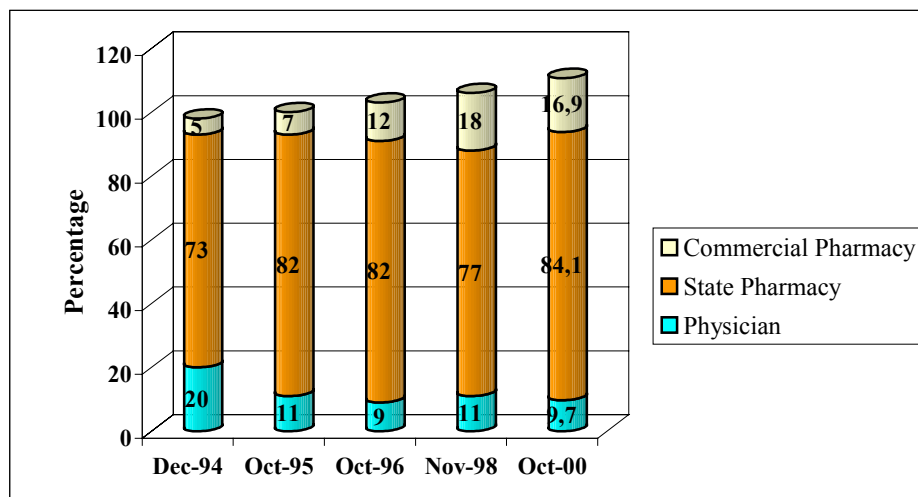
The RLMS individual questionnaire data indicate a steadily increasing role of private commercial pharmacies, particularly in urban areas, as the source of medications prescribed by health workers (Figures 10a, b). Although state-owned pharmacies remained the most common source of medications, their share was slowly declining in urban areas.

**Figure 10a. Where Medications Prescribed by Health Workers Were Obtained
(Respondents in Urban Areas)**



Source: RLMS Individual Questionnaire Data, Zohoory et al. (2001)

**Figure 10b. Where Medications Prescribed by Health Workers Were Obtained
(Respondents in Rural Areas)**



Source: RLMS Individual Questionnaire Data, Zohoory et al. (2001)

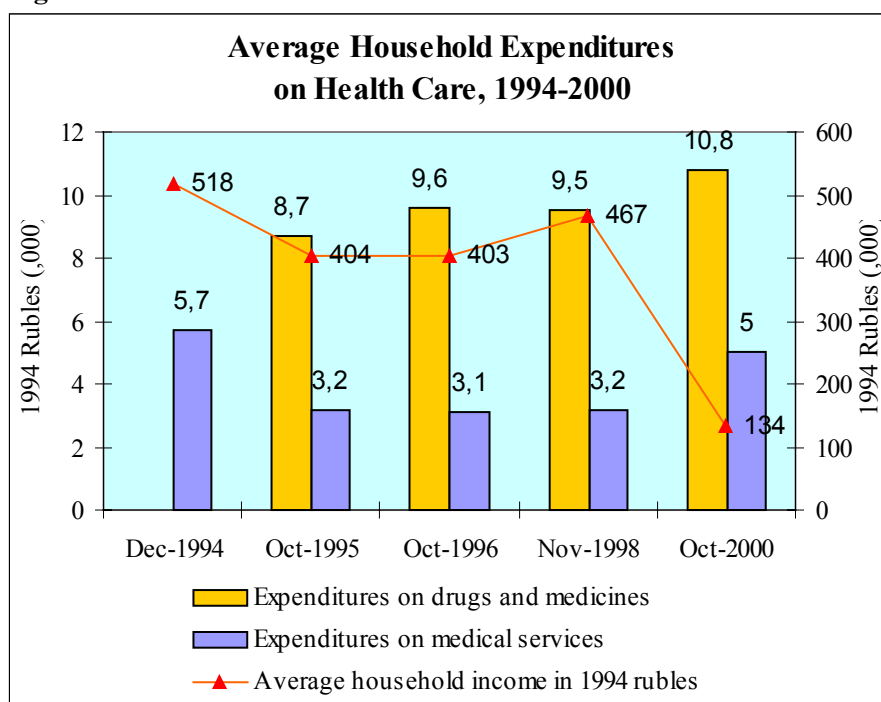
Household Expenditures on Drugs and Services

The RLMS household questionnaires included two very important questions that directly asked about the volumes of household expenditures on drugs and medical services. Based on the answers provided by the respondents, we calculated the average household monthly expenditures on these items for each round of the survey. Interestingly enough, we were not able to find any pronounced trend in the real value of either indicator (obviously, the nominal values grew sufficiently because of the inflation). We used two alternative price deflators: the consumer price index, and the Ruble/US dollar exchange rate. The results are presented in Figures 11a, b.

The results suggest that, in the period of 1994-2000, an average Russian household was spending monthly about nine to ten thousand of 1994 rubles on drugs, and about three to five thousand of 1994 rubles on medical services, and this numbers did not depend on the fluctuations in the average household income.

We did a loose check of these results by comparing them with the *Goskomstat* data presented in Figure 5. We divided the *Goskomstat* annual data on the private expenditures on medical services by the twelve times our estimates of the monthly household spending on the medical services, and obtained estimates for the number of households in Russia in a corresponding year. The 1994 and 1995 estimates (10 million and 33 million households) were not so good but the estimates for 1996, 1998, and 2000 (50 million) were close to the actual figures.

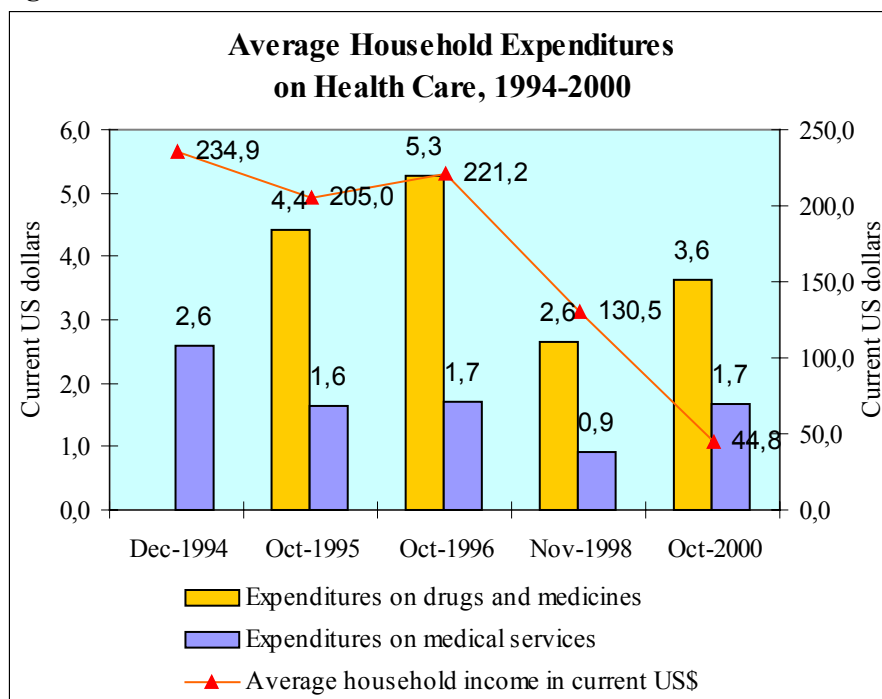
Figure 11a.



NB: In the 1994 questionnaire, expenditures on drugs were combined with other expenditure items such as the costs of gym exercises. Hence, we did not consider them.

Source: RLMS Household Questionnaire Data

Figure 11b.

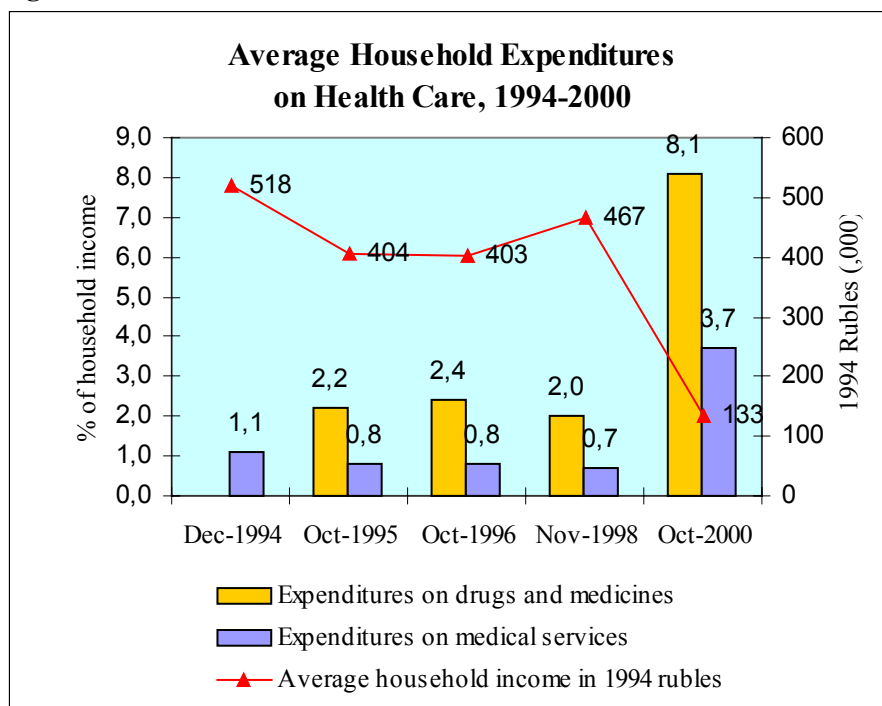


NB: In the 1994 questionnaire, expenditures on drugs were combined with other expenditure items such as the costs of gym exercises. Hence, we did not consider them.

Source: RLMS Household Questionnaire Data

Since there were considerable fluctuations in the average household in the period of 1994-2000, the share of the health care expenditures in the income went up and down, too (Figure 11c). While in 1994-1998 an average household was spending a little more than two per cent of its income on drugs, and a little less than one per cent, on medical services, in 2000, this shares suddenly had grown to eight and four per cent, because of the significant (3,5 times) decline in the real income.

Figure 11c.



Source: RLMS Household Questionnaire Data

While the average household expenditures on drugs and medical services were very inelastic with respect to the ups and downs of the average household income, one cannot say the same about the behavior of households with different income levels during the same year. For each round of the survey, we divided the households into five quintiles on the basis of the per capita household income, and then compared their health care expenditures (Figures 12-14, 16-17). For each round, we found a typical J-shaped picture when the bottom quintile spends more than each of the three middle quintiles, the three middle quintiles spend about equal amounts, and the top quintile spends the most. Then, for each quintile we calculated the relative shares of health care expenditures in the household income. We expected the J-shaped picture to reverse, and did find this effect in the case of 1994 medical services expenditures (Figures 12a, b). However, in all other cases, the difference in the income levels between the top and the bottom quintiles was so high that we found a steady decline of the health care expenditure as a percentage of a household income with the growth of the income (Figures 13, 14, 16,17).

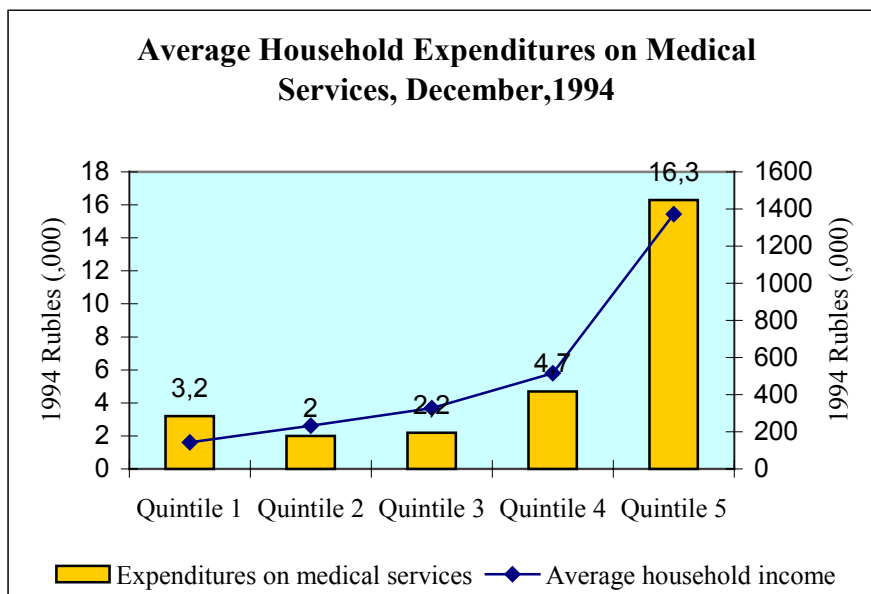
We may conclude that household health care expenditures posed a heavier burden on lower income groups. This is particularly notable for drugs, where the poorest were spending more than several times the percentage of income reported by the richest.

Our 1996 findings can be compared with the 1996 findings by York University researchers (Street et al, 1997). They conducted a survey of household expenditures for drugs in three locations in Russia. They found that the average percentage of household income spent on prescription and over-the-counter non-prescription drugs combined was 16% for 4,123 households surveyed. This number is much higher than our estimate of 2,4% for the population as a whole but it is close to our estimate of 24% for the poorest quintile. Indeed, the York University sample includes only relatively poor cities of Tula, Pskov, and Penza while the RMLS sample is nationally representative.

