Disability Risk and Miraculous Recoveries in Russia

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March 2008

Abstract (*JEL* classifications **J10**, J15, P36)
This paper examines determinants of being disabled in Russia, along with the probability of moving from one disability status to another, using data from 1994 through 2005 from the Russian Longitudinal Monitoring Survey. Disability risk rises with age, declines with income and self-reported good health, and is lower for women. On the other hand, neither smoking nor drinking alcohol increase either the risk of being or becoming disabled.

This study has been funded in part by National Institute of Aging grant #2P30 AG17248-02 through the Population Aging Center at the University of Colorado at Boulder. We are grateful to Aleksandr Andreev for outstanding research assistance.

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1. Introduction

This paper provides estimates of the disability risk, and of the probability of moving from one disability risk category to another, using data from the Russian Longitudinal Monitoring Survey (RLMS) and the Russian National Survey on Household Welfare and Participation in Social Programs (NOBUS). The topic is critical for several reasons. First, the economically developed regions of the former USSR have extremely high disability rates, and state social allowances are a major budgetary concern. Hence, it is important to gain insight into the nature of the region's disabled population, and in particular in the extent to which it might diminish with further economic recovery. Second, insurance markets are now forging ahead in Russia, and understanding disability risk is essential to the design and pricing of insurance products. Finally, both the state and private insurers need to know the extent to which today's high disability rates reflect true ill-health, as opposed to efforts to gain additional incomes. Indeed, the patterns analyzed here may well be universal rather than unique to Russia: our focus in Russia is based on the unusually clear and simple disability categorizations in its comprehensive social security system that reveal behavioral responses to shifts in the underlying environment.

Relatively little is known about the likelihood of recovering or moving from one disability status to another, or even about the characteristics of disability in middle-income countries more generally (for two major exceptions to this statement, see Metts, 2000, and Hoopendardner, 2001; for detailed presentations of disability patterns in Russia and Kazakhstan, see Merkuryeva 2007 and Seitenova and Becker 2008). Even for developed countries, the literature on the behavioral consequences of disability pensions and the determinants of disability status is far from vast.[1] We do know that disability rates vary considerably over time, and that there is even greater variation among the underlying causes. Russia offers a unique opportunity to consider the dynamics of disability in a middle-income country, enabling us to focus on the influence of factors other than health status on the individual likelihood of obtaining a state disability pension. During economic decline, many individuals at risk of losing employment or suffering income declines can be expected to seek disability support, even if the actual health condition might allow continuing labor force participation. Conversely, individuals may tend to return to labor force as conditions improve, especially if the recovery leads to a real, positive influence on health (either because of improved medical care or for psychological reasons). Results from multinomial logit regressions offer mixed

[1] A good sense of both the literature and empirical results – broadly consistent with those obtained here – can be found in Maki (1993), Kreider and Riphahn (2000), and Haveman, de Jong, and Wolfe (1991).

results. Low income does not emerge as a dominant reason for becoming disabled. On the other hand, this could reflect measurement error, as a surprisingly large proportion of "incurably" disabled Russians do in fact recover.

2. Disability Incidence and Pensions in Russia

The Russian social welfare system closely follows its Soviet predecessor. Government is responsible for provision of a pay-as-you-go "Solidarity" component, which among all includes payments of disability pensions.[2] The sources of funding for basic pensions are payroll taxes paid by employers and transfers from state budgets. Thus, a substantial part of expenditures continues to be a government responsibility. Private disability and health insurance also have emerged in Russia, with these risks and hence costs also closely related to official disability status. Virtually the entire population is covered by the Solidarity system: the Soviet legacy is a much more comprehensive welfare state than is normally found in upper-middle income countries. The levels of disability payments and other pensions vary according to economic conditions: the amounts cannot be described as lavish, but for a substantial portion of the population are the dominant source of income.

The Law on State Pensions in Russian Federation defines three groups of disability depending on the degree of health damage. Individuals who have completely lost regular work capacity are assigned to Group I if they require permanent care, and to Group II if they the disability is severe but not inherently permanent. Those with only partial disability, whether or not permanent, are assigned to Group III.[3] A special medical commission defines disability status. It is reconsidered every two years for the first group, and annually for the second and third groups, except for those individuals who have reached official retirement age or have incurable diseases (Merkuryeva, 2007; Seitenova and Becker, 2008).

Disability pensions are set at 75% of earnings for Groups I and II, and at 30% of earnings for the third group. If information on earnings is not available, the recipient received a minimum

[2] Descriptions of the system can be found in AVFS (1997 and 1999), and AFSRF (2000).

[3] The definition of disability groups used here follows the classification valid until 2002. In 2002, a bill passed by Parliament introduced a new approach embracing three disability categories, where category 3 denotes the most severe degree of disability. The 2002 Pension Reform also changed the methods for calculation of pension amounts: disability pensions can comprise basic, insurance and individual accumulative account components, defined in accordance with the Law on the Labor Pensions and the Law on the State Pensions. As the data used here are for 2002 and earlier, we use pre-reform categorizations.

disability pension, which is equal to the minimum old-age pension for those in Groups I and II, and 2/3 of the minimum old-age pension for the third group. In any case, a disability pension cannot exceed the maximum amount of old-age pension.

Minimum Russian pensions for different disability groups along with old-age pension and minimal wage size over the recent years are provided in **Table 1**. Average Russian disability pensions are about 10% lower than old-age pensions. Hence, a large proportion of disabled people at retirement age elect instead to receive old-age pensions, while still enjoying disability privileges. In both Russia and neighboring Kazakhstan, in the event of an on-the-job injury or for disabilities incurred by persons under 20 years of age, the amount of disability pension is independent of the number of years worked. In all other cases, a minimum employment qualification period is required depending on the age. There are special cases when different calculation approaches are applied, including members of the armed forces, those with incomplete work histories, and immigrants. In addition to the general pension amount, until 2005 there were supplementary non-money benefits available to disabled people. The most valuable of these "privileges" include provision of free medicines, free transportation, and discounts on utilities payments; all together these benefits nearly double pensioners' real incomes (FBEA, 1999: 28).

