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Consumer out-of-pocket spending for pharmaceuticals in Kazakhstan: implications for sectoral reform

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What do consumers pay for pharmaceuticals in a transition economy, and who is hit hardest? Kazakhstan is in the midst of emerging from a Soviet Union state to a market economy. It has seen a significant dip in Gross Domestic Product and available revenues for health as a result. New sources of revenues, such as out-of-pocket payments, both formal and informal, have become widespread. In this paper we use the results of a 1996 Living Standards survey jointly sponsored by the World Bank and the Kazakhstan Government to examine patterns of prescribed pharmaceutical spending.

We use a two-part regression model that is utilized to adjust for the skewness of non-spenders and heavy utilizers. Results suggest that upper-income groups spend more in absolute terms, but low-income groups pay a higher share of their income for pharmaceuticals. Pharmaceutical expenditure is positively related to poor health status, chronic illness and rural area residence. Our estimates suggest that on average people in rural areas spend 16% more than people in urban areas. The analysis shows that certain types of illnesses impose significant out-of-pocket burden for consumers – gynaecologic as well as intestinal and cardiac. The findings can be used for developing and designing a new 10-year World Bank-financed programme for restructuring the health sector. They also suggest the need for prioritizing rural care, as well as covering pharmaceuticals for specific types of care interventions and certain demographic groups.

Introduction

The countries of the former Soviet Union (FSU) enjoyed a tradition of universal access to health care services, as well as considerable investments in curative medicine, prevention, and water and sanitation. Coverage of health care services was, in principle, comprehensive and free to all citizens (Health Observatory 1999). Almost a decade after the breakup of the Soviet Union, the same principles of free care remain in many of the newly independent states. This is certainly the case in the Central Asian republic of Kazakhstan, where free health care is guaranteed in principle to all citizens according to its Constitution. Nevertheless, Kazakhstan, like many other countries, is struggling to balance costs and available resources as it struggles to modernize and re-structure its health service delivery system. To do this it has been formally exploring new funding sources, including out-of-pocket payments for some services and pharmaceuticals. At the same time, real wages have fallen significantly, encouraging growth in informal out-of-pocket payments for services and for priority access to care.

In terms of basic health indicators, Kazakhstan lies somewhere between established market economies and middle income countries (see Table 1). However, the share of the country's Gross Domestic Product (GNP) devoted to health has declined dramatically since the 1980s – from 6% of GDP in the mid-1980s to 3.3% in 1990, and to 2.1% in 1998 (versus 8.1% OECD average). In real terms, per capita health spending in 1994 was 41% of that in 1990; in terms of purchasing

Table 1. Basic health indicators

Selected demographic and health indicators	Kazakhstan	Russia	Turkey	UK	EU
Life expectancy at birth (females)	70.6	71.7	68.4	79.5	80.7
Life expectancy at birth (males)	59.4	58.3	64.1	74.1	74
Infant mortality rate	25.3	18.2	56.5	6.2	6.1
Maternal mortality rate (per 100 000 live births)	59.0	53.3		6.9	6.2
Crude birth rate	14.2	9.28	22.4	12.49	10.9
Crude death rate	9.8	15		11.01	9.98

Source: WHO (2001).
Note: Data for Kazakhstan is from 1997. For Turkey, it is from 1992, and for other countries, it is from 1995.

power parity, per capita health spending went from US$100 in 1990 to about US$50 in 1995.