Our findings for 1996 and 1998 can be also compared with the results of Boikov et al. (1998) for December, 1997, presented in Figure 15. Their findings are based on a statistically representative sample of 3,000 households living throughout the country, including those in the more prosperous urban areas of St. Petersburg and Moscow. Qualitatively, they results are similar to ours: for instance, they also found the incidence of out-of-pocket expenditure for

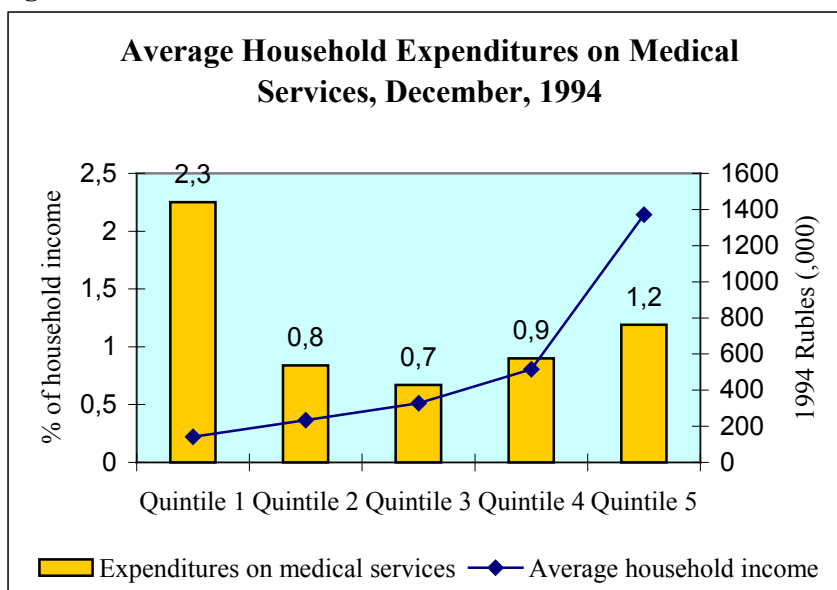
health care to be regressive. Quantitatively, however, their results are close to ours only for low-income groups. Their average estimate of 13,8% of monthly household expenditure going for drugs and medical services far exceeds our estimates of 3,2% for October, 1996 and 2,7%, for November, 1998. The reason for such a diversion may be that their survey was especially designed to investigate health care expenditures while the RLMS surveys had more general objectivity. For instance, three-quarters of their respondents reported non-zero expenditures on drugs while only one-half of the RLMS respondents did so.

Figure 12a.



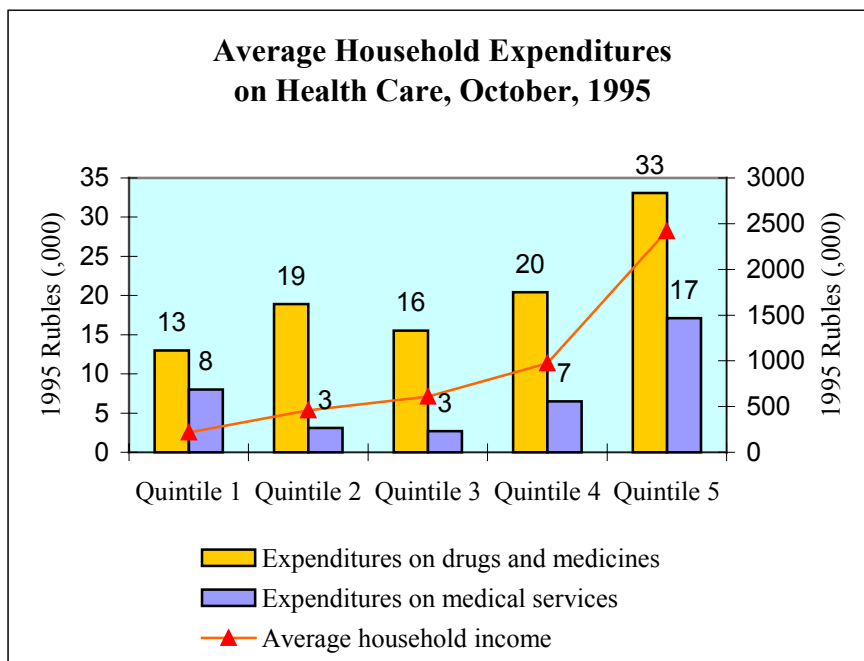
Source: RLMS Household Questionnaire Data

Figure 12b.



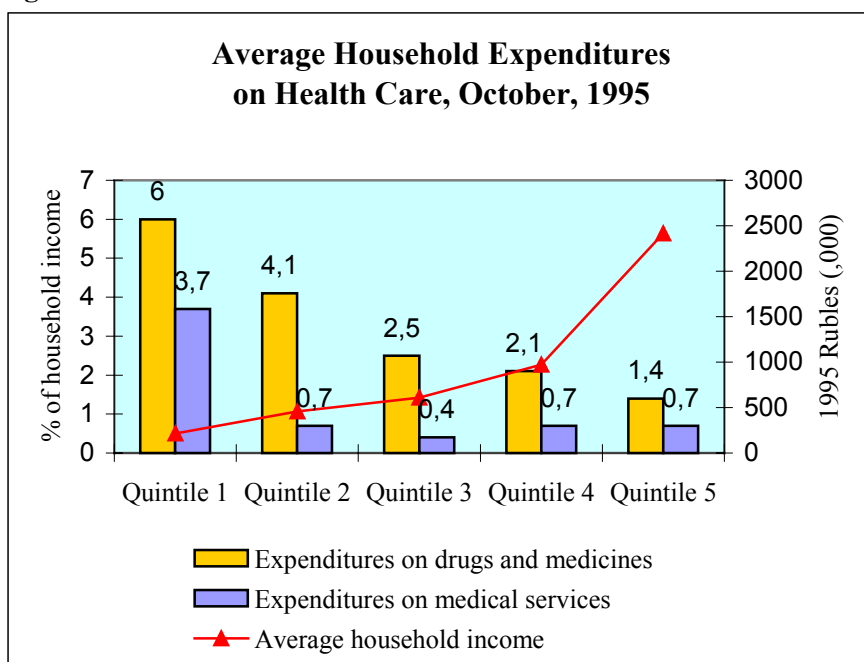
Source: RLMS Household Questionnaire Data

Figure 13a.



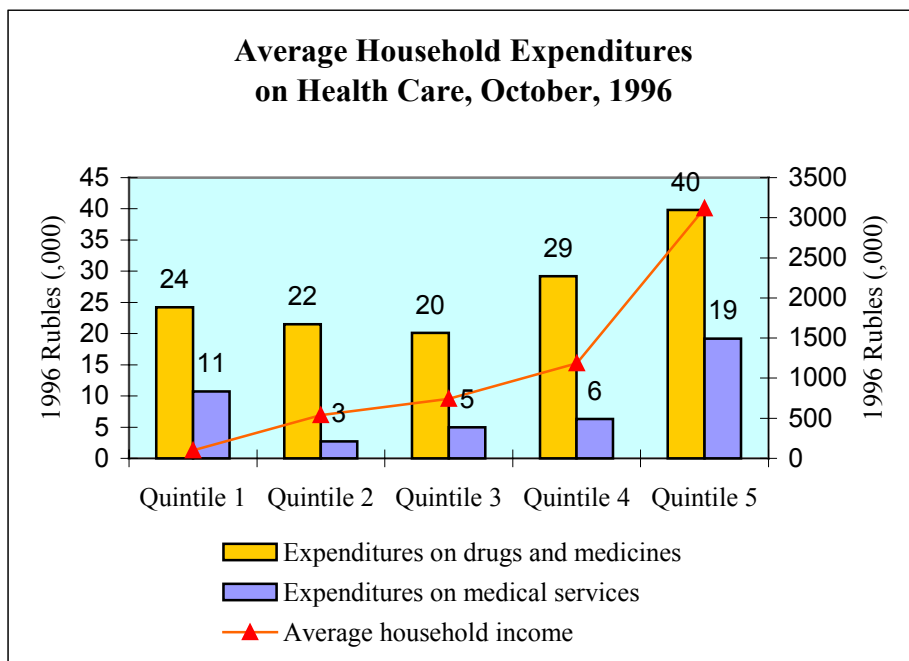
Source: RLMS Household Questionnaire Data

Figure 13b.



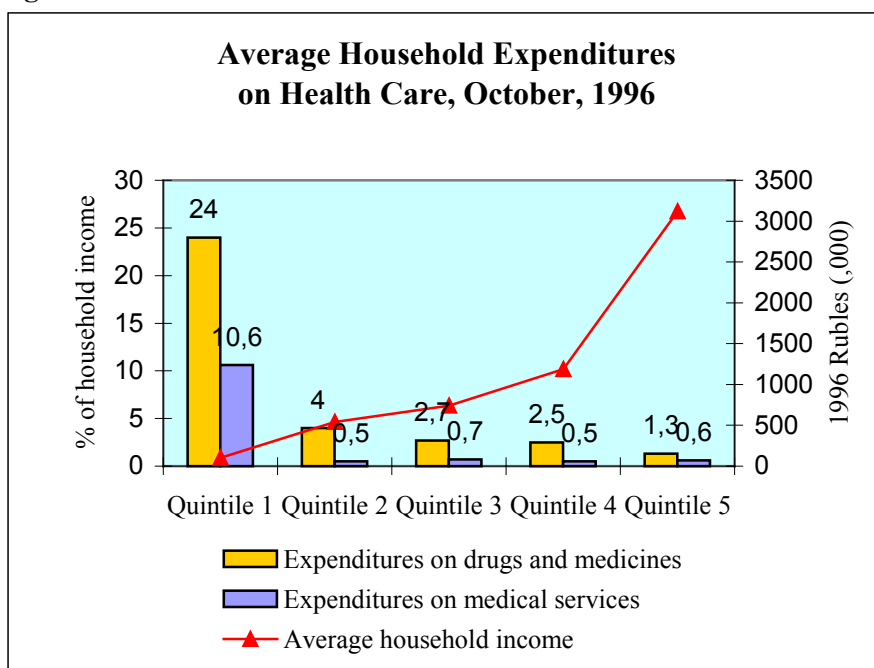
Source: RLMS Household Questionnaire Data

Figure 14a.



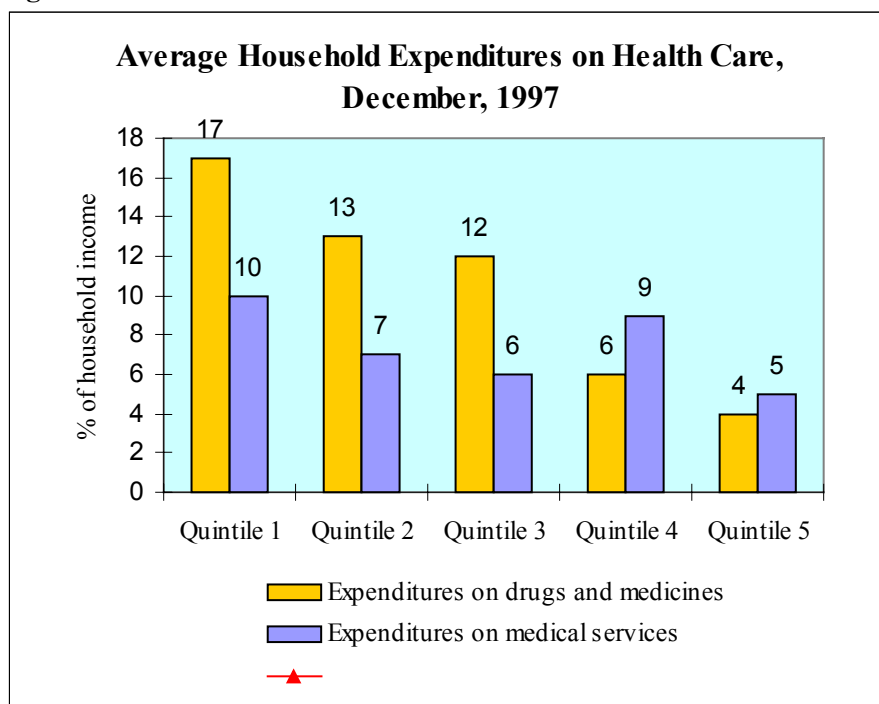
Source: RLMS Household Questionnaire Data

Figure 14b.



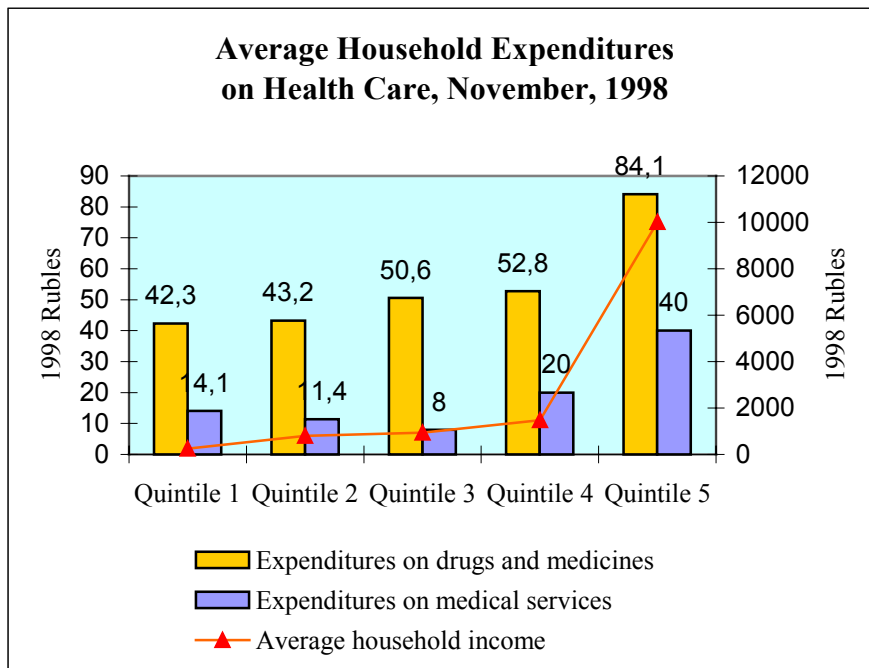
Source: RLMS Household Questionnaire Data

Figure 15.