Since the RLMS is designed to survey a broad range of questions, no perfect measure of disability exists in the RLMS questionnaire. Specifically, there is no question asking an individual to self-identify as "disabled." The RLMS does ask the respondent to identify his primary occupation from a set of possible choices. Of these, 1.6% of respondents identified themselves as not working for health reasons – disabled; however, this figure clearly underestimates Russian disability rates because of the existence of many options, some of which are not mutually exclusive. For example, an individual may designate himself as a "pensioner" when he is in fact also "disabled." Lacking a direct question of self-identification, disability for health reasons may be inferred from the wide variety of health questions asked in the RLMS. All of these are summarized in **Table 2** for individuals aged 16 and over. For example, almost half of respondents reported chronic health problems, 17% reported mobility problems and 14% reported their health status as being poor or very poor. Indeed, the frequency of these responses is so great that one can conclude little, other than that Russians are willing to complain about aches and pains to a sympathetic listener.

Recognition of having an officially-recognized disability can be judged from responses to two questions. In all rounds, the RLMS asked individuals whether they received disability pensions; in Round 14, 5.4% responded in the affirmative. Starting in Round 12, the RLMS also asked about disability groups; 8.7% of Russians aged 16 and over reported an assigned disability group in Round 14. Since different pensions are not mutually exclusive, the number of individuals with assigned disability groups exceeds the number receiving pensions. Since information on disability groups is more useful, we let the dependent variable in the econometric analysis below be an individual's assigned disability group.

Dynamics of disability ratios from RLMS surveys are plotted in **Figure 1**. Again, since until Round 12 the RLMS only asked about pensions, and not disability groups, only the former series is plotted for the entire time period. Additionally, the percentages of those with a disability group assigned have been plotted using the data from the last three rounds. *T*-tests on results from Rounds 12, 13, and 14 reveal that the observed increase in disability ratios is statistically significant.

Despite these problems of accurate estimation, it does appear that Russia's disability problem has grown dramatically since the breakup of the USSR, and continues to grow.[4] The number of disabled people is now about 4.5 million people, or roughly 3% of the total population. **Table 3** reports the number of people registered as disabled along with the average amount of pensions received in the period between 1970 and 2002. Virtually the entire growth of the number of disabled occurred between 1992 and 1997 (**Figure 2**), corresponding to the economic deterioration of that era. The trend then stabilized, likely reflecting the nation's rapid growth after the 1998 crisis, and declined markedly in 2002, only to resume the upward trend in 2004-2005. The number recognized as disabled for the first time peaks in 1995, a year of rapid deterioration of the financial positions of Pension Fund; gradual decline is observed thereafter (**Table 4**). Because of a rising share of middle aged and elderly in the Russian population, it seems likely that the proportion of disability pensioners in the total population will continue to increase.

The fact that the maximum both for the number of disabled people and the number of first-time disability pensioners was reached in the mid to late 1990s is consistent with the hypothesis that the observed growth is caused in large part by economic (reduced real income and employment opportunities) rather than demographic reasons. This statement is also supported by increase of proportion of Group II disabled people, which is a benchmark group for getting privileges and compensations (falsifying Group I status is more difficult, while Group III status invites careful, regular review), and seems realistic for a person with long working experience to obtain from local

[4] Two different approaches are used to estimate disability rates in Russia. The first counts all individuals receiving a disability pension. The second includes recipients of all types of social benefits. Both methods trace the recipients of pensions, but not individuals actually suffering health deficiencies.

authorities. Table 4 documents the rise in the numbers of newly disabled, from roughly six per thousand adults in 1991, to nine in 1995, and around eight during 1996-2002. Of this huge increase between 1991 and 1995, Group II disabled accounted for 86% of the total.

A second feature emerging from Table 4 is that the overall disability incidence is quite high, and has risen from 2.3% of the adult population in 1991 to 3.1% to 3.3% in more recent years.[5] Yet even these figures, taken from reports submitted by regional government payment centers, appear to be low. **Table 5** reports disability incidence estimates taken from the NOBUS 2003 household survey: at 7.5% of the adult population, the estimate is more than twice as great as the figures generated by the Statistics Ministry (Goskomstat) on the basis of payments reports. There is no simple way to reconcile a discrepancy of this magnitude, especially as the vast NOBUS survey of 45,000 households also was carried out by Goskomstat: we simply note that our estimates and empirical work do not depend on either of these official data sources.[6]

A final feature of the official data is the marked regional variation (**Table 6**). The variation is far greater for Groups II and III than for Group I (Table 5), casting further suspicion on the nature of many of these disabilities, especially as some of the highest incidence regions are relatively prosperous. In terms of overall disability risk, rates vary even more, and at the regional level generate some almost absurd results. Taken at face value, wealthy regions such as Moscow (109 disabled adults per thousand) and Nizhegorodskaia oblast (Nizhnii Novgorod: 107) are in fact very risky, even by the standards of regions normally considered dangerous industrial areas or remote places where people live very tough lives. Perhaps the most outrageous contrast is St. Petersburg (159) and Murmansk (46), a military-industrial region far to the north. While it is true that major cities historically have had older populations at greater risk of being disabled, recent years have seen huge out-migrations of the able bodied population from Russia's far north and east, and in-migration of working-age adults to wealthy and thriving cities. In short, it is difficult to imagine that disability is

[5] Comparable data on patterns and historic trends of disability and disability pension payments in Kazakhstan are given in Seitenova and Becker (2008) and Becker and Urzhumova (1998), which also provides an early warning of the impending rise in disability pensions in post-Soviet societies. Briefly, the risk of becoming disabled more than doubled in the post-Soviet era relative to the 1980s, although disability rates in Kazakhstan appear to be slightly lower than those in Russia. However, this pattern most likely is driven by differences in age structures. The rise in the incidence of new disabilities appears to have halted in Kazakhstan, and has declined and stabilized – though this appears to reflect public policy rather than any improvement in adult health.

[6] This inconsistency based on household *vs.* payment reports is not a newly discovered phenomenon, but rather is widely known. The extent of the discrepancy and underlying causes are discussed in detail in FBEA (1998).

not endogenous, driven by a cross between individual need and a regional government's ability to deliver social payments.

3. Data Description and Testable Hypotheses

The data used in this research are obtained from Russia Longitudinal Monitoring Survey (RLMS).[7] The RLMS longitudinal study is designed to provide a repeated cross-sectional sampling, but can also be used in panel analysis. The data consist of two phases covering the periods 1992-1993 and 1994-2005 with different panels; in total, data have been collected 14 times.