Spending on health as a percentage of government budgets has been relatively stable since 1989, hovering at around 9–10%. However, Kazakhstan's decline in real GDP, as in most of the FSU countries over the past several years, has contributed to reduced tax revenues being generated locally and therefore less revenues for health services. In the short term, the government might be able to allocate a greater share of the public budget to health services or to rationalize services. In the longer term, public funding will depend upon growth and expansion of the general economic base. Nominal public health care expenditure in Pavlodar, for example, has fallen by 19% since 1995, without accounting for the effects of inflation – from 1604 in 1995 to 1295 tenge in 1997 (World Bank 1998).[1]

Large-scale rationalization has taken place, with beds per capita falling by 39% and a 22% reduction in number of physicians between 1990 and 1997 (Health Observatory 1999). Despite these reductions, the country still has a higher ratio of beds and physicians than most EU member states. There has been a further short-term response to under-funding through greater reliance on more diverse sources of revenue, including (1) enactment of a self-sustaining public health insurance trust fund through a new Compulsory Medical Insurance Fund (CMIF) legislation;[2] (2) employer-based payroll contributions; (3) an emerging private supplemental insurance sector; and (4) revenues through patient co-payments, especially outpatient pharmaceuticals through formal coverage rules.

Recent studies show that expenditure for pharmaceuticals forms a substantial share of total out-of-pocket payments. For instance, Langenbrunner and Yazbek (1995) stated that the average cost per household for pharmaceuticals was almost three times higher than reported average monthly household income. In this paper, we examine the recent experience of out-of-pocket payments for pharmaceuticals in Kazakhstan, its impact, and the implications for reform initiatives that could involve changes in coverage and payment polices for services and pharmaceuticals. In addition to providing insights for Kazakhstan, our analysis further adds an understanding of mechanisms for designing and implementing pharmaceuticals coverage in other countries as well.

The rest of the paper is organized as follows. We provide a brief review of previous studies on out-of-pocket payments focusing more on payments for pharmaceuticals in Kazakhstan and in the region. We present data, and descriptive results from the data, in the third section. In the next two sections, we discuss the empirical model and the findings from the empirical analysis. The last section is devoted to brief discussion and conclusions.

Paying for pharmaceuticals

Outpatient costs are borne by direct out-of-pocket payments, as prescribed by law, though some vulnerable groups such as veterans and children under 3 years are protected (World Bank 1998). But access and affordability for consumers may be hurt by the fact that pharmaceutical prices were deregulated in the early 1990s. Secondly, pharmacies were privatized, which may stimulate competition in urban areas, but in rural areas may encourage monopoly pricing where there are fewer outlets. Currently, pharmaceuticals are formally covered by the government for in-patient care, though most discussions and reports indicate that patients can effectively pay for up to half of the costs of in-patient care pharmaceuticals through informal payment mechanisms (see Ensor and Savelyeva 1998).

While formal co-payments are a relatively recent development (World Bank 1998), informal payments persist from Soviet times and appear to be worsening (Lewis 1999). Together, these revenue streams constitute the second most important source of funding for the sector. Sari et al. (2000) found out-of-pocket spending (covering both formal and informal payments) at a full 31% of all spending for health services in 1996, or 1.41% of GDP. Funding from national budget and insurance (funding from payrolls) were 8.32% and 9.47% of total health spending, respectively. Out-of-pocket payments are lower than the regional (oblast) budget (49.67% of health spending), but almost twice the combined national budget and insurance payments (Table 2).

Expenditure for prescribed drugs is the most substantial portion of out-of-pocket payments. Almost 66% of out-of-pocket payments (22% of total health care expenditure) are for pharmaceuticals (World Bank 1997). What portion is formal and informal is not clear. Other studies in the region

Table 2. Sources of funding for the health sector in 1996 (actual spending)[a]

	Tenge (million)	US$ (million)	% of GDP	% of total health spending
National budget	5 117	76	0.36	8.32
Oblast budget	30 544	451	2.16	49.67
Insurance (payroll)	5 825	86	0.41	9.47
Out-of-pocket payments	20 005	295	1.41	32.53
Total	61 492	908	4.34	100.00

Source: Sari et al. (2000).
[a] In 1996, nominal GDP at market prices is 20 761 million US$, population is 16.5 million, and exchange rate is 67.76 tenge/US$ (World Bank 1998).