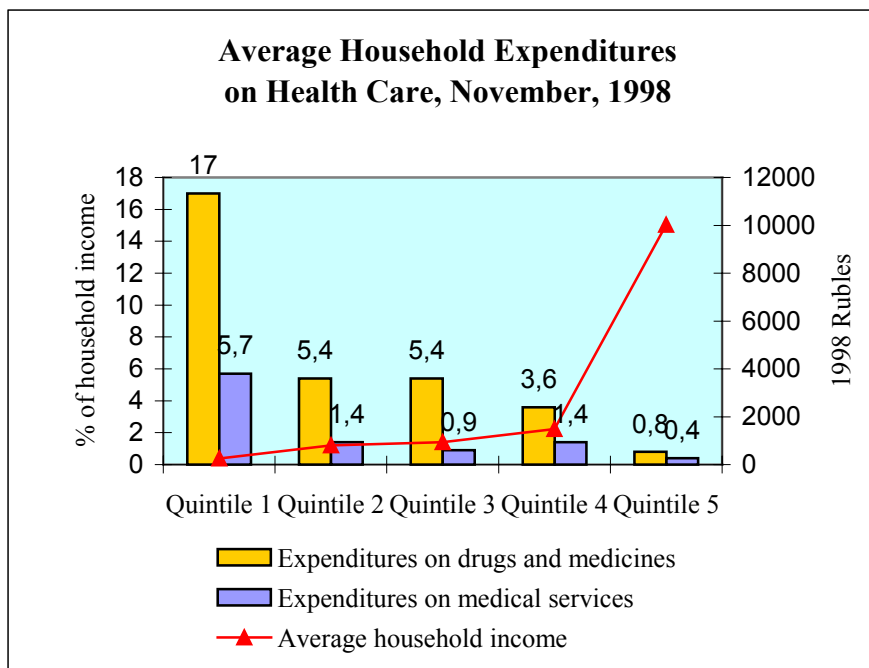
Source: Boikov et al (1998)

Figure 16a.



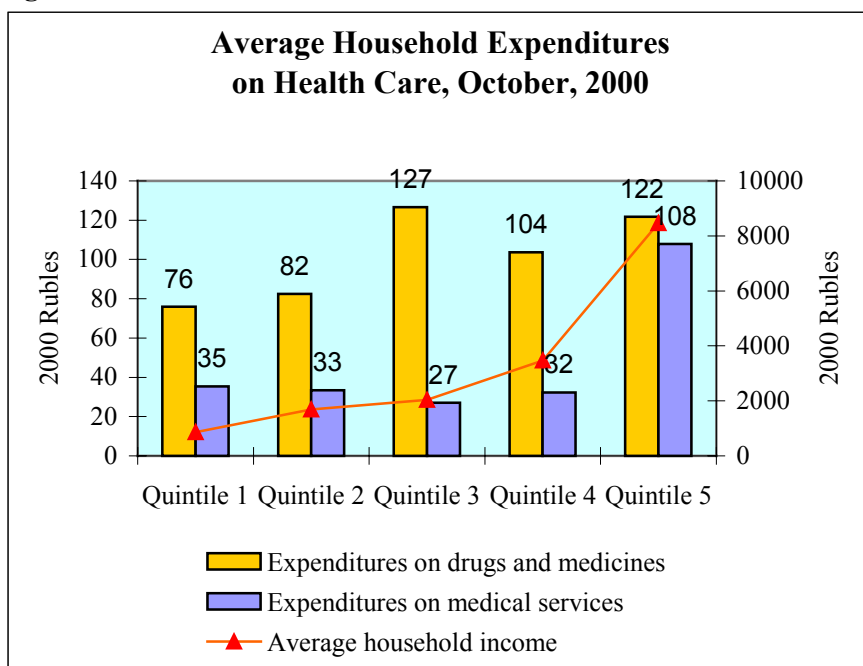
Source: RLMS Household Questionnaire Data

Figure 16b.



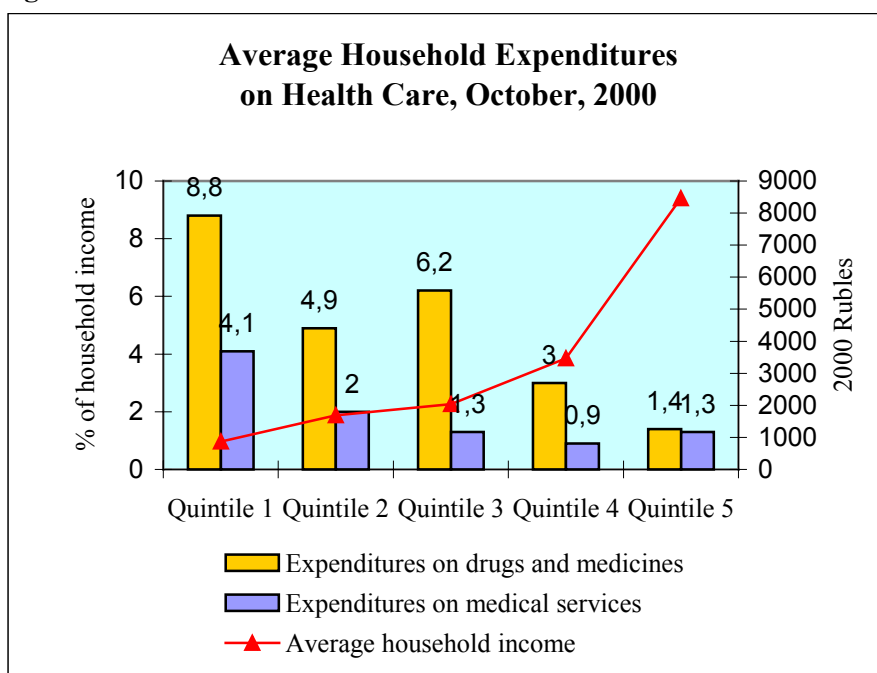
Source: RLMS Household Questionnaire Data

Figure 17a.



Source: RLMS Household Questionnaire Data

Figure 17b.



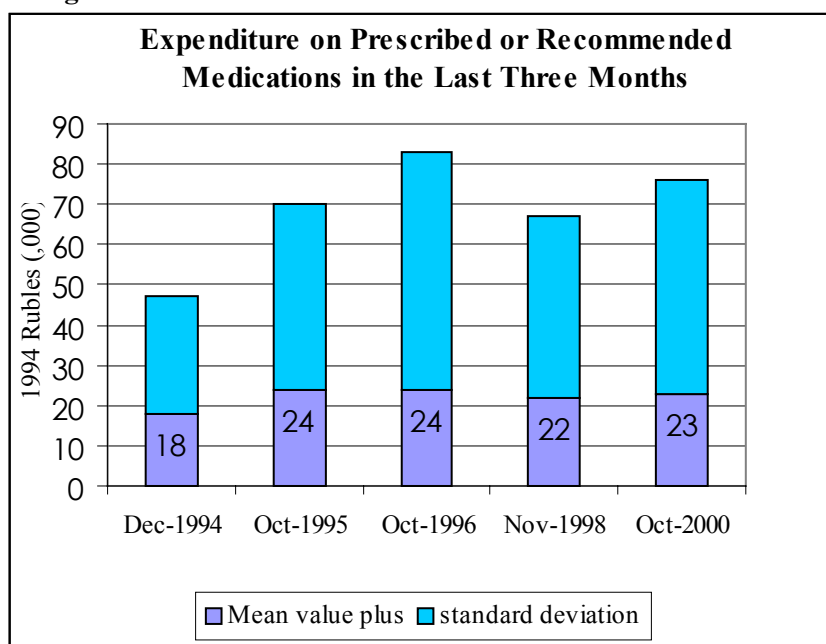
Source: RLMS Household Questionnaire Data

Individual expenditures on drugs

The RLMS individual questionnaires included questions designed to investigate respondents' ability to obtain medications prescribed by health workers. About 850 – 900 respondents reported purchasing prescribed or recommended medications during the three months before a survey was conducted.

A typical cost of the purchase stayed on about the same level of seven 1994 rubles during the whole 1994-2000 period (Figure 18).

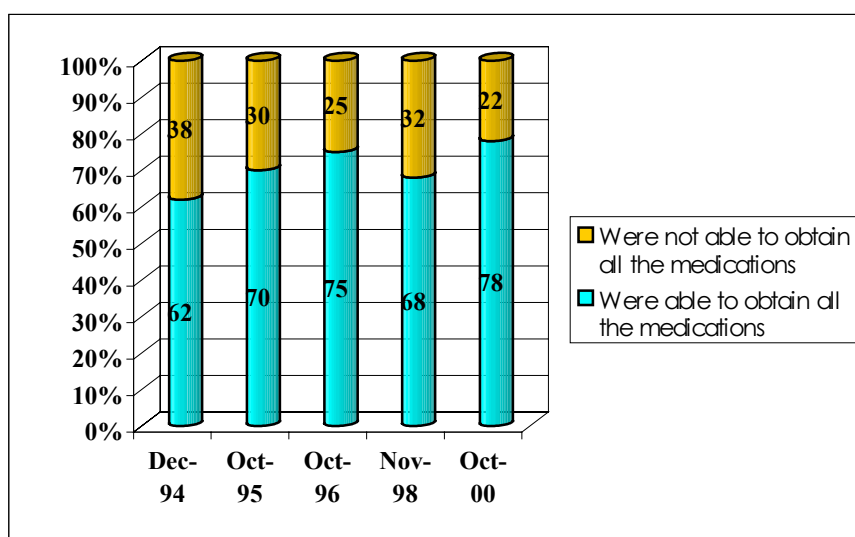
Figure 18.



Source: RLMS Individual Questionnaire Data

The overall reported ability of respondents to obtain prescribed medications had grown in 1994-2000, as presented in Figure 19.

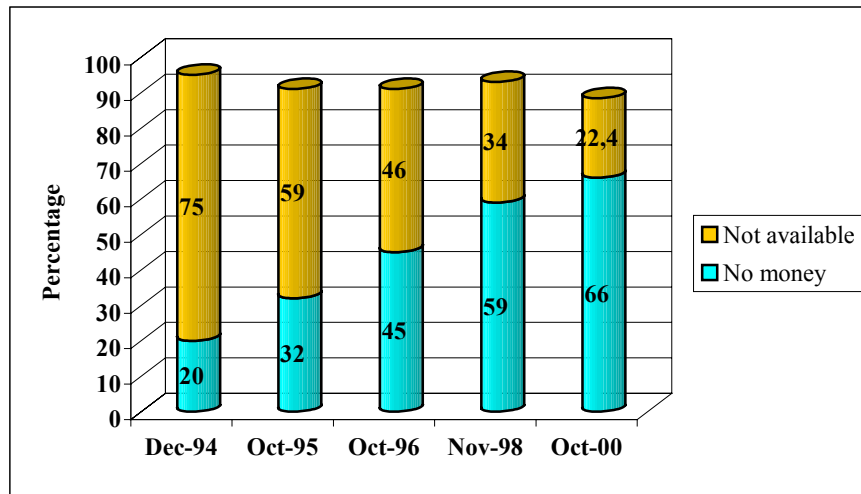
Figure 19. Overall Ability to Obtain Prescribed Medications by the Respondents Who Received Prescriptions



Source: Zohoori, et al., 2001

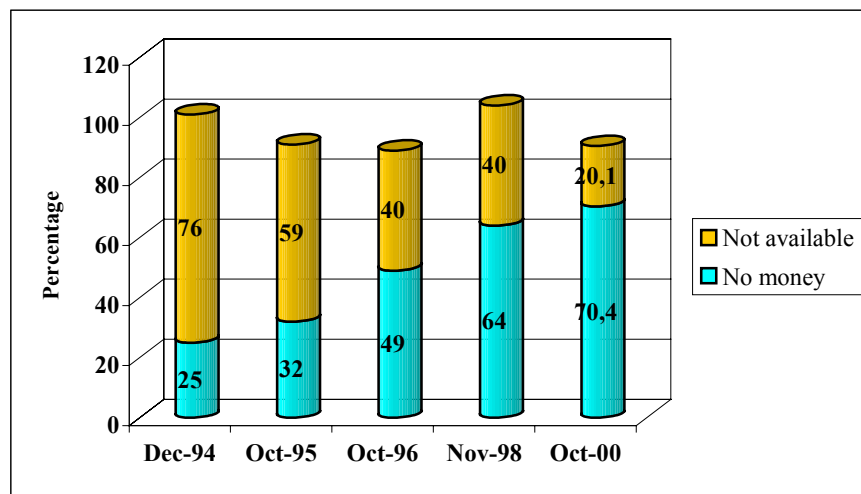
Unavailability of the drug and lack of money were the two most often cited reasons for inability to obtain prescribed medications. Over the years of the survey, there was a pronounced qualitative change in their comparative importance (Figures 20a, b). While in 1994 drug unavailability was the top reason for not being able to obtain medications in both urban and rural areas, in 2000 most respondents were citing lack of money as the primary reason for not obtaining medications. This dynamics suggests that some transformation of medication supply patterns in Russia towards more commercialization did take place.

Figure 20a. Two Top Reasons for Inability to Obtain Prescribed Medications (Respondents in Urban Areas)



Source: Zohoori, et al., 2001

Figure 20b. Two Top Reasons for Inability to Obtain Prescribed Medications (Respondents in Rural Areas)



Source: Zohoori, et al., 2001

V. Commercial vs. non-commercial services in public treatment facilities

Outpatient Care

The household expenditure data presented above suggest that most outpatient and hospital payments go, officially or unofficially, for services provided in public sector facilities. Main methods of payments for formally free-of-charge health care services are: quasi-voluntary health insurance contract between a recipient of a service and an insurance company associated with the service provider; a direct contract between a recipient of a service or his/her employer and the service provider; an informal direct payment by a recipient of a service to a medical worker.

Shishkin et al (2002) present a comparative analysis of medical services offered at twenty public outpatient care treatment facilities in the capital cities of Moscow and St. Petersburg, and a provincial city of Saratov. This supply-side view nicely complements our analysis of the household demand for medical care.