The units of observation are households and household members residing in selected dwelling units over the period of survey. The original sample consisted of 7,200 households with a response rate of 88.8%; the number of individuals in participating households was 17,154, with a response rate of 97.0%. In later rounds, the sample was decreased to roughly 4,000 households, and different sampling principles were introduced. We limit our analysis to data from the second phase, and include individuals observed in Rounds 12-14 (2003, 2004, and 2005), as well as data on income and disability characteristics of the same individuals in the period between 1994 and 2000 and in Rounds 10 and 11 (2001 and 2002). The sample is further restricted to individuals aged 16+ to allow for the possibility of labor force participation. In total, this gives a sample of 10,194 individuals observed in 2005 and at different moments over an 11-year prior period.

Throughout the empirical work, our dependent variable is a dichotomous variable denoting an individual's disability pension status in the month prior to the interview date (*disab*). We take advantage of the longitudinal nature of RLMS to condition current status on past disability status, thereby focusing on disability status changes. The focus on **change** in disability removes the inherent endogeneity bias that emerges from simply regressing disability status on contemporaneous income, wealth, locational and family status, all of which depend on disability as well as *vice-versa*. Incorporation of a self-reported health indicator (we examine both contemporaneous and lagged values) also enables us to control for endogeneity bias from gradually emerging conditions that eventually pass a threshold. To the extent that the onset of a disabling characteristic is predictable, omission of a lagged health indicator would create an omitted variables' bias, since one's stock of health and other variables are simultaneously determined.

[7] Available without charge from Carolina Population Center at the University of North Carolina at Chapel Hill web site: www.cpc.unc.edu/projects/rlms.

Explanatory variables enable us to control for socio-demographic, household, health, employment and income characteristics of an individual. Variables of particular interest include the respondent's real total income at different observation periods (*inclmod*), which serves as an indicator of the effect of economic prosperity on disability risk, and lagged disability values, which enable us to assess risk of continued disability status. This is likely to be especially important to the extent that those with poor or deteriorating job prospects aggressively seek disability status.

Socio-demographic variables include age, gender, and marital status of the respondent (*age, female, married*). There are also dummies for non-marital status (*widow* and *divorced*, with never married as the residual omitted category). We were torn over whether to estimate separate disability risk equations for men and women, and, given our modest pool of disabled persons and large number of transition possibilities, opted against doing so. Inclusion of a female binary variable may capture some gender effects, but will not do so if the effects are complex and unrelated to the intercept.

Two variables measure educational attainments: number of years of schooling (*grdlev*) and exposure to higher (university or technical) education (*highsc*). Relevant household characteristics include household size, income, and wealth indicators. Household income is defined as per capita real income (*incppersd*), a variable distinct in most cases from respondent's income.

Pension income (*ampensd*) is recorded separately. Unfortunately, no direct measurement of household wealth (for example, market value of property owned) is available. Information on proximate factors, including type of dwelling occupied, dwelling ownership, living space, size of land used by the family, and land ownership, is available – but none of these turn out to be important in (unreported) regressions. Many of these variables are highly correlated with the type of city or rural area in which the respondent lives, while living space still reflects Soviet norms, and hence varies less than in longstanding market economies. What does vary substantially – quality of housing, or local infrastructure and services – is not observed. Worse, these omitted variables are often negatively correlated with the ones that we do observe, so that the coefficients estimated tend to be biased in absolute value toward zero.

Household size (*num*) and marital status are likely to have complex effects on disability risk. Being married and having a large family increases the likelihood that there are other family members who can work, thereby reducing the pressure on any individual to do so. These characteristics are also associated with better care of individuals, so that genuine disability is likely to be lower. On the other hand, having a stable (if paltry) disability payment, and subsidized or free communal services, may be critical to a large family. In effect, large families enable individuals to specialize, and some members may "specialize" in low but steady disability benefits.

Several variables reflect a respondent's health status. These include self-evaluation of respondent's health (*healthgood*, and, at the other poor health extreme, *healthpr*); alcohol-use frequency (*alco*); smoking (*smokes*); and presence of health problems in the last 30 days (*hprblm*).

Employment status is characterized by being currently working (*wrknow*), and being in the labor force (*lfp*). The decision to work is properly endogenous, and to get rid of the simultaneity, it is preferable to use a lagged value. However, in the Russian context, where real GDP often rises or falls by nearly 10% during the course of a year (and, of course, individual circumstances fluctuate even more wildly), using a one-year lagged value is costly. To the extent that disability status reflects current opportunity costs, then circumstances of a previous year may have limited relevance. Nor can we easily discern suitable instruments for labor force participation, working, and other potentially endogenous variables. In short, the ideal would be to estimate a structural model, but the data set does not allow us to do that readily.

The alternative we employ is to retreat to estimating a reduced form disability equation, including explanatory variables that would affect labor force participation. These include most of the demographic and health variables mentioned above, as well as the income and education variables, the real monthly amount of old-age pension received (*ampensd*); and the amount of disability pension the respondent receives (*benefitsd*), if any. This last variable reflects the attractiveness both of formal disability rules and regional governments' effectiveness in distributing payments, as level of payment actually received should influence efforts to secure disability status. Actual disability payments will vary according to disability group, pensioner category (some individuals are eligible for higher levels based on nature of service or residence), and, conceivably, administrative and financial capacity of a pensioner's regional government.

Males constitute 43% of the total sample. Average age is 44 years old due to the exclusion of individuals under 16 years old. Married people represent 50.2% of the sample; 7.9% of the sample is divorced and 11.9% is widowed. Some 67% of the sample lives in urban areas and 53% is currently working. Those who have completed secondary education constitute 77.2%, while 18.0% have completed higher education. Depending on one's perspective, the health of Russian adults is either reasonably good (85.7% report being in good health) or terrible (48.7% report chronic health problems). Finally, 34.4% self-report as smoking while half have consumed alcoholic beverages in the past 30 days.

The average net monthly real individual income in 2002 amounted to 2750 rubles; average per capita household income is slightly lower at 2300 rubles. By 2002, individual real incomes had recovered to roughly the same level as in 1994, and almost double the amount in 1998 (**Figure 3**). Income continued to grow rapidly in the next three years, and by 2005 Russia's per capita income had returned to its Soviet-era peak. This recovery enables us to test the relationship between disability risks and economic well-being.