also look at estimates of the level and extent of out-of-pocket payments, and distinguish between formal and informal payments, but similarly fail to apportion for pharmaceuticals alone. From a household survey in Russia, Feeley et al. (1998) estimated that more than half of all spending for health was out-of-pocket, and that 15.4% of household expenditures on drugs and medical services are informal or 'under the table'. An ODA-sponsored study in Kyrgzstan (Abel-Smith and Falkingham 1995) found that 80% of patients paid for pharmaceuticals during a hospital stay, despite formal coverage of these items. Novak et al. (1996) undertook a survey of 5000+ families in South Kazakhstan oblast and found that payments to providers were common for both outpatient and in-patient care; 57% had to provide their own pharmaceuticals for both in-patient and outpatient care. The average cost per household for pharmaceuticals was 1645 tenge per hospital admission, 975 tenge per physician visit, and 628 tenge for home care. These numbers are significant in the context of reported average monthly household income of only 568 tenge at the time of the survey (Langenbrunner and Yazbeck 1995; Novak et al. 1996).

In the next section, we introduce the data used in this study. The survey is nationally representative, and therefore provides a better understanding in terms of the recent experience of out-of-pocket payments for pharmaceuticals in Kazakhstan.

Data

This study uses results from a survey of Kazakhstan Living Standard Measurement undertaken in July 1996. We use the health-related part of the survey. A total of 7224 individuals from 1996 households participated from different oblasts across the country. The sample is nationally representative, but not at the oblast level. After eliminating missing and incomplete data, the sample size decreased to 7073, 17.6% of which reported health problems during the last month.

Perhaps of greater concern is that of a total of 677 respondents who answered that they held prescriptions for medicine, almost 42% reported that they failed to buy the prescribed drugs when they were sick.[3] Among the prescribed patients, 14% experienced difficulty in finding the drugs on the market. When analyzed by location, this is almost equally distributed between rural and urban areas (47% of them are in rural areas). A full 26% of the patients reported that they could not afford the prescribed drugs. When analyzed by poor/non-poor,[4] 30% of the poor reported they could not afford the prescribed drugs. About the same number of non-poor (25%) reported the same difficulty. When analyzed by location, 66% of these patients are from urban areas. While not shown here, most of the 66% of these people (41%) are from the lowest two income quintiles.

Table 3 reports the impact of payment for pharmaceuticals as a percentage of monthly income. These figures show that the poor are affected more significantly as a percentage of income when they pay, and this holds both for urban and rural poor.

Table 3. Payment for pharmaceuticals (as a percentage of monthly income)

	Poor	Non-poor	Total
Rural	32.55	14.14	15.50
Urban	44.28	9.03	10.84
Total	39.06	10.83	12.51

Empirical model

In order to examine these relationships further, we use a two-part regression model to evaluate expenditures for pharmaceuticals conditional on having any prescription.[5] The model therefore estimates the probability of incurring pharmaceutical expenditure conditional on having any prescription and for those with positive expenditures, the level of spending.[6] Table 4 reports the basic statistics for variables used in the regression analysis.

Health care utilization data and spending for pharmaceuticals have a distinctive characteristic. Although a group of individuals does not incur any spending for pharmaceuticals, the distribution of spending among users is skewed. These characteristics of health care data led researchers to use a two-part model to address the issue of non-spenders and heavy spenders. Duan et al. (1983) test alternative models of the demand for health care using experimental data. Their simulation supports the use of a two-part model. The same approach is implemented in Grootendorst (1995), Leibowitz et al. (1985) and Street et al. (1999).