The services are grouped in two categories: free services financed from public sources (including the budgets of different levels of the government and the MMI funds), and paid services financed from private sources (patients' own money, patients' employers' money paid directly to a treatment facility). The shares of each group in the total volume of services offered in the three cities are presented in Figure 21a,b.

The authors find that the volume of funding from private sources is comparable with the total amount of financing from the budgets and the MMI system. However, the number of patients whose treatment was financed from private sources is much lower. Hence, on average, the treatment of one patient financed from public sources costs much less than the treatment of one patient financed from private sources.

Figures 22 and 23 summarize some findings by Shishkin et al (2002) on the subject of the differences in medical services that public treatment facilities provide on commercial and non-commercial basis. While the MMI standard prescribes a typical combination of services provided free-of-charge to include an appointment with a general practitioner or a specialist and two or three lab diagnostic procedures or functional diagnostic procedures, in practice such combinations are available only for extra payments. The authors estimate that only 20-30% of non-commercial patients receive MHI-guaranteed service combinations while the majority of commercial patients receive combinations of services guaranteed by federal standards. The authors conclude that people are forced to purchase commercial services because of their shortage in the system of free-of-charge health care provision.

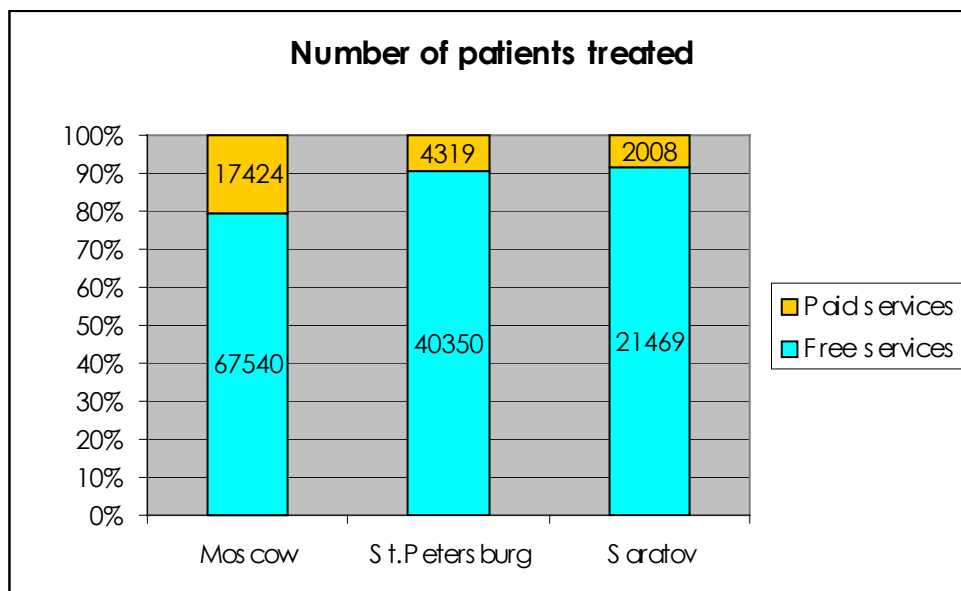
The RLMS individual questionnaire data provide some information on the spread and the dynamics of paid services in outpatient treatment facilities (Figure 24). The share of paid visits to such facilities in the total number of reported visits had grown from 4,0% in 1994 to 10,0% in 2000. The percentage of the respondents who had to pay for additional tests and procedures during a visit to a facility in the total number of those who undertook such test and procedures had grown from 8,8% in 1994 to 17,1% in 2000. Finally the share of paid preventative check-ups in the total reported number of such check-ups had grown from 11,0% to 22,7% over the same period. In other words, we record a twofold increase in all three indicators of outpatient care commercialization.

Those RLMS individual respondents who had to pay for a visit to a medical worker, for additional test and procedures during that visit, or for a preventive check-up, provided the information on the costs. This information, summarized in Figures 25 - 27, is not conclusive. While the reported mean values demonstrate some fluctuations during the period of the survey, these fluctuations are statistically insignificant, as shown by the standard deviations. For instance, the mean cost of a visit to a medical worker demonstrates a visible but statistically insignificant tendency to growth, with a temporary drop in 1998.

The questionable increase in the degree of commercialization seemed not to deter the patients from visiting medical institutions in order to solve their health problem. Over the whole period of 1994-2000, the proportion of those who decided to seek a professional help in the total number of the respondent who reported having a health problem was more or less stable (Figure 28). The percentage of respondents who went to a medical institution or to a specialist for a preventive check-up dropped from 19% in 1994 to 13% in 1998. This may be caused by the abolishment in 1998 of the mandatory annual physical for the employees of state-owned enterprises. In 2000, this percentage had grown back to 15%.

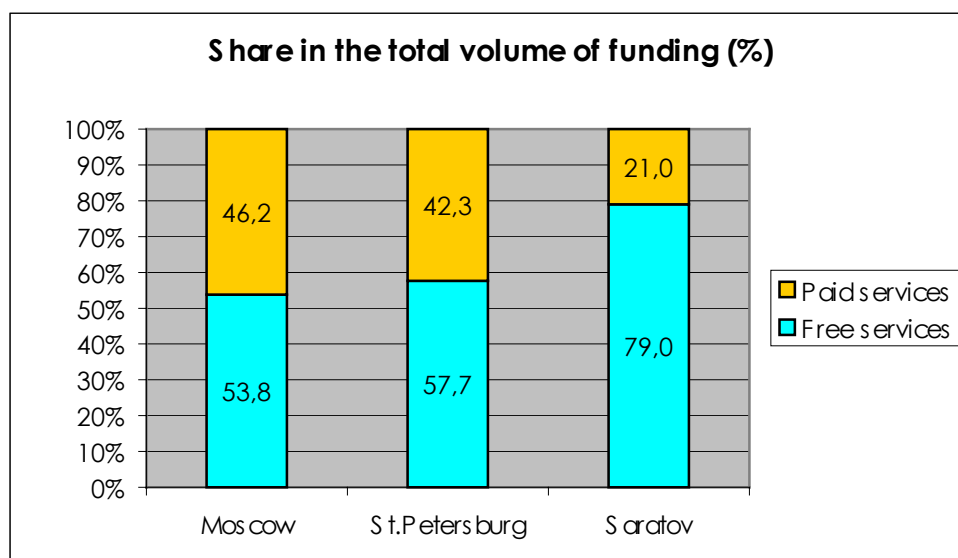
The 2000 RLMS questionnaires included more detailed questions on the payments for outpatient care separating the payments made “officially in the cashier’s office” from those made with “money or gifts to the medical personnel”. The summary of the answers is presented in Figure 29. It demonstrates that most of the payments were made “officially in the cashier’s office”.

Figure 21a.



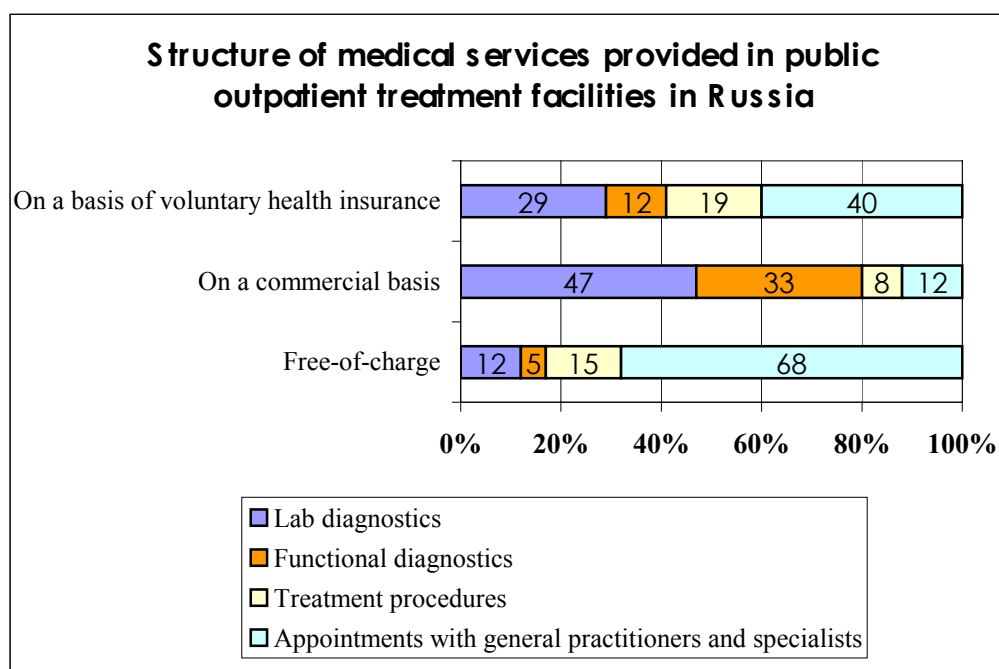
Source: Shishkin et al (2002)

Figure 21b.



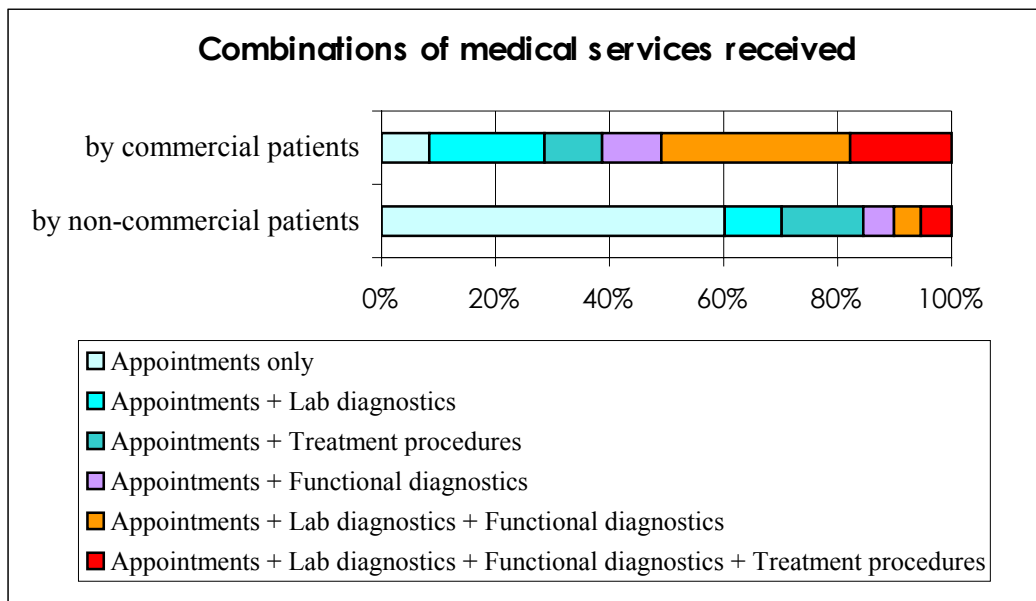
Source: Shishkin et al (2002)

Figure 22. Structure of medical services provided in public outpatient treatment facilities in Russia



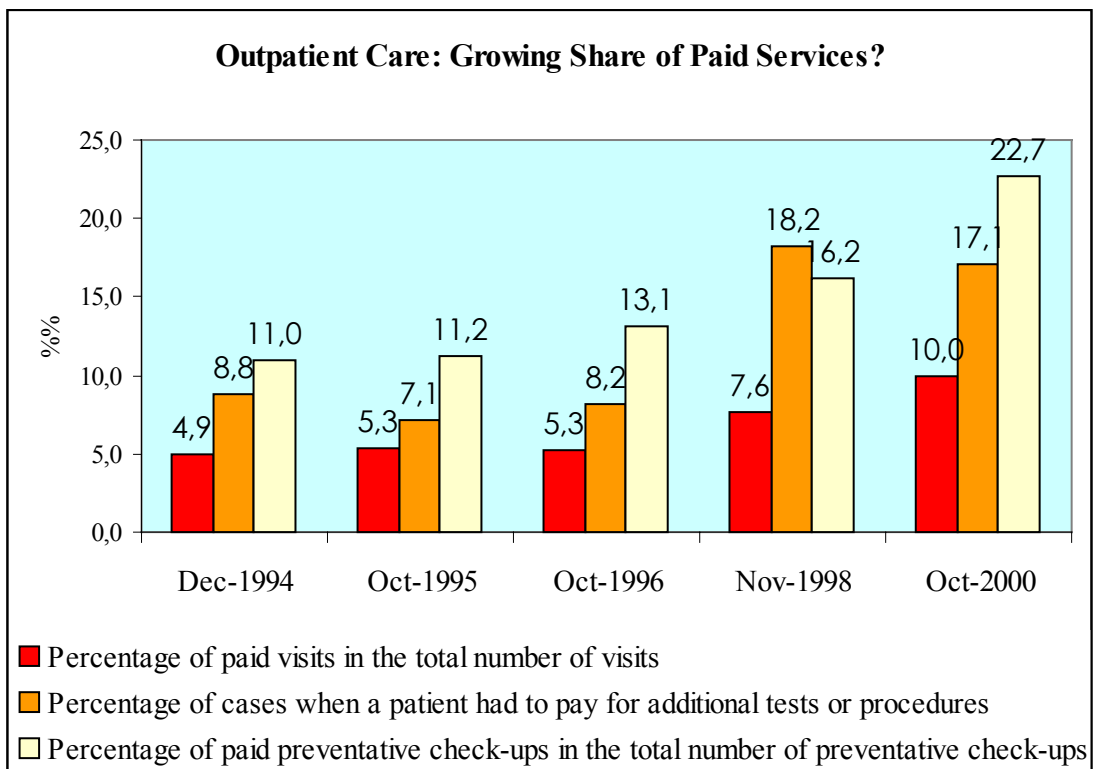
Source: Shishkin et al (2002)

Figure 23.