4. Transitions in Disability Status

Before turning to modeling and econometric results, we present patterns of movement from one disability status to another in the RLMS panel. Starting with Round 12, the RLMS began formally asking to which disability group one belongs; previously, this information had to be inferred on the bases of one's health status and disability payments received. This allows us to calculate period-to-period transition matrices for Rounds 12, 13, and 14**.** Average transition probabilities are summarized in **Table 7**, which gives the distribution of outcomes at time $t+1$ conditional on a given status at time t (so that the rows all sum to 100%). Average transition probabilities for Rounds 5-11 appear in **Table 8**.[8] These are coefficients and those in Table 7 are not perfectly comparable, since disability questions were less accurate in the earlier rounds. Nonetheless, the likelihood of recovery was so much larger in the earlier period that it is difficult to believe that it was entirely due to less exact determination. Rather, it seems overwhelmingly likely that it was far easier to be awarded disability status in the 1990s, and that the public Medical-Labor Expert Committees have become much stricter in recent years.

While approximately 8.7% of adults in the RLMS sample have an assigned disability group, the annual risk of a healthy person becoming disabled is only about 1.5%. These two figures would imply a stable disability rate if the average disability duration were five years, implying an annual recovery rate around 20% (allowing for some mortality). This is far from what Table 7 reports, with a recovery rate (movement to non-disability status) of 2% for Group I, 3% for Group II and 8% for Group III

[8] Because of small changes in responding population, the proportions disabled in a given year n differ slightly, depending on whether one examines the matrix showing the disability fate of the population from year $n-1$ in year n, or the fate of the population from year n to $n+1$. Transition data for specific pairs of years are available from the authors on request.

disabled.. The differences in these rates are plausible, since one would expect a lower recovery rate for severe disability.

These RLMS data provide a unique perspective on adult disability risk in a middle-income country. The fact that Russia has clear rules governing disability status and has maintained a functioning welfare state enables us to assess the risk of an individual becoming partially or severely disabled. It is also possible to assess potential for recovery. However, the existence of high "recovery" rates for those who are apparently severely disabled also suggests that disability is rather subjective – as likely is elsewhere. Such news can only be sobering for the rapidly growing but still young insurance industries in emerging markets. We therefore now consider the extent to which such movements are systematically related to social and economic characteristics.

5. Determinants of Disability Transition

The following empirical analysis focuses on the risk of becoming disabled – that is, current disability status conditioned on past disability – rather than the likelihood of simply being disabled. Obviously, the stock of disabled persons is far greater than the number of people who become disabled over a short interval, making it easier to infer stock characteristics. However, marginal factors may not be the same as average ones, especially in a society in which conditions (and monitoring of disability) have changed markedly over time. More critically, economic measures are flow variables, and we have some but limited information over individuals' pasts. Limiting the sample to those for whom there is a lengthy history also is problematic, as this would be a non-random group. For these reasons, and to reduce endogeneity problems, we focus on the transition to disability status, and relate this to individual demographic and current economic characteristics. Disability status at any time *t* thus depends on prior disability status, past individual labor market attributes, and contemporaneous human capital and demographic state variables.

Approximating the true relationship with a linear function, the basic disability risk model can be written in the following form:

$$P_t = \sum_i \alpha_i P_{t-i} + \sum_i \beta_i I_{t-i} + \gamma X + \varepsilon, \qquad \textbf{(1)}$$

The a, β, γ are estimated parameters; ε is a random error term with the traditional properties assumed; P_t is the probability of being disabled at time t, with t relating to current observations and $t\text{-}i$ representing lagged values; and I_t is an individual's net real income at time t. $\boldsymbol{X}$ is a vector of personal and household characteristics, including age, gender, years of schooling, marital status, satisfaction with life, per capita household income, health problems dummy, alcohol use frequency, smoking dummy, unemployment, and years of general employment recorded. Actual variables reported below were selected after preliminary regression analysis, but results proved not sensitive to the inclusion of interchangeable variables.

The model seeks to capture the effects of changing individual economic circumstances on individual disability risk. Such a link anticipates that disability status is at leas in part a conscious choice. We expect earnings opportunities to affect disability risk negatively. Those who can earn higher wages should be less willing to apply for disability benefits (which requires substantial time and effort), and will be more likely to recover. For the same reasons, unemployment is expected to increase disability risk. Presumably, current income and employment will be most influential, and the effects will dissipate as higher order lags are considered. The effect of other family members' incomes is less clear. Increased incomes of other members reduce pressure on an individual to leave a currently low-income job (and, in particular, one in which wages are paid late or sporadically). But higher incomes of other also have a leisure effect that should push an individual toward disability status, especially if being disabled is consistent with various types of home production (looking after grandchildren, maintaining a family dacha, cooking…). Higher incomes of others will further push an individual toward disability if that status carries with it various unpriced social benefits.

Health problems are expected to increase the risk of becoming disabled. Assessing the effects of smoking and alcohol consumption is complex. To the extent that smoking and excessive drinking damage health, they should increase disability risk. However, those who are severely ill or otherwise disabled may have little capacity for (or get little pleasure from) smoking and drinking. This simultaneity problem will bias the estimated coefficients downward. Disability risk also increases with age. Older people have higher probability of both being and becoming disabled, and retirees often use disability pensioner status to increase their real incomes.

For any given disability status (not disabled; Groups I, II, and III disabled) experienced by a person at time t, three states of the world are possible in time $t+1$ (as we aggregate Groups I and II together in empirical work given the small number of observations). However, only two of these states of the world are independent, since the sample includes only those who survive to period *t+1*. Therefore, for each of the initial disability states, two regressions must be estimated simultaneously.

For any state of the world *S* at time *t*, we assume that the probability of being in state *s* at time *t+1* can be depends on a vector of explanatory variable *X* and follows the cumulative logistic probability function, which ranges from 0 to 1:

$$p_s = f(Z(S) = \alpha + \beta' X) = \frac{1}{1 + e^{-(\alpha + \beta' X)}} \qquad \textbf{(2)}$$

This implies that the probabilities of any two states of the world *s1* and *s2* will be determined (as *p3 = 1 – p1 – p2*) by

$$\ln(\frac{p1}{p3}) = a_1 + b_1' X_1 \qquad \ln(\frac{p2}{p3}) = a_2 + b_2' X_2 \qquad \textbf{(3)}$$

These two equations must be estimated simultaneously for each of the three initial states since they are not independent. Estimation is performed using multinomial logit regressions; these are reported in **Tables 9-11.** These results obviously should be treated with some caution in light of the small sample size. Lags need to be investigated further, and does the endogeneity of several variables, especially smoking and alcohol consumption, for which reverse causality may be the dominant relationship. Predicted transition probabilities computed at sample means are reported in **Table 12**.