Street et al. (1999) analyzed the impacts of exemption status and other socioeconomic variables on pharmaceutical use in Russia. They used a two-part model to examine the expenditure on drugs. The probability of drug purchase is modelled using a probit model, and level of spending is estimated using OLS regression on the logarithm of expenditure. The essence of this model is that the likelihood function can be decomposed into two multiplicative terms. To illustrate, consider that the sample of N observations is partitioned into two pieces: the first (n_1) observations have positive expenses, and the last ($N - n_1$) observations have no drug expenditures. Following Duan et al. (1983), the likelihood function for the first n_1 observations is defined as

$$L_i = Pr(med_i > 0|X_i) \bullet f(med_i|med_i > 0, X_i)$$

where med_i denotes expenditure for pharmaceuticals and f stands for the probability density function.

For each of the last ($N - n_1$) observations, the likelihood function is

$$L_i = Pr(med_i = 0|X_i)$$

Furthermore the likelihood of the entire sample can be defined as

Table 4. Basic statistics for variables in the regression analysis

Variable	Variable definitions	Mean	Std. dev.	Min	Max
Logmed	Natural logarithm of expenditure on medicine	6.21	1.14	2.71	9.62
Age	Age of respondent	43.80	22.50	0.07	94.53
Age square	Square of respondent's age	2424.38	1959.73	0.01	8936.21
Rural	1 if respondent lives in rural area	0.39	0.49	0	1
Female	1 if respondent is female	0.38	0.48	0	1
Log income	Natural logarithm of income (expenditure based income)	8.47	0.70	6.46	12.19
Otology	1 if respondent has otological disease	0.05	0.21	0	1
Intestine	1 if respondent has intestine disease	0.13	0.33	0	1
Cardiac	1 if respondent has cardiac problem	0.28	0.45	0	1
Gynaecologic	1 if respondent has gynaecologic disease	0.05	0.21	0	1
Injuries	1 if respondent had any injuries	0.03	0.18	0	1
Skin	1 if respondent has any skin disease	0.03	0.17	0	1
Lingering	1 if respondent has acute lingering disease	0.15	0.36	0	1
Bad health	1 if respondent reported poor or very poor health condition	0.43	0.50	0	1
Log BMI	Natural logarithm of weight/square of height	3.18	0.29	2.26	5.91
Chronic	1 if respondent has any chronic illness	0.72	0.45	0	1
Log HH	Natural logarithm of household size	1.20	0.53	0	2.48

$$L = \prod_{i=1}^{n_1} Pr(med_i > 0|X_i) \bullet f(med_i|med_i > 0, X_i) \bullet \prod_{i=n_1+1}^{N} Pr(med_i > 0|X_i)$$

Note that the likelihood function for the entire sample above can be decomposed in two separate terms:

$$L_1 = \prod_{i=1}^{n_1} Pr(med_i > 0|X_i) \bullet \prod_{i=n_1+1}^{N} Pr(med_i > 0|X_i)$$

$$L_2 = \prod_{i=1}^{n_1} f(med_i|med_i > 0, X_i)$$

As Duan et al. (1983) noted, the first likelihood function depends exclusively on parameters in the model of the binary outcome equation (whether expenditure is positive), and the second likelihood function depends on parameters in the equation explaining expenditures of the users. Since the likelihood function is separable, maximizing each likelihood function separately is equivalent to maximizing the likelihood function L alone.

The results from this model are shown in Table 5. The first column shows the results from OLS estimation by using the entire sample including both positive and zero spenders. The second and third columns present estimations from a two-part model. The second column presents results from a probit estimation using likelihood function L_1. The third column is the result from OLS estimation on positive spenders from likelihood function L_2.

Findings

Table 5 presents OLS and two-part model results from our empirical model. The two-part model improves the estimation results compared with OLS estimation using the entire sample. Although all variables have the same sign, variables for different types of illnesses become significant in the two-part model. Additionally, the F-statistics and R^2 values improve significantly.

As income increases, spending for health care also increases. This is also true in low- and middle-income countries, where individuals spend a similar proportion on health as income increases (Schieber and Maeda 1998). The result in this research is consistent with this conjecture and with previous studies from the region. For instance, Street et al. (1999) estimates the income elasticity of drug expenditures in Russia in three different oblasts. Their results range from 0.15 to 0.22.