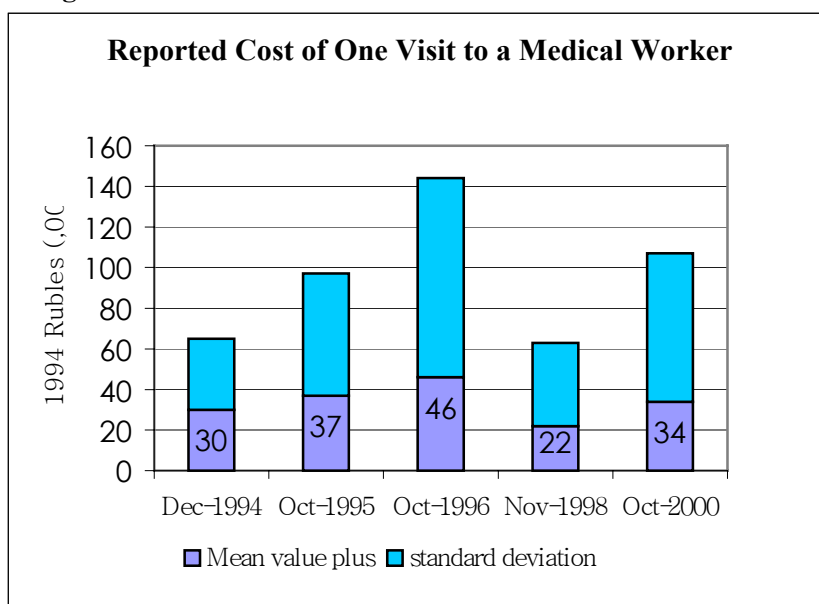
Source: Shishkin et al (2002)

Figure 24.



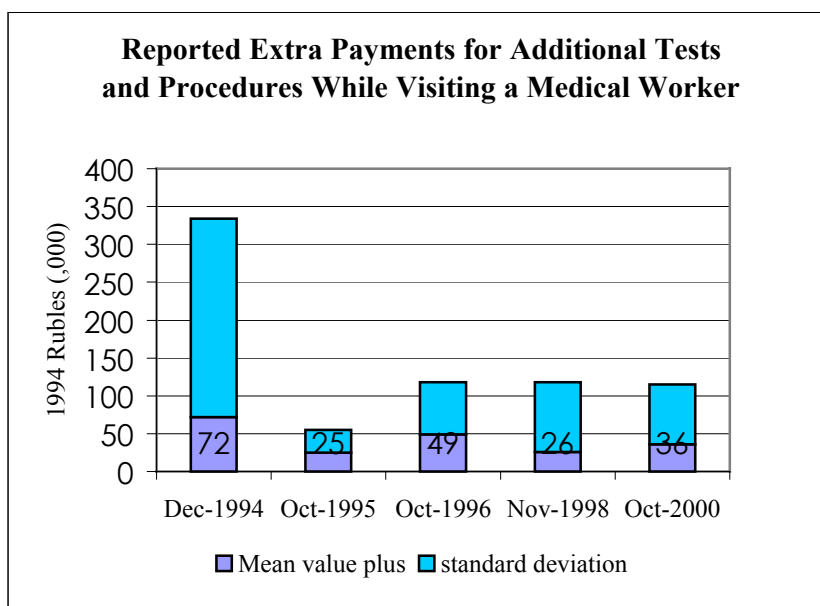
Source: RLMS Individual Questionnaire Data

Figure 25.



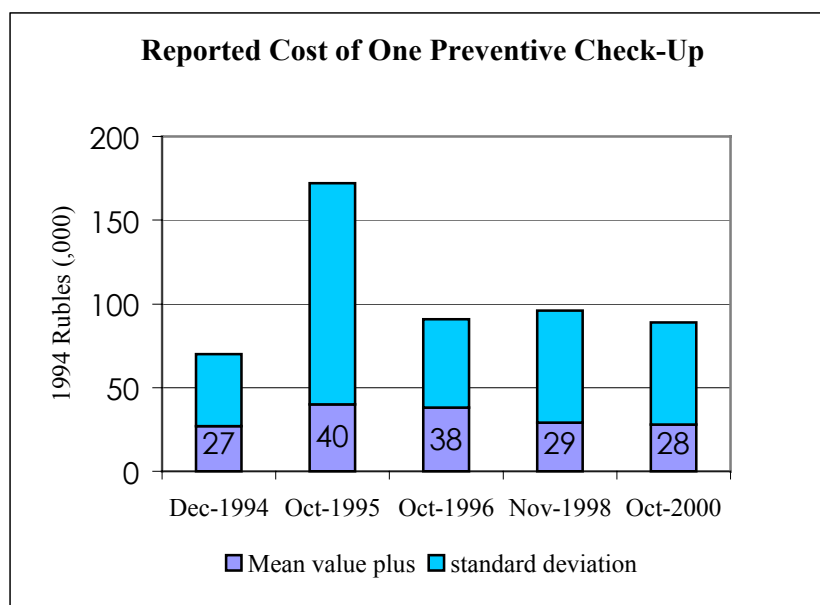
Source: RLMS Individual Questionnaire Data

Figure 26.



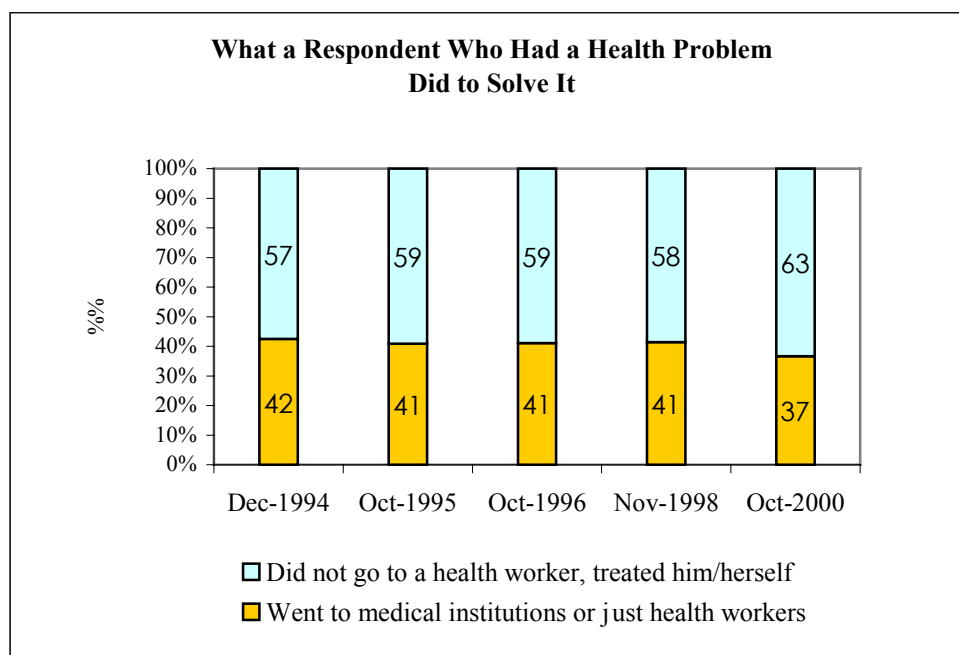
Source: RLMS Individual Questionnaire Data

Figure 27.



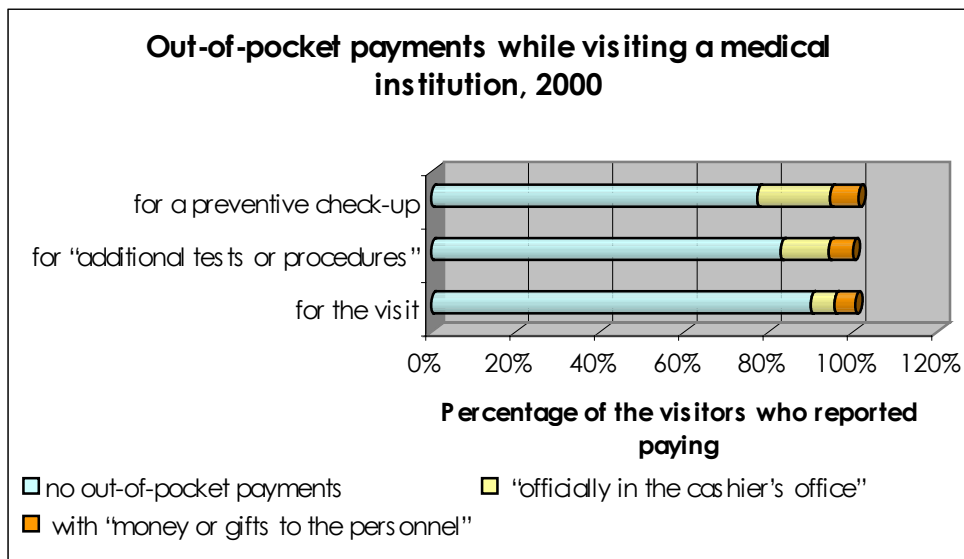
Source: RLMS Individual Questionnaire Data

Figure 28.



Source: RLMS Individual Questionnaire Data

Figure 29.

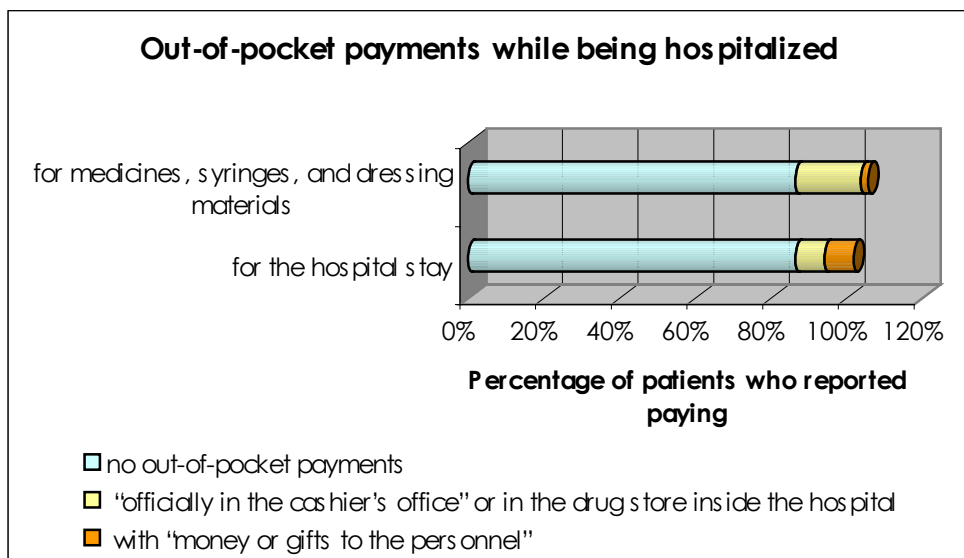


Source: RLMS Individual Questionnaire Data

Inpatient Care

Figure 30 provides a summary of the 2000 individual RLMS questionnaires detailed questions on different types of payments for inpatient care. As in the case of outpatient care, most of the payments were made "officially in the cashier's office".

Figure 30.

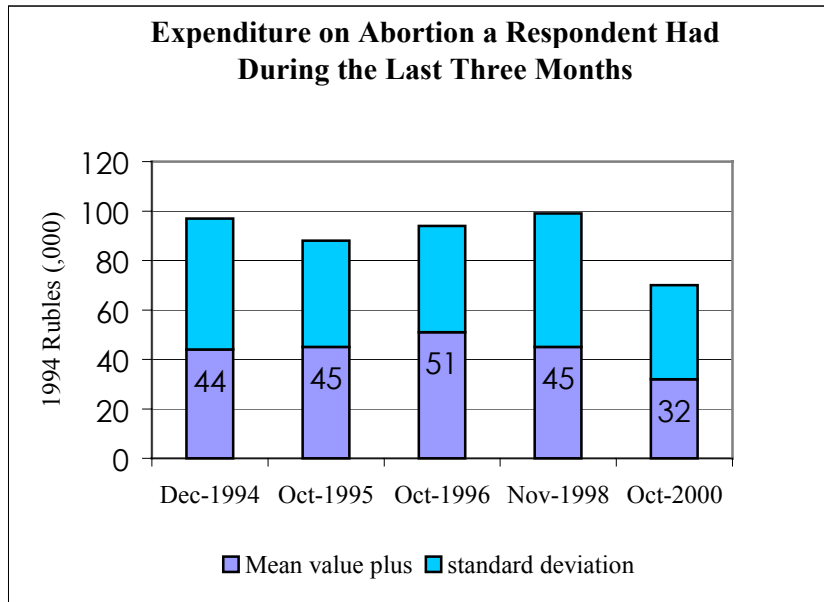


Source: RLMS Individual Questionnaire Data

Those few (from sixty to eighty, depending on the year of a survey) individual RLMS respondents who had an abortion provided the information on the costs of this kind of inpatient treatment. This information is presented in Figure 31. The mean real cost of the

procedure demonstrates a small growth and then a decline over the survey period. However, all these fluctuations were not statistically significant, as shown by the standard deviations.

Figure 31.