The regressions in Table 9, examining transition from healthy to disabled status, are the more plausible, as the sample size is much larger. A core finding is that the risk of moving from non-disabled to severely disabled rises strongly with age for all age groups and sexes. Age also appears to be a significant factor in moving from healthy to partially disabled. Note, too, that the marginal impact of age on becoming severely disabled is highest among pre-retirement, middle-aged adults, while the age effect on risk of partial disability is greatest among younger adults. Although not surprising, these results bolster our confidence in the quality of the data.

Women are less likely than men to become severely or, especially, partially disabled. This phenomenon appears to hold regardless of age. If anything, the regression coefficients understate the female advantage, since women are on average older than men (because of greater survival) and since disability risk rises with age. Moreover, in gender-specific regressions, it appears that the severe disability age gradient is nearly as steep for women as for men, while the partial disability age gradient is much steeper for women.

From Table 10 it can be seen that there is not an obvious gender advantage in terms of recovery from severe disability. However, the age gradient for transition from severe disability to not disabled is strongly negative for men and insignificant for women, while the gender effects reverse for recovery from severe to partial disability. Age has no significant effect on the likelihood of moving from partially disabled to severely disabled (Table 11).

Beyond age, the strongest factor associated with maintained good health is, not surprisingly, self-reported good health status. Moreover, the effect appears to be larger for men than women and less important for those of retirement age. In essence, this term reflects the respondent's subjective evaluation of health, so that other variables should reflect behavioral response to the economic environment. In reality, what one considers to be "good health" might vary significantly for a wide variety of reasons, including differences in perception (implying measurement error) and one's disability status (implying endogeneity, though less to since we control for past disability status).[9] Good health status appears to be more important for men than women (depending on one's gender, on can interpret this to imply that perhaps men report more accurately, or alternately that they have steeper health gradients in general). Good health status is associated with the likelihood of women recovering from being severely disabled to healthy, but is not otherwise associated with recovery – likely because of the small number of observations.

Disability transition does not appear to be consistently related to alcohol consumption or smoking. Smoking is never statistically significant. Where alcohol consumption is significant, the coefficients at times have unexpected signs and magnitudes. In the transition from healthy to severely disabled, smoking and alcohol use appear to matter little. Those who have consumed alcohol in the past 30 days do appear to be less likely to move from healthy to partially disabled status. In the other regressions, the effect is even less clear-cut. The RLMS also asks individuals who do not currently smoke whether they have ever smoked in the past; in unreported regressions, past smoking behavior did not have statistically significant effects. While this finding reduces pressure to penalize those

[9] A good sense of the culture-specific nature of health perceptions can be gleaned by comparing the number of sites that respond to the search for "kidney pain" (почки боль) on www.google.com (336,000) *vs.* www.google.ru (597,000) – even though there are many more English-language than Russian-language sites. Price (2006) finds that self-reported health status in the United States improves with various measures of social capital, with much of the Black self-assessed health disadvantage reflecting lower levels of social capital.

who smoke and drink by charging higher insurance premia, we caution that simultaneity problems may be at play.

Urban residence does not appear to have a consistent effect on disability transition. Where statistically significant (Table 11, regressions 13 and 14), it is negatively associated with recovery from partial disability. Since the RLMS characterizes survey locations as an administrative center, city, urban-type community (PGT), or village, we can include these dummies in our regression. These results are reported in **Table 13** (PGT is the omitted location). The results clarify that residence appears to have no effect on disability transition.

Marital status appears to have no significant effects on disability transition. In **Table 14**, we also test further family status variables, including single, divorced, and widowed. Regression 20 reveals that these have no significant effects on disability transition.

This does not mean that family structure and conditions are irrelevant to risk. Household size (*Num*) is consistently negatively associated with becoming partially disabled (Table 9) and positively associated with recovering from severe disability (Table 10). The plausible interpretation is that additional household members increase a family's ability to care for its disabled members. Regressions 21-22 (Table 14) specifically include the number of children less than 18 years of age. The number of children appears to have no statistically significant effect on moving from healthy to severely disabled status but does appear to be associated with decreased probability of becoming partially disabled. While it is not inconceivable that care for those teetering on disability would come in part from children, this finding also raises the possibility that the explanation simply reflects adverse selection: adults living in a family setting, and especially with children, are less likely to engage in risky behaviors – and, if they do, may find other family members moving out.

The only impact of years of schooling is to increase the risk of moving from being healthy to partially disabled, at least for men. Since schooling is inversely linked to likelihood of working in relatively risky industrial or construction activities, the general unimportance of this term suggests that many disabilities are acquired outside of the workforce or in non-employment related accidents. However, it also may reflect greater recognition of disabilities and greater effectiveness in having them diagnosed by those with higher education.

To investigate this further, we include education attainment dummies in regressions 23-25 in **Table 15**. These include completing secondary education; obtaining a professional diploma;

completing a course of study at a PTU, FZU, or FZO (professional-technical institution, factory-training institution, or distance-learning university); obtaining a technical diploma; and completing a course of study at a university, institute, or academy. None of these is not statistically significant, save for the technical diploma, which is slightly associated with an increased probability of becoming partially disabled.

Turning to our key point of inquiry, lagged income does not appear to be associated with moving from healthy to disabled status for the population as a whole. However, when we separate the population into distinct age groups, income becomes negatively associated with becoming severely disabled for the working age population and positively associated for the retirement age population. That is, those at or near retirement age are more likely to retire if they are able to afford doing so – and, if they can have themselves declared disabled, they will gain additional pension benefits. In contrast, younger workers in higher income positions have less incentive to seek disability status, though they also may be employed in less risky activities. There is also a weak tendency for higher incomes to be associated with lower risk of partial disability. Overall, though, the conclusion that emerges is that income effects seem modest. One might argue that this simply reflects the fact that permanent income effects are captured in the education variables, so that income itself picks up mainly transitory effects in the reduced form approach. However, since education terms are even less significant, it is difficult to argue that economic incentives are dominant in today's Russia.

How do these findings compare with those from earlier rounds? To repeat, the disability questions are not identical, so that there is some uncertainty.[10] Nonetheless, there are some marked differences. For all age groups, the likelihood of going from being partially to completely disabled falls markedly with income. This negative association also holds for healthy men; rather confusingly, the reverse sign obtains for healthy women. For adults aged 35-55/60, the likelihood of recovering from being partially disabled also rises with constant-ruble income. Broadly put, then, there appears to have been a somewhat greater tendency to seek disability determination during the economically depressed 1990s than during the recent boom.