The result for income elasticity with respect to total pharmaceutical spending in current research is very close to the result in Street et al. (1999), with an income elasticity of 0.18 for pharmaceutical spending. This result suggests that people in the upper-income group spend more in absolute terms, consistent with other research in transition countries (Makinen et al. 2000). However, low-income groups pay a relatively higher share of their income for pharmaceuticals, which imposes a significant burden on consumers.

Pharmaceutical expenditure is positively related to poor health status, chronic illness and rural areas. Our estimates suggest that, on average, people in rural areas spend 16% more than people in urban areas. The literature suggests that rural status is a determinant of utilization. The direction, however, is not consistent (see Belajaran 1987; Haynes 1991) but suggestive that rural residents seek care less often for minor, self-limiting conditions. This may have to do with access to providers and facilities, as well as ability to pay. Recent results from a survey in Nepal (Hotchkiss et al. 1998), for example, found that reported severity of illness was higher in rural areas and, controlling for income, rural residents paid more for health care.

It is, in general, expected that females pay more for health care (Novak et al. 1996). Our results confirm this, but the coefficient estimate is not statistically significant. Pharmaceutical spending

Table 5. Estimates for pharmaceutical spending

	Entire sample		Two-part model			
	OLS		Probit		OLS	
	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Socio-demographic factors						
Age	0.02	1.11	0.01	0.48	0.01	1.07
Age square	−0.0004	−2.06[a]	−0.0002	−1.08	−0.0002	−2.12[a]
Rural	0.46	2.60[a]	0.33	2.25[a]	0.16	1.62
Female	−0.11	−0.60	−0.20	−1.32	0.10	0.95
Log income	0.44	3.33[a]	0.27	2.30[a]	0.18	2.76[a]
Type of illness						
Otology	−0.63	−1.57	−0.29	−0.89	−0.43	−2.03[a]
Intestine	0.04	0.13	−0.32	−1.38	0.38	2.30[a]
Cardiac	0.10	0.42	−0.17	−0.78	0.24	1.81[b]
Gynaecologic	0.21	0.48	−0.48	−1.37	0.72	3.17[a]
Injuries	0.18	0.34	−0.26	−0.61	0.38	1.24
Skin	−0.33	−0.65	−0.30	−0.72	−0.06	−0.18
Lingering	−0.20	−0.65	−0.36	−1.56	0.17	1.10
Health status						
Bad health	0.44	2.16[a]	0.03	0.17	0.47	4.40[a]
Log BMI	0.39	1.60	0.22	0.90	0.17	1.32
Chronic	0.15	0.73	−0.01	−0.08	0.18	1.42
Log HH	0.49	2.39[a]	0.33	2.17[a]	0.12	1.12
Constant	*−0.40*	*−0.27*	*−1.98*	*−1.59*	*3.54*	*4.58*
Observations	647		647		579	
F-statistics	3.43		–		4.82	
Chi square	–		39.75		–	
R square	0.07		–		0.11	
Log likelihood	–		−201.76		–	

Note: Dependent variable is natural logarithm of pharmaceutical spending.
[a] Significant at 5%; [b] significant at 10%.

is positively correlated with gynaecologic services used by women. Gynaecologic services require the most expensive drugs among all other health problems stated through the survey. On average expenditure here is 72% higher than expenditures for other diseases. Unfortunately, the survey does not capture specific information on types and dosage of these drugs.[7]

Additionally, the results show a positive correlation with certain diseases, namely intestinal disorders and cardiac problems. Our estimates suggest that people with cardiac or intestinal disorders pay 24% and 38% more, respectively, than others with other health problems. And while only 5% of the population reported that they have gynaecologic problems, people with cardiac or intestinal disorders make up around 13% and 28% of those prescribed (see Table 4). These results may be viewed with some caution, and might be attributable to supply-side factors such as available specialists and to the acute nature of such illnesses, encouraging larger payments for priority access.