Source: RLMS Individual Questionnaire Data

More on shadow payments

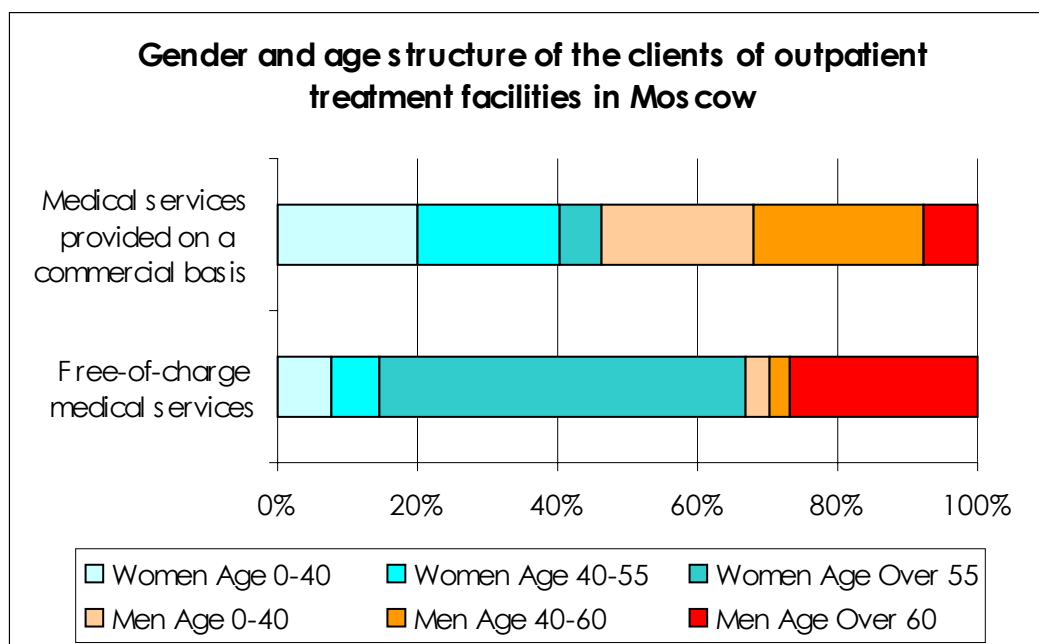
Satarov (2001) provides some estimates of the magnitude of shadow payments in Russian health care that are far higher than ours. He reports that 22% of those who seek services in a government polyclinic face a necessity to offer a bribe (our estimate based on the RLMS data is 5%). His estimate of the percentage of those who face a necessity to offer a bribe when going through a serious treatment or a surgery in a government hospital is 26% (our estimate is 10%). Altogether, he reports that 36,1% of Russian citizens pay shadow money or gifts to medical personnel in order to solve health problems of their own or of a family member.

The reason for the difference in the estimates is probably due to the way the questions were formulated and asked. While the RLMS data are based only on the responses of those respondents who actually had a medical treatment during the previous month, the Satarov (2001) data are based on the responses of all the respondents whose relatives had health problems during the previous year.

Gender and age differences

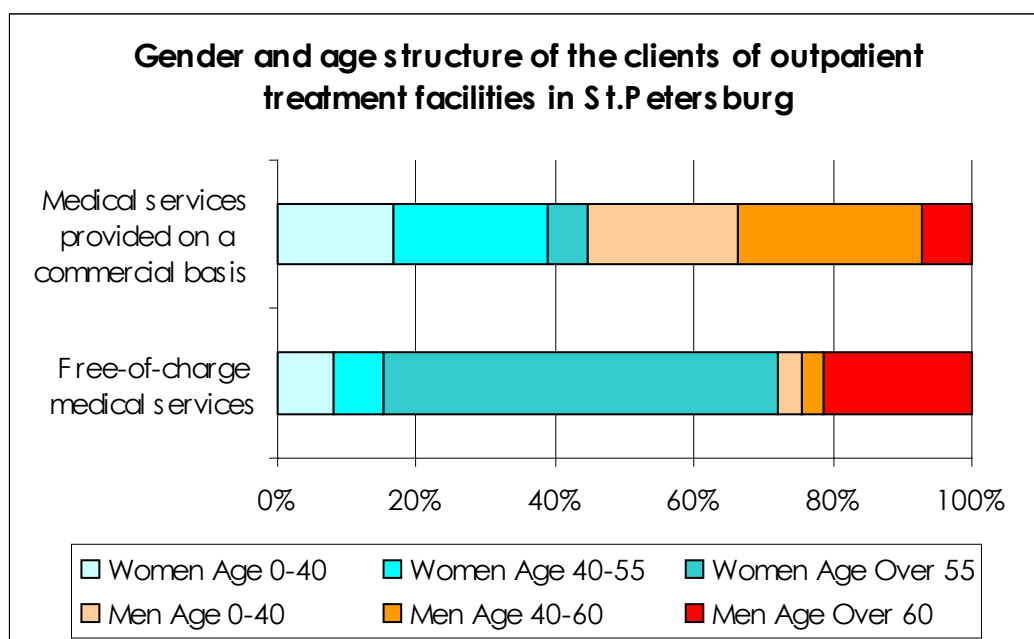
Figures 32 - 34 illustrate another interesting finding of Shishkin et al (2002) concerning the services provided in Russia's public outpatient treatment facilities. The elderly receive the major part of free-of-charge medical services while the non-elderly purchase most of the services provided on a commercial basis. This pattern remains if one considers only female or male patients, and does not depend on a particular choice of a city.

Figure 32.



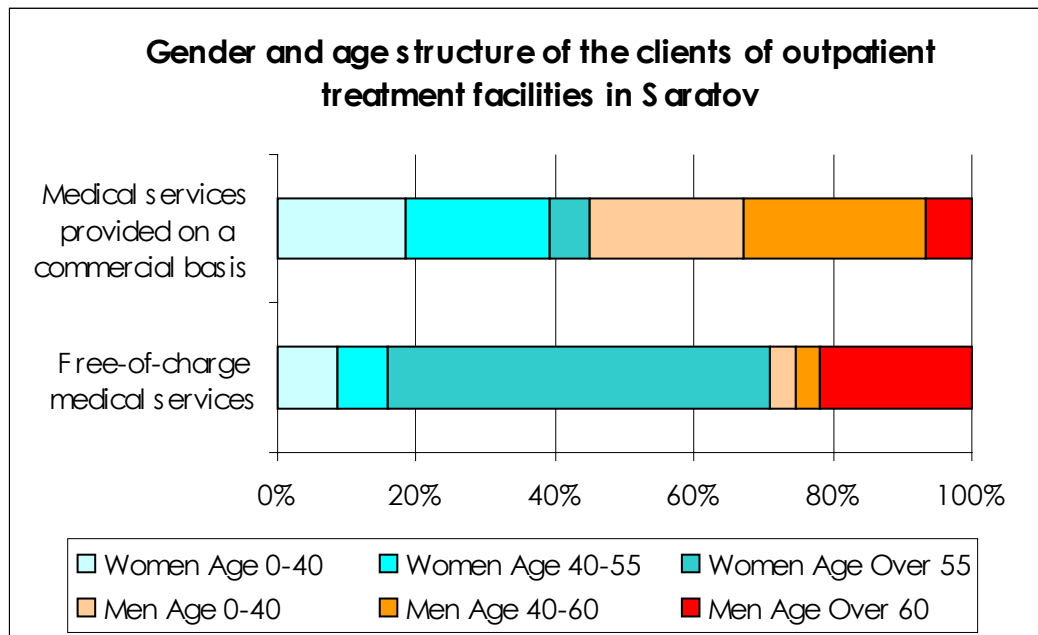
Source: Shishkin et al (2002)

Figure 33.



Source: Shishkin et al (2002)

Figure 34.



Source: Shishkin et al (2002)

VI. Estimation of health care demand determinants

In this section, we analyze possible determinants of out-of-pocket medical expenditures in Russia. A very low share of non-zero responses to most questions on out-of-pocket expenditures on health care makes it very difficult to determine statistically significant relationships between such expenditures and household or individual characteristics. We run a logit regression to find coefficients of an equation that can be interpreted as “the participation equation” in a standard “two-part model” of the determinants of the market demand for medical care. The objective of this standard model is to estimate the impact of a host of household characteristics upon the household demand for medical care. The use of the two-part model assumes that the decision to spend (the participation equation) is independent of the decision on the level of spending (the spending equation). In order to build the two-part model in full, one has to have reliable data on health care spending as well as on relevant prices. Since we do not have reliable price estimates, we cannot estimate the spending equation. However, even the estimation of the participation equation alone allows us to utilize very detailed individual-level and household-level data provided by the Russia Longitudinal Monitoring Survey, and make some conclusions about the significance of different factors.

A more detailed description of the theoretical model and its empirical framework can be found in Appendix One.

We run two logit regressions, one based on the individual data, the other, on the household data. The main purpose of this exercise is to obtain Wald statistic values that would signal which characteristics have a statistically significant influence on the decision by a household or an individual to spend extra money on health care.

Estimation Using the RLMS Data on Individuals' Behavior

In this section, we estimate the participation equation (11, Appendix One) on the basis of the RLMS data on individual behavior. We define the dependent variable as a dummy that takes value 1 if an individual respondent reports any non-zero expenditures on medical services and medicines, and 0, if not.

Table 1. Individuals who had any non-zero expenditures on medical services and medicines

| | 1994 | 1995 | 1996 | 1998 | 2000 |
|---|------|------|------|------|------|
| Total number of respondents | 8345 | 7871 | 7507 | 7273 | 6948 |
| Number of respondents who had non-zero expenditures | 1499 | 1176 | 1215 | 1400 | 1309 |
| Percentage of respondents who had non-zero expenditures | 18,0 | 14,9 | 16,2 | 19,2 | 18,8 |
| Number of cases rejected because of missing data | 3803 | 3852 | 3756 | 3643 | 3527 |
| Number of cases included in the analysis | 4542 | 4019 | 3751 | 3630 | 3421 |

As independent variables, we selected several important household characteristics.

To capture differences in the opportunity cost of time for individuals we included variables JOB and MARRIED, JOB is a dummy that takes value 1 if respondent is employed, and 0, if not, The dichotomous MARRIED variable represents whether the respondent is married,

In order to represent environmental factors that are given by the vector X in the gross investment equation (3), we introduce the dichotomous URBAN variable to represent whether the residence is located in an urban area. This variable may capture the ease of access to medical services, as well as the characteristics of the work environment. Most importantly, the variable represents some housing characteristics that may impact the demand for medical care through their influence on the depreciation of health capital. Essentially, it is a dummy variable to indicate the presence of toilet, bath, and own tap water in the place of residence.

Variable EDUCATION approximates the level of the human capital on the basis of the level of schooling, We use the reported level of education for each individual who is 18 years of age and older.

Main biological differences among respondents of the same gender are captured by dichotomous variables ILLNESS that indicates whether the respondent has a chronic illness, and DISEASE that indicates whether the respondent experiences a temporary health problem.

To reflect the differences in attitudes toward risky and unhealthy behavior, SMOKING and DRINKING dummies have been used.

Biological differences, differences in attitudes toward risky and unhealthy behavior, as well as the differences in lifestyles and the efficiency in health production may differ between genders. This suggests inclusion of gender as an explanatory variable into the demand function (Hunt-McCool, Kiker and Ng 1995), MALE is a dummy that takes value 1 if respondent is male, and 0, if female.

Age captures the depreciation in health capital, AGE stands for the respondent's age divided by ten.

Variable INCOME states for the per capita income of the household where the given respondent is a member, In order to exclude the inflation bias, INCOME is calculated as a difference from the sample median income.

Table 2 presents the estimated coefficients of the participation equation and their p -values (shown in the parentheses). While the logit coefficients themselves do not have a meaningful interpretation as some kind of elasticity coefficients, the p -values do demonstrate whether a given regressor has a significant influence upon the dependent variable.

Table 2. Logit Model Estimates Using the Data on Individuals' Behavior

| Respondents' Characteristics | Participation equation coefficients (in the parentheses: <i>p</i> -values according to Wald statistic) | | | | |
|------------------------------|---|----------------------|----------------------|----------------------|----------------------|
| | 1994 | 1995 | 1996 | 1998 | 2000 |
| INCOME | ,0239 (,1066) | ,0306** (,0448) | ,0402** (,0141) | ,0627** (,0009) | -,0000 (,2609) |
| AGE | -,1535** (,0000) | -,1546** (,0000) | -,1464** (,0001) | -,1015** (,0023) | -,0756** (,0261) |
| MALE | -,4471** (,0000) | -,4014** (,0008) | -,5755** (,0000) | -,2571** (,0172) | -,4240** (,0002) |
| URBAN | -,0087 (,9364) | -,0418 (,7388) | ,0094 (,9420) | ,0033 (,9777) | ,2820** (,0257) |
| MARRIED | ,0999 (,3216) | ,0305 (,7852) | ,1617 (,1523) | ,1159 (,2464) | ,1566 (,1283) |
| EDUCATION | ,0050 (,7742) | ,0119 (,5490) | ,0112 (,5816) | ,0223 (,2289) | ,0520** (,0055) |
| ILLNESS | ,2954** (,0007) | ,2045** (,0437) | ,1828* (,0741) | ,1814* (,0550) | ... [#] |
| DISEASE | 1,5457** (,0000) | 1,8359** (,0000) | 1,8692** (,0000) | 1,6084** (,0000) | 1,7487** (,0000) |
| JOB | ,3272** (,0015) | ,3343** (,0045) | ,1423 (,2125) | ,3048** (,0035) | ,0974 (,3753) |
| SMOKING | ,1212 (,2378) | -,0001 (1,0000) | ,1812 (,1330) | -,0868 (,4314) | ,2529** (,0283) |
| DRINKING | -,2103 (,3585) | -,1432 (,5759) | -,1206 (,6380) | -,0215 (,9339) | -,1710 (,4591) |
| Constant | -2,2475** (,0000) | -2,4821** (,0000) | -2,3971** (,0000) | -2,3702** (,0000) | -2,9931** (,0000) |

*The coefficient estimates significant at 90% level.

**The coefficient estimates significant at the 95% level.

[#] Since the data on chronic illnesses are not available for 2000, this variable is excluded from the 2000 regression.

We found that the level of household income played in 1995-1998 a significant role in the decision of its individual member to spend extra money on health care. Although out of pocket health care expenditures are clearly regressive if measured by the percentage of household income spent on drugs and other health care services, the absolute volume of spending depends on the household income positively.

Somewhat surprising is to find that age is a significant *negative* impact on out-of-pocket medical care spending.

The gender of an individual also has a significant impact on individual medical care demand. Women are more inclined to spend money for this purpose. The gender and age impact are similar to the ones reported by Mocan et al. (2000) for the People's Republic of China.

We found (predictably) that having chronic illness or just being sick does affect the decision to spend extra money on health care. Somewhat surprisingly, we were not able to find such a significant dependence on having bad habits of smoking or drinking. Only for one round of the data we found that individuals with better sanitary facilities have higher demand for medical care in comparison to individuals with no bath or toilet, as captured by the URBAN variable.