Given the very small sample sizes, and the inconclusiveness of several results, these regressions should be viewed as preliminary. However, it is worth noting that the age and income effects are consistent with Rose's (2000) analysis of determinants of self-assessed health; so, too, are

[10] These regressions from rounds 5-11 are not reported, but are available from the authors upon request,

the absence of education and smoking effects. The results reported here are also consistent with those obtained in the closest study we have found, namely Hoopengardner's (2001) work on Poland. The impacts of gender, income, age, marital status, and rural/urban location appear to be similar in Russia and Poland. The main discrepancy is that disability risk falls sharply with income in Poland, although it is possible that education is correlated with many of the behavioral variables included in our regressions that were not available in the Polish study.

An obvious next step is to compare these estimates of transition with those generated by the Russian Ministries of Labor and Social Security. Unfortunately, however, these official data do not contain information on individual characteristics, and the best option would be to link movements in disability status, aggregated by region and year, to regional economic characteristics.[11] Initially, though, there is little reason to distinguish disability risk by residence, income, educational attainment, or behavioral characteristics. Self-reported health and age are important, as to some extent is gender.

6. Disability risk analysis: implications for Russia

This study offers an initial view of disability risk using the longitudinal data from the Russian Longitudinal Monitoring Survey (RLMS). Despite the relatively small sample and some potential internal problems, we can observe considerable systematic behavior. What do the findings suggest and how can they be used in determining insurance rates? Transition risks, reported in Table 7, can be used as a starting point to determine insurance premia. For a typical healthy Russian adult, the annual risk of becoming disabled is about 1.6%, with the highest risk being that of entering Group II, at about 0.9%. Since 8.1% report an assigned disability group, the average duration of disability is about 5 years, independent of disability severity. Thus, a base disability insurance rate for a contract that guaranteed 50% of the insured person's salary would need to be around 4% of current wage plus an additional charge for operating costs and profit (but ignoring discounting).

The transition hazard regressions provide little basis for differentiating disability insurance rates according to marital or family status, educational attainment or income, urban residence, or smoking or alcohol consumption behavior. Risk of severe disability does increase significantly with age, and it is therefore appropriate to borrow age gradients from international actuarial tables.

[11] Our regressions follow age and gender delineations as reported in Ministry of Labor and Social Security statistics, thereby enabling eventual comparability, as well as combining these results with average disability rates and movements for inferential purposes.

Disability risk is also inversely related to self-reported health status. Despite the moral hazard contained in self-reporting, some useful information may be obtained from an initial health report, especially if the respondent is required to list recent illnesses.

To get a sense of what one can infer, consider the transition matrices reported in Table 12 for four individuals: a 44-year old man, a 44-year old woman, and their 50-year old counterparts. These matrices were generated using the regressions reported in Tables 8-10, and they reflect the coefficient estimates rather than the averages reported in the data. Overall, looking at the risk of moving from healthy to disabled, we can observe that a significant gender gap exists, to the disadvantage of men. Additionally, the risk increases with age and the gender gap widens. This is also true for the probability of recovering from disability. Thus, at age 44, the male disability risk relative to that for women is 1.64 (1.05%/0.64%). By age 50, this relative risk disadvantage rises to 2.70 (2.40%/0.89%). Similarly, while there is no gender gap in recovery from or improvement in disability status for 44-year olds, 50-year old women have an advantage over their male counterparts.

Both Russia and Kazakhstan have begun to introduce standard insurance products. In the case of disability insurance, product design and price should depend on the nature of disability risk, which aggregate data suggest are similar in the two countries. These risks, however, are likely to be different from those in advanced market economies, both because true risks are different, and because behavior depends heavily on country-specific legislation and custom.

From a social standpoint, a number of issues also arise. The apparent increase in risk of becoming disabled is troubling, and points to a need for research using a larger database. The apparent failure of traditional support systems, as captured by marriage and household size, to reduce disability transition risks for women is also disturbing, and presumably reflects differences in social status. On the other hand, the dramatically higher male age gradients are cause for concern as well.

It is impossible to say whether the disability rates, transition risks, and regression coefficients are large or small: to our knowledge, there are virtually no comparable figures. By implication, it is important to establish a comparable database over time, at some level of age and gender disaggregation. This database ideally would be maintained for the economically more advanced regions of the former Soviet Union and Eastern Europe with good health and social data, and ideally by region. This information will then inform policymakers as to whether the situation is improving or deteriorating – a point of social importance, and also critical in forecasting public expenditure commitments.

There is little reason to believe that Russians are more apt to take advantage of disability status than any other population; indeed, the converse may be true. Maki (1993) surveys the considerable evidence that Canadian and US adults are likely to withdraw from the labor force if eligible for disability pensions, and attributes 35% of the decline in the 5.7 percentage point decline between 1975 and 1983 in Canadian male age 45-64 labor force participation rates to disability pensions. The application process also appears to be endogenous: Kreider and Riphahn (2000) find that Americans' efforts to secure disability benefits are positively related to expected benefit size and likelihood of success.

Rather, we anticipate (as a firm statement must await comparable analysis from panel data from other countries) that the distinctive feature of Russia and likely other transition countries is the fluidity of disability status. It is no surprise that the risk of being disabled is greater for the poor and near-elderly (as Hoopengardner, 2001, finds for Poland). Our results here show that, in addition to being at greater risk of becoming disabled, the same groups (including, notably, men) are much more likely to stay disabled. Yet, these finding also give cause for optimism. If becoming and remaining disabled both are linked indirectly to prospects for finding a well-paying job, then with economic recovery Russia should experience a virtuous cycle in which average disability risk falls and recovery from being disabled rises. While recovery has been too recent to let this issue be carefully tested, doing so is clearly a priority.