Discussion

While the rural population may be paying more for prescribed pharmaceuticals, the results do not show that groups traditionally thought to be negatively affected – women and the poor – necessarily do badly relative to other groups. Although poor people, both rural and urban, do not spend more in absolute terms, they spend a significantly higher portion of their income on pharmaceuticals. This suggests the relative importance of extending coverage for lower-income groups.

The results also confirm the need to address rural care issues, and a number of reforms are focused on rural areas. A new government programme financed by the World Bank (1997) will build on rural reform programmes initiated in several oblasts, while targeting more basic public health and health system delivery issues nationwide. The programme will provide the opportunity to adapt to evolving priorities within an agreed framework over a 10-year timeframe.

A modified benefit package will be developed which will cover outpatient prescription pharmaceuticals for eight to 10 common disease conditions currently treated in in-patient settings but amenable to outpatient care. The conditions include diabetes, hypertension, tuberculosis, childhood asthma, and acute respiratory infections (ARI). Again, perhaps if a phased approach is used, rural areas might be the first to test these approaches.

Our analysis shows that certain types of illnesses and services impose particularly significant out-of-pocket burden for consumers, i.e. gynaecologic services, and intestinal and cardiac problems. Design of improved pharmaceutical coverage may need to address these categories in a more explicit way. Again, this may be an issue that hits the poor in a disproportionate way.

Finally, the analysis raises basic issues of access to pharmaceuticals. The survey shows that over 14% of those prescribed could not find the pharmaceuticals in the market. Policies will need to recognize and try to address this issue of basic availability.

This paper sheds light on one of the important health care financing issues in Kazakhstan. Due to the design of the household survey, we have pharmaceutical expenditure data only for those people with prescriptions. Although the evidence from this research provides important insights for prescribed pharmaceutical coverage policies, it has limitations in providing insight for pharmaceutical spending in general. Further studies, which use new data, may provide a better understanding on this issue.

Endnotes

[1] For a more detailed discussion on the health sector and health expenditures in Kazakhstan, see Sari et al. (2000).

[2] Recently the Compulsory Medical Insurance Fund (CMIF) was abolished as a health purchaser. Contributions of 3% of payroll taxes previously allocated for the CMIF were collapsed into a unified payroll tax effective on January 1, 1999, and there was a public expenditure reduction in 1999 across all sectors to reduce Kazakhstan's debt position.

[3] Some people did not buy all the drugs they were prescribed. Only 68 of 677 people did not cash their prescriptions. For these people, we do not know from the survey whether they never cashed their prescriptions or if they did but only after the interview had been conducted (the data collection tool truncates observations that occurred after the month in question). Hence, if some of the zeros are not true zeros (i.e. they report positive expenditure later), it implies that the survey underestimates the amount of pharmaceutical expenditure. Therefore the results in the empirical section of the paper should be evaluated by keeping this in mind.

[4] Expenditures, which include spending for all purposes and value of home production, are used as a proxy for income in our analysis. In order to create a benchmark for income, we used a poverty line estimated by the Government of Kazakhstan. The minimum per capita consumption standard that we used as the poverty line in 1996 was 2861 tenge per month (Kazakhstan National Statistical Agency 1996). For the analysis, the sample is divided into two categories by income, those who are below the poverty line and others, or *poor* versus *non-poor*. Only 21% of those prescribed were poor overall; among the rural population it was 41%.

[5] We have data on pharmaceutical spending only for those people with prescriptions.

[6] In our estimations, due to missing data for some variables – 23 missing observations in pharmaceutical spending and seven in BMI – we use a final sample of 647 observations.

[7] The survey provides information for individual's health problems (otology, intestine, cardiac, gynaecologic, injuries, skin, lingering, and others not classified) and the expenditures for prescribed drugs only.

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