Being employed means in three out of five rounds to be more inclined to spend additional money on health care.

Estimation Using the RLMS Data on Households' Behavior

In this section, we estimate the participation equation (11) on the basis of the RLMS data on household behavior. We define the dependent variable as a dummy that takes value 1 if a household had any non-zero expenditures on medical services and medicines, and 0, if not.

Table 3. Households who had any non-zero expenditures on medical services and medicines

| | 1994 | 1995 | 1996 | 1998 | 2000 |
|--|------|------|------|------|------|
| Total number of respondents | 3975 | 3755 | 3591 | 3464 | 3319 |
| Number of households who had non-zero expenditures | 319 | 1536 | 1465 | 1711 | 1918 |
| Percentage of households who had non-zero expenditures | 8,0 | 40,9 | 40,8 | 49,4 | 57,8 |
| Number of cases rejected because of missing data | 114 | 134 | 151 | 107 | 0 |
| Number of cases included in the analysis | 3861 | 3621 | 3440 | 3357 | 3319 |

We selected eight important household characteristics to serve as independent variables in the regression.

Variable INCOME states for the per capita income of a given household. In order to exclude the inflation bias, INCOME is calculated for each given period as a difference from the sample median income.

To capture obvious differences in the health care preferences, we included variables BABY, CHILD, and SENIOR. Each variable is a dummy that takes value 1 if at least one member of the household is, correspondingly, a preschooler, a school-aged child, or a senior person. Otherwise, it takes value 0.

Environmental factors are represented by dichotomous variables HEATING, WATER, SEWERAGE, and PHONE. The variables indicate whether a given household has centralized heating, centralized plumbing, centralized sewerage, and a private telephone connection.

Table 4 presents the estimated coefficients of the participation equation and their p -values (shown in the parentheses). While the logit coefficients themselves do not have a meaningful interpretation as some kind of elasticity coefficients, the p -values do demonstrate whether a given regressor has a significant influence upon the dependent variable.

We found that the level of household income played in 1994-2000 a significant role in the decision of a household to spend extra money on medical services and drugs. The comparison of Tables 2 and 4 demonstrates little qualitative difference between the estimates based on individual data and household data. The decision to spend extra money on health care depends on the household income positively in both cases.

We found that households who have a preschool-aged child or a senior person among their members do have more incentives to spend extra money on medical services and medicines while the presence of a school-aged child does not significantly influence this decision. These findings may partially explain the significantly negative effect of individual age on individual decision to spend extra money on health care: younger persons are more likely to have a preschooler.

Out of the three types of sanitary facilities, only own tap water has questionably a significant impact upon the demand for extra medical care. The impact is positive.

Finally, we found that households with telephones demonstrate a significantly higher demand for extra medical care and medicines than households with no telephone. This is another evidence of the positive income effect.

Table 4. Logit Model Estimates Using the Data on Households' Behavior

| Household Characteristics | Participation equation coefficients (in the parentheses: <i>p</i> -values according to Wald statistic) | | | | |
|------------------------------|---|---------------------|---------------------|---------------------|---------------------|
| | 1994 | 1995 | 1996 | 1998 | 2000 |
| INCOME | ,0335* (,0713) | ,0451** (,0085) | ,0759** (,0001) | ,2064** (,0000) | -,0000** (,0016) |
| BABY | ,1021** (,4686) | ,1640* (,0591) | ,2821** (,0025) | ,3499** (,0005) | ,2824** (,0086) |
| CHILD | -,2242* (,0804) | ,1205 (,1084) | ,1221 (,1135) | ,1738** (,0283) | ,0091 (,9094) |
| SENIOR | -,2583* (,0512) | ,2413** (,0016) | ,3032** (,0001) | ,6795** (,0000) | ,4603** (,0000) |
| HEATING | ,6369 (,0149) | -,2354 (,1298) | -,2157 (,1394) | ,1180 (,4704) | -,0332 (,8236) |
| WATER | ,1853 (,4552) | ,2195 (,1038) | ,2558* (,0503) | ,2346* (,0728) | ,3284** (,0125) |
| SEWERAGE | -,4471 (,0666) | ,2171 (,1508) | ,1101 (,4549) | ,0525 (,7558) | ,2063 (,1715) |
| PHONE | ,3107** (,0112) | ,1533** (,0354) | ,1771** (,0176) | ,1522** (,0462) | ,3223** (,0000) |
| Constant | -2,7352** (,0000) | -,6659** (,0000) | -,6535** (,0000) | -,7844** (,0000) | -,3485** (,0003) |

*The coefficient estimates significant at the 90% level;

** The coefficient estimates significant at the 95% level.

VII. Conclusions

We investigated the patterns of Russia's out-of-pocket household expenditure on health care using the RLMS 1994-2000 data. We found that:

Privately provided commercial health care in Russia during the described period was a luxury good available mainly for the rich. Same was true for voluntary medical insurance.

Most of the household money spent on medical services went to the public medical care system for services that were supposed to be provided for free to the general public.

Total household monthly expenditure on health care demonstrated a slow but steady growth in real terms from 12,000 of 1994 rubles in 1995 to 16,000 of 1994 rubles in 2000.

On average, households were spending about 3 percent of their income on prescribed drugs and medical services in 1994-1998. In 2000, this percentage suddenly grew to 12 percent due mainly to a drop in the average reported monthly household real income.

Most of the household expenditure items demonstrated the dynamics of the shape presented in Figure 5: a steady growth, with a temporary drop in 1998.

The burden of out-of-pocket expenditure was income-regressive. While the households from the top income quintile were spending about two times more in absolute terms than the households from the bottom income quintile, in relative terms, they were spending about ten times less share of their income than the bottom quintile households.

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Appendix One

The Regression Model Description

Following Grossman (1972a, 1972b), we assume that health care demand is determined by optimizing behavior of individuals who maximize an inter-temporal utility function of the form

$$\int_0^T \alpha(t) U(C(t), S(t)) dt, \quad (1)$$

where $U(\cdot)$ is a quasi-concave utility function, $C(t)$ is a consumption commodity, $S(t)$ is sick time, T is time of death, and $\alpha(t)$ is a time discount factor. It is assumed that $U_c > 0$, $U_s < 0$.

Sick time depends on the level of health capital, $H(t)$, such that

$$S(t) = f_1[H(t)], \quad f_1' < 0, \quad f_1'' > 0. \quad (2)$$

Net investment in the stock of health, depicted in Equation (3) below, is equal to gross investment, $I(t)$, minus depreciation. The rate of depreciation, δ , is a function of t (the age of the individual), and environmental factors, X :

$$\dot{H}(t) = I(t) - \delta[t, X(t)]H(t). \quad (3)$$

Gross investment at time t , $I(t)$, is produced according to a household production function, where medical care, $M(t)$, and time input are ingredients. More formally:

$$I(t) = f_2[M(t), \text{time}, E], \quad (4)$$

where E represents the variables that influence the productivity of health investment, such as the stock of human capital. Thus, consumers are assumed to produce gross investment in health by combining their own time with purchased medical care. Asset accumulation is described by Equation (5):

$$\dot{A}(t) = rA(t) + Y[S(t), M(t), E(t)] - P^c(t)C(t) - P^m(t)M(t). \quad (5)$$

The rate of change of financial assets is a function of the stock of assets, $A(t)$, the rate of interest, r , earned income $Y(\cdot)$, and the outlays on a consumption commodity and medical care, where P^c and P^m stand for the prices of the consumption commodity and medical care, respectively. It is assumed that $Y_M = 0$; i.e., being sick, consuming medical care cannot increase income directly. Also, it is assumed that $Y_s = 0$; i.e., days off due to sickness are not associated with a reduction in income up to a high threshold.

The individual maximizes (1) subject to the conditions presented in (4) and (5), the boundary conditions $H(0)=H_0$, $A(0)=A_0$, $T = \min\{t: H(t)=H^d\}$, where H^d is the “death” stock of health, and $A(T)=0$. This yields the following equilibrium condition:

$$\left[\frac{U_s}{\lambda} \right] f_1' = [r + \delta[t, X(t)] - \pi_\Delta] \pi(t), \quad (6)$$

where $\pi(t)$ is the marginal cost of gross investment in health, π_Δ is the percent change in gross investment in health, and λ is the shadow price of initial assets. The equilibrium condition can be re-formulated as the equality between the marginal consumption benefit of health and the marginal cost of new investment:

$$\ln U_s - \ln \lambda + \ln f_1' = \ln \delta + \ln \pi(t) + \ln \psi, \quad (6A)$$

where $\psi = [r + \delta[t, X(t)] - \pi_\Delta] / \delta$.

From (2), we obtain that $\ln(f_1') = f_3[H(t)]$. The production function of gross investment in health depicted by (4) gives rise to a marginal costs of gross investment function, where the prices of the medical care, the opportunity cost of time and E are the ingredients. That is,

$$\ln \pi(t) = f_4[P^m, P^{time}, E]. \quad (7)$$

Following previous research, one can hypothesize that $r - \pi = 0$, which implies $\psi = 1$, or, alternatively, postulated that $\psi = f_5(t)$. All these formulations give rise to the structural demand for health function of the form

$$H = g[P^m, P^{time}, \lambda, t, X, E]. \quad (8)$$

The derived demand for medical care is

$$M = m[H, P^m, P^{time}, t, X, E]. \quad (9)$$

Expressions (8) and (9) produce the following reduced form of demand for medical care (see Grossman 1972a, Muurinen 1982, Wagstaff 1986):

$$M = m_r[P^m, P^f, P^{time}, \lambda, t, X, E]. \quad (10)$$

Empirical Implementation

Estimation of equation (10) requires the treatment of zero expenditures. We deal with this issue by estimating a two-part model. The two-part model is a frequently employed benchmark in health economics research when observations are clustered at zero. The use of the two-part model assumes that the decision to spend (the participation equation) is independent of the decision on the level of spending. Although the two-part model can be criticized on the grounds of this potentially restrictive assumption (Hay and Olsen 1984, Maddala 1985), it has been shown that estimation of a two-part model does not have a significant impact on the results (Duan et al, 1984). Also, it has been demonstrated that if the true model is of the selection type, then the two-part model provides a good estimate of the response surface (Manning et al., 1987). In addition to its robustness, another appealing feature of the two-part model is that it allows an investigation as to whether variables of interest have larger impacts on the participation or consumption decisions (Manning et al, 1995).

The empirical framework can be summarized as follows. The latent variable I_i is a function of a set of explanatory variables X_i , and error term ε_{1i} , where i represents the households:

$$I_i = X_i\alpha + \varepsilon_{1i} . \quad (11)$$

A dichotomous variable D_i is defined as $D_i = 1$ if $I_i > 0$ (households with positive health care spending), and $D_i = 0$ otherwise. For those households with positive health care spending, the log-level of spending is determined by

$$\ln(S_i | D_i = 1) = X_i\beta + \varepsilon_{2i} , \quad (12)$$

where S stands for spending on medical care ($S = MP$, where M is the quantity and P is the price of medical care) .

Equation (11) is treated as a logit, where the probability of the discrete event of positive medical care spending is explained as

$$\Pr(D_i = 1) = \exp\{X_i\alpha\} / [1 + \exp\{X_i\alpha\}] , \quad (13)$$

where X is a row vector of explanatory variables. In this framework, the expected value of the unconditional spending is $E(S_i) = \Pr(D_i = 1)E(S_i | D_i = 1)$.