References

1. AVFS (Analytical Vestnik of the Federated Soviet). 1997. *The Main Problems of Social Development in Russia. – Основные проблемы социального развития Росии.* Аналитический вестник Совета Федерации, # 19(64), 1997. www.budgetrf.ru/Publications/Magazines/VestnikSF

2. AVFS (Analytical Vestnik of the Federated Soviet). 1999. *The Problems of Pension Legislation in Russian Federation. – Проблемы законодательного обеспечения пенсионной системы в Российской Федерации.* Аналитический вестник Совета Федерации ФС РФ. #14, 1999. www.budgetrf.ru/Publications/Magazines/VestnikSF

3. AFSRF (Apparat of the Federated Soviet of the Russian Federation). 2000. *Relevant Problems of Social Support for Pensioners. – Актуальные проблемы социальной поддержки пенсионеров.* Аналитический вестник Совета Федерации, # 8(120). www.budgetrf.ru/Publications/Magazines/

4. Becker, Charles and Dina Urzhumova. 1998 (November) "Pension Burdens and Labor Force Participation in Kazakstan." *World Development* **26**(11), pp. 2087-2103.

5. Becker, Charles M., and Dina S. Urzhumova. 2005. Mortality recovery and stabilization in Kazakhstan. *Economics and Human Biology* **3**(1): 97-122.

6. Breathwaite, Jeanine and Daniel Mont, 2007, "Disability and poverty: a survey of World Bank assessments and implications," Washington, DC: World Bank, unpublished manuscript.

7. FBEA (Fund of the Bureau of Economic Analysis). 1999. *Disabled in Russia: Causes and Dynamics of Disability, Contradictions and Prospects for Social Policy. – Инвалиды в Россuи: причины и динамика инвалидности, противоречия и перспективы социальной политики.* Информационно-аналитический бюллетень Фонда "Бюро экономического анализа". #3.

8. FBEA (Fund of the Bureau of Economic Analysis). 1998. *Disability Increase in Russia: Causes, Trends, Forecasts.* – Рост инвалидности в России: причины, тенденции, прогнозы. Информационно-аналитический бюллетень Фонда "Бюро экономического анализа", #4.

9. Goskomstat RF. 2003. *Organizational-Methodological Presentation of the Operation of the National Survey on Household Welfare and Participation in Social Programs (NOBUS): foundation stage.* Moscow: Goskomstat RF.

10. Goskomstat RF. 2003a. *Russian Statistical Yearbook (Social Conditions and Living Standards in Russia).* Moscow: Goskomstat RF.

11. Haveman, Robert; Philip de Jong; and Barbara Wolfe. "Disability transfers and the work decision of older men." *Quarterly Journal of Economics* **106**(3): 939-950.

12. Hoopengardner, Tom. 2001. "Disability and work in Poland." Washington, DC: World Bank *Social Protection discussion paper no. 0101.*

13. Kreider, Brent and Regina T. Riphahn. 2000 (Winter). "Explaining Applications to the U.S. Disability System: A Semiparametric Approach." *Journal of Human Resources* **35**(1): 82-115.

14. Maki, Dennis R. 1993 (January). "The Economic Implications of Disability Insurance in Canada." *Journal of Labor Economics* **11**(1, Part 2): 148-69.

15. Merkuryeva, Irina S. 2007 "The system of disability benefits in Russia: estimation of targeting accuracy," St. Petersburg: St. Petersburg State University, Graduate School of Management, *Project 05-167*.

16. Metts, Robert L. 2000. "Disability issues, trends and recommendations for the World Bank." Washington, DC: World Bank *Social Protection discussion paper no. 0007*.

17. Price, Gregory, 2006, "Race, social capital, and health disparities," Jackson, MS: Jackson State University Department of Economics, unpublished manuscript.

18. Rose, Richard. 2000. "How much does social capital add to individual health? A survey study of Russians." *Social Science & Medicine* **51**: 1421-1435.

19. Seitenova, Ai-Gul and Charles Becker. 2008. "Disability in Kazakhstan: making sense of recent trends," Washington, DC: World Bank, *Social Protection discussion paper 0802*. http://siteresources.worldbank.org/SOCIALPROTECTION/Resources/SP-Discussion-papers/Disability-DP/0802.pdf