Appendix Two

Table 5: CHARACTERISTICS OF THE RLMS SAMPLE, 1994 - 2000

| | Round 5 1994 | Round 6 1995 | Round 7 1996 | Round 8 1998 | Round 9 2000 |
|--|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Total number of respondents | 8345 | 7871 | 7507 | 7273 | 6948 |
| Age, years (standard deviation) | 45,2 (17,2) | 45,6 (17,4) | 45,8 (17,5) | 46,2 (17,5) | 46,5 (17,8) |
| Gender (male) | 43,3 | 43,0 | 42,8 | 42,9 | 42,0 |
| Residence (%) | | | | | |
| City - administrative center of oblast | 42,9 | 41,3 | 39,8 | 38,3 | 38,2 |
| Town; smaller city | 27,5 | 28,3 | 28,1 | 28,2 | 27,0 |
| small urban-type community | 5,5 | 5,7 | 6,2 | 6,7 | 6,9 |
| village | 24,2 | 24,8 | 25,9 | 26,9 | 27,9 |
| Geographic Location (%) | | | | | |
| St. Petersburg | 4,2 | 3,4 | 2,6 | 2,6 | 2,1 |
| Moscow | 6,7 | 6,0 | 5,6 | 5,0 | 3,6 |
| Moscow oblast | 4,9 | 4,9 | 5,0 | 5,0 | 4,9 |
| Komi Republic, Syktyvkar | 2,3 | 2,4 | 2,3 | 2,6 | 2,6 |
| Komi Republic, Usinski region | 2,2 | 2,1 | 2,1 | 2,2 | 1,8 |
| Leningrad oblast, Volosovski region | 2,2 | 2,3 | 2,2 | 2,1 | 2,1 |
| Smolensk | 2,6 | 2,6 | 2,8 | 2,7 | 2,6 |
| Tver oblast, Rzhevski region | 2,3 | 2,4 | 2,5 | 2,3 | 2,2 |
| Tula | 2,5 | 2,1 | 2,4 | 2,6 | 2,8 |
| Kaluga oblast, Kuybyshevski region | 2,1 | 2,0 | 2,1 | 2,1 | 2,3 |
| Nizhni Novgorod | 2,6 | 2,7 | 2,3 | 2,5 | 2,4 |
| Chuvash Republic, Shumerlinski region | 2,3 | 2,4 | 2,5 | 2,5 | 2,6 |
| Penza oblast, Zemetchinski region | 2,4 | 2,4 | 2,7 | 2,9 | 2,6 |
| Lipetsk | 2,6 | 2,8 | 3,0 | 2,8 | 2,7 |
| Tambov oblast, Uvarovski region | 2,1 | 2,1 | 2,3 | 1,9 | 2,0 |
| Kazan | 2,8 | 2,8 | 2,9 | 2,6 | 2,5 |
| Saratov | 2,4 | 2,4 | 2,4 | 2,6 | 2,6 |
| Saratov oblast, Volski region | 2,4 | 2,3 | 2,2 | 2,4 | 2,6 |
| Volgograd oblast, Rudnyanski region | 2,5 | 2,6 | 2,8 | 2,9 | 2,9 |
| Kabardino-Balkaria, Zolski region | 3,2 | 3,1 | 3,6 | 4,4 | 4,7 |
| Rostov oblast, Bataysk | 2,8 | 2,7 | 2,8 | 2,7 | 2,3 |
| Krasnodar | 2,1 | 2,2 | 1,9 | 1,7 | 2,4 |
| Stavropol territory, Georgievski region | 2,4 | 2,5 | 2,5 | 2,4 | 2,1 |
| Krasnodar territory, Kushchevski r-n | 2,4 | 2,8 | 2,8 | 2,9 | 3,0 |
| Chelyabinsk | 2,6 | 2,5 | 2,4 | 2,0 | 2,2 |
| Kurgan | 2,3 | 2,2 | 1,9 | 2,4 | 2,2 |
| Udmurt Republic, Glazovski region | 2,2 | 2,5 | 2,4 | 2,5 | 2,7 |
| Orenburg oblast, Orsk | 2,3 | 2,7 | 2,6 | 2,6 | 2,5 |
| Perm oblast, Solikamski region | 2,2 | 2,4 | 2,5 | 2,3 | 2,3 |
| Chelyabinsk oblast, Oktyabrski region | 2,3 | 2,2 | 2,2 | 2,2 | 2,5 |
| Tomsk | 2,1 | 1,9 | 2,2 | 2,1 | 2,4 |
| Khanty-Mansiyski okrug, Tyumen oblast, Surgut region | 2,7 | 2,6 | 2,2 | 2,6 | 2,3 |
| Altai territory, Biyski region | 2,5 | 2,5 | 2,6 | 2,7 | 2,8 |
| Altai territory, Kur'inski region | 2,4 | 2,5 | 2,7 | 2,9 | 3,2 |
| Krasnoyarsk | 2,4 | 2,3 | 2,0 | 1,8 | 2,1 |
| Vladivostok | 2,6 | 3,0 | 3,1 | 2,3 | 3,0 |
| Krasnoyarsk territory, Nazarovski r-n | 2,2 | 2,3 | 2,3 | 2,3 | 2,3 |
| Amur oblast, Tambovski region | 2,3 | 2,5 | 2,6 | 2,8 | 2,9 |

Table 6: CHARACTERISTICS OF THE RLMS SAMPLE

| | Round 5 1994 | Round 6 1995 | Round 7 1996 | Round 8 1998 | Round 9 2000 |
|---|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Number of respondents | 8345 | 7871 | 7507 | 7273 | 6948 |
| % of respondents who answered positively | | | | | |
| Do you have medical insurance? | 34,0 | 56,1 | 65,7 | 71,9 | 87,7 |
| Do you have compulsory medical insurance, that is, a medical insurance policy? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 87,6 |
| Do you have supplementary voluntary medical insurance, with some form of service from an insurance firm, polyclinic, hospital, or medical center? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 1,8 |
| Who pays for your medical insurance? You, yourself? | 1,2 | 1,3 | 1,2 | 3,3 | <i>N/A</i> |
| Who pays for this supplementary medical service? You, yourself? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,3 |
| Who pays for your medical insurance? Your enterprise, organization? | 16,4 | 26,8 | 29,6 | 29,1 | <i>N/A</i> |
| Who pays for this supplementary medical service? Your enterprise, organization? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 1,3 |
| Who pays for your medical insurance? The government? | 14,3 | 26,0 | 30,0 | 37,1 | <i>N/A</i> |
| Who pays the sum of the monthly premium for this insurance? Other? | 0,6 | 0,6 | 0,7 | 0,7 | <i>N/A</i> |
| Who pays for this supplementary medical service? Others? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,2 |
| Have you had any health problems in the last 30 days? | 48,0 | 41,5 | 41,7 | 41,2 | 43,5 |
| Do you or does anyone in your family suffer from a chronic illness or do any of you get sick often? | 49,4 | 42,4 | 45,1 | 45,2 | <i>N/A</i> |
| What did you do to solve these health problems that you have had in the last 30 days? Went to medical institutions or just health workers? | 20,3 | 16,9 | 17,1 | 17,0 | 16,0 |
| What did you do to solve these health problems that you have had in the last 30 days? Did not go to a health worker, treated yourself? | 27,5 | 24,5 | 24,5 | 24,1 | 27,6 |
| Did you pay for this visit? | 1,0 | 0,9 | 0,9 | 1,3 | 1,6 |
| Whom and how much did you pay for this visit? Officially in the medical enterprise's cashier's office? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,9 |
| Whom and how much did you pay for this visit? Paid money or gifts directly to the medical personnel? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,8 |

Table 6 (CONTINUED): CHARACTERISTICS OF THE RLMS SAMPLE

| | Round 5 1994 | Round 6 1995 | Round 7 1996 | Round 8 1998 | Round 9 2000 |
|--|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| % of respondents who answered positively | | | | | |
| Besides being seen by a medical worker, did you undergo any additional tests or procedures? | 9,1 | 7,0 | 7,3 | 7,7 | 7,0 |
| Did you pay extra for these tests or procedures? | 0,8 | 0,5 | 0,6 | 1,4 | 1,2 |
| Did you pay extra for these tests or procedures officially in the medical enterprise's cashier's office? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,8 |
| Did you pay extra for these tests or procedures with money or gifts directly to the medical personnel who performed the investigation or procedure? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,4 |
| Have you been hospitalized in the last three months? | 6,1 | 5,0 | 4,9 | 4,9 | 5,2 |
| Did you pay for the stay in the hospital, medical care, treatment, and medicine? | 1,0 | 0,9 | 1,3 | 2,2 | 0,7 |
| Did you pay for treatment and care, not counting payments for medicine, officially in the hospital cashier's office? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,4 |
| Did you pay for treatment and care, not counting payments for medicine, syringes, and dressing materials, to doctors and other medical personnel with money or gifts? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,4 |
| Did you pay for medicines, syringes, and dressings when you were in the hospital with money or gifts? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,7 |
| Did you pay for medicines, syringes, and dressings when you were in the hospital officially in the cashier's office or the drug store of the hospital in which you stayed? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,4 |
| Did you pay doctor or other medical personnel with money or gifts for medicines, syringes, and dressings when you were in the hospital? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,1 |
| Did you yourself or according to your request buy medicines, syringes, and dressings in the drug store inside the hospital in which you stayed? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 0,5 |
| Tell me, please, in the last three months have you gone to a medical institution or simply to a specialist, not because you were sick but for a preventive check-up? | 19,1 | 14,3 | 13,0 | 13,0 | 15,0 |
| Did you pay for this preventative check-up? | 2,1 | 1,6 | 1,7 | 2,1 | 3,4 |
| Did you pay for this check-up officially in the cashier's office of a medical institute? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 2,6 |
| Did you pay doctors and other medical personnel directly with money and gifts for this check-up? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 1,0 |

Table 7. CHARACTERISTICS OF THE RLMS SAMPLE, 1994 - 2000

| | Round 5 1994 | Round 6 1995 | Round 7 1996 | Round 8 1998 | Round 9 2000 |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|
| Number of respondents | 3975 | 3755 | 3591 | 3464 | 3319 |
| (% of households who answered positively) | | | | | |
| Did your family spend money in the last 30 days for treatment or examination in in-patient hospitals, military hospitals, or clinics, not including payments for medicine? | 8,6 | 5,8 | 5,4 | 8,1 | 11,4 |
| Did your family spend money in the last 30 days for medicines, including vitamins and other drugs? | <i>N/A</i> | 41,8 | 44,4 | 52,2 | 55,9 |
| Did your family spend money in the last 30 days for treatment relating to false teeth, not including payments for medicine? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 4,5 |
| Did your family spend money in the last 30 days for treatment or examination in in-patient hospitals, military hospitals, or clinics, not including payments for medicine? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 4,0 |
| Did your family spend money in the last 30 days for treatment or examination in a polyclinic, not including payments for medicine? | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | <i>N/A</i> | 4,0 |

Appendix Three

Table 8. The choice between commercial and non-commercial health care providers

| Where did you go to solve your health problem last time? | 1994 | | 1995 | | 1996 | | 1998 | | 2000 | |
|--|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|
| | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % |
| Income Quintile 1 – the Poor | | | | | | | | | | |
| to a local public outpatient facility with free services | 247 | 86,1 | 227 | 84,1 | 194 | 85,5 | 172 | 90,1 | 176 | 84,2 |
| to a pay-per-service outpatient facility | 6 | 2,1 | 4 | 1,5 | 2 | 0,9 | 3 | 1,6 | 5 | 2,4 |
| to a local public inpatient facility with free services | 33 | 11,5 | 36 | 13,3 | 31 | 13,7 | 15 | 7,9 | 26 | 12,4 |
| to a pay-per-service inpatient facility | | | 1 | 0,4 | | | | | | |
| to a private practitioner | 1 | 0,3 | 1 | 0,4 | | | 1 | 0,5 | 2 | 1,0 |
| somewhere else | | | 1 | 0,4 | | | | | | |
| Total | 287 | 100,0 | 270 | 100,0 | 227 | 100,0 | 191 | 100,0 | 209 | 100,0 |
| Income Quintile 2 | | | | | | | | | | |
| to a local public outpatient facility with free services | 298 | 89,8 | 244 | 90,7 | 193 | 81,8 | 228 | 90,8 | 211 | 84,1 |
| to a pay-per-service outpatient facility | 4 | 1,2 | 3 | 1,1 | 7 | 3,0 | 3 | 1,2 | 8 | 3,2 |
| to a local public inpatient facility with free services | 27 | 8,1 | 21 | 7,8 | 32 | 13,6 | 19 | 7,6 | 28 | 11,2 |
| to a pay-per-service inpatient facility | 2 | 0,6 | | | 2 | 0,8 | | | | |
| to a private practitioner | 1 | 0,3 | 1 | 0,4 | 2 | 0,8 | 1 | 0,4 | 2 | 0,8 |
| somewhere else | | | | | | | | | 2 | 0,8 |
| Total | 332 | 100,0 | 269 | 100,0 | 236 | 100,0 | 251 | 100,0 | 251 | 100,0 |
| Income Quintile 3 | | | | | | | | | | |
| to a local public outpatient facility with free services | 351 | 90,5 | 236 | 84,0 | 252 | 90,0 | 250 | 88,7 | 220 | 88,0 |
| to a pay-per-service outpatient facility | 4 | 1,0 | 6 | 2,1 | 4 | 1,4 | 4 | 1,4 | 7 | 2,8 |
| to a local public inpatient facility with free services | 29 | 7,5 | 38 | 13,5 | 21 | 7,5 | 24 | 8,5 | 22 | 8,8 |
| to a pay-per-service inpatient facility | 1 | 0,3 | | | 2 | 0,7 | 1 | 0,4 | 1 | 0,4 |
| to a private practitioner | 3 | 0,8 | 1 | 0,4 | 1 | 0,4 | 2 | 0,7 | | |
| somewhere else | | | | | | | 1 | 0,4 | | |
| Total | 388 | 100,0 | 281 | 100,0 | 280 | 100,0 | 282 | 100,0 | 250 | 100,0 |

Source: The RLMS data on individual behavior

Table 8 (continued). The choice between commercial and non-commercial health care providers

| Where did you go to solve your health problem last time? | 1994 | | 1995 | | 1996 | | 1998 | | 2000 | |
|--|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|
| | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % |
| Income Quintile 4 | | | | | | | | | | |
| to a local public outpatient facility with free services | 312 | 86,2 | 236 | 86,1 | 248 | 89,2 | 222 | 84,1 | 213 | 86,2 |
| to a pay-per-service outpatient facility | 10 | 2,8 | 8 | 2,9 | 4 | 1,4 | 9 | 3,4 | 7 | 2,8 |
| to a local public inpatient facility with free services | 36 | 9,9 | 26 | 9,5 | 23 | 8,3 | 24 | 9,1 | 18 | 7,3 |
| to a pay-per-service inpatient facility | 3 | 0,8 | 2 | 0,7 | 1 | 0,4 | 2 | 0,8 | 1 | 0,4 |
| to a private practitioner | 1 | 0,3 | 2 | ,7 | 2 | 0,7 | 5 | 1,9 | 6 | 2,4 |
| somewhere else | | | | | | | 2 | 0,8 | 2 | 0,8 |
| Total | 362 | 100,0 | 274 | 100,0 | 278 | 100,0 | 264 | 100,0 | 247 | 100,0 |
| Income Quintile 5 – the Rich | | | | | | | | | | |
| to a local public outpatient facility with free services | 298 | 83,5 | 223 | 86,1 | 223 | 84,8 | 203 | 83,5 | 172 | 78,5 |
| to a pay-per-service outpatient facility | 21 | 5,9 | 13 | 5,0 | 11 | 4,2 | 9 | 3,7 | 15 | 6,8 |
| to a local public inpatient facility with free services | 25 | 7,0 | 13 | 5,0 | 22 | 8,4 | 25 | 10,3 | 21 | 9,6 |
| to a pay-per-service inpatient facility | 4 | 1,1 | 4 | 1,5 | | | 2 | 0,8 | 3 | 1,4 |
| to a private practitioner | 9 | 2,5 | 6 | 2,3 | 7 | 2,7 | 4 | 1,6 | 5 | 2,3 |
| somewhere else | | | | | | | | | 3 | 1,4 |
| Total | 357 | 100,0 | 259 | 100,0 | 263 | 100,0 | 243 | 100,0 | 219 | 100,0 |

Source: The RLMS data on individual behavior