Figure 1
RLMS sample disability ratios, rounds 5-14, 1994-2005

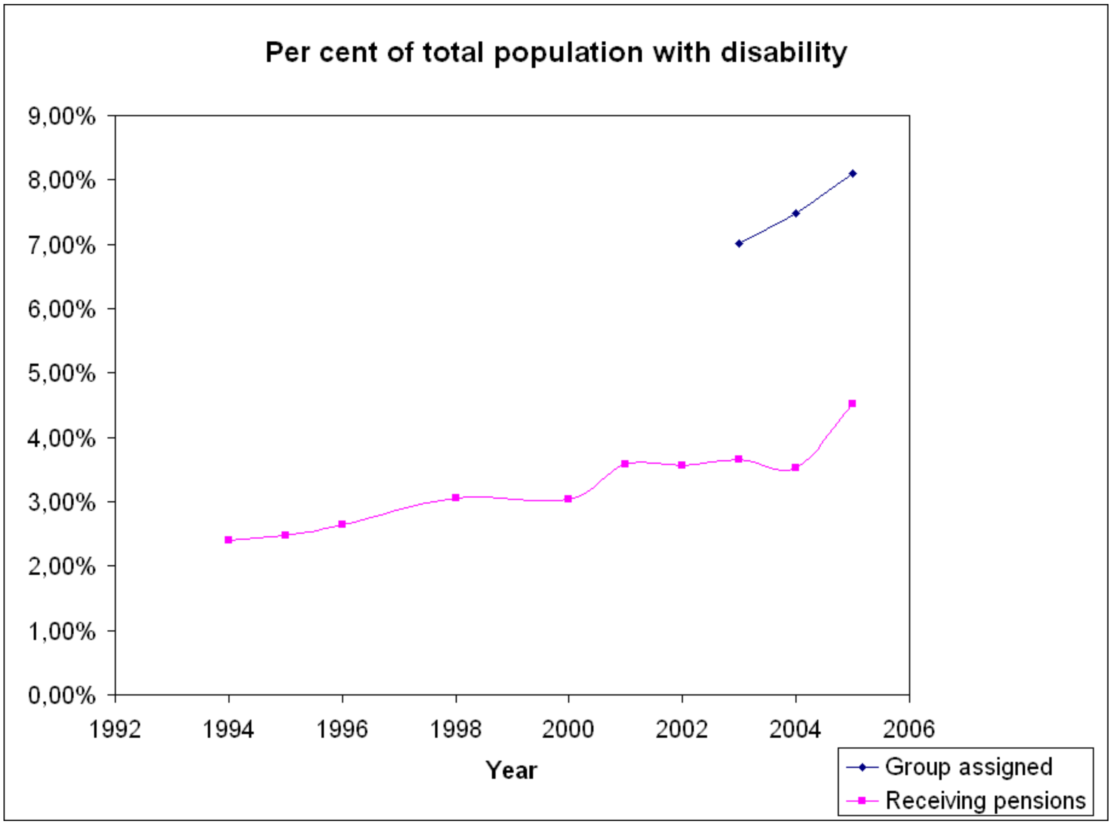
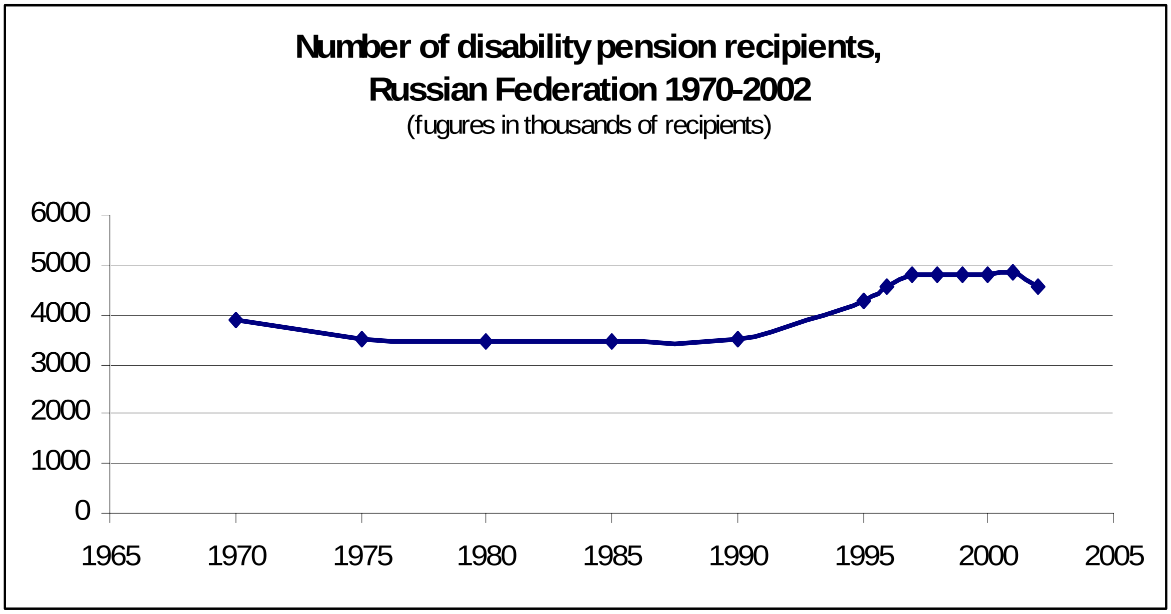


Figure 2
Number of disability pension recipients, 1970-2002



Source: *Russian Statistical Yearbook (Social Conditions and Living Standards in Russia)*, Goskomstat RF, 2003a.

Figure 3
RLMS sample monthly real income, 1994-2002

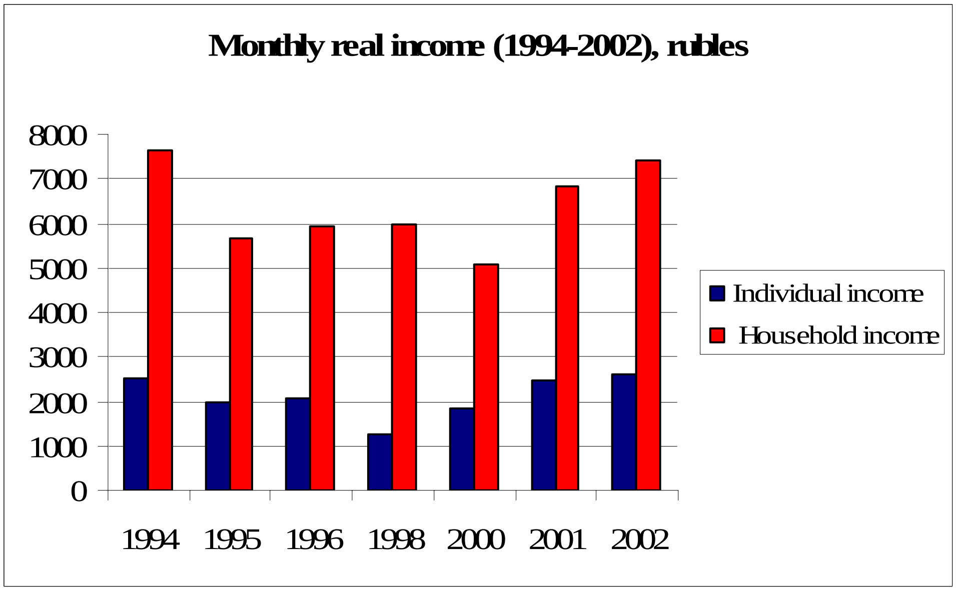


Table 1
Minimum wage and monthly pension amounts, Russian Federation, 1997-2003
(thousand rubles; after 1998: rubles)

	1997	1998	1999	2000	2001	2002	2003
Minimum wage	83.5	83.5	83.5	83.5	200	300	450
Minimum pension amounts:							
Old-age pension	70	84	84	108	153		
Disability pension:							
1 group	139	168	168	217	306		
2 group	70	84	84	108	153		
3 group	46	56	56	72	102		
Social pension to those disabled at birth:							
1 group	139	168	168	217	306		
2 group	70	84	84	108	153		
Social pension to those disabled without work experience:							
1 group	70	84	84	108	153		
2 group	46	56	56	72	102		
3 group	35	42	42	54	77		
Social pensions to disabled children:	70	84	84	108	153		
Basic component of labor pension:							
Old-age						450	522
Disability 1 group						900	1045
Disability 2 group						450	522
Disability 3 group						225	261

Source: *Russian Statistical Yearbook (Social Conditions and Living Standards in Russia)*, Goskomstat RF, 2003a.

Table 2
Different Measures of Disability in the Russian Federation (RLMS Round 14)

	RLMS Round 14 (2005) Individuals aged 16 or higher (10194 observations)	
	Number of Individuals	Per cent
I feel pain	6004	58.90
I feel some pain	5050	49.54
I feel strong pain	954	9.36
I feel panic or depression	5257	51.57
On occasion	4941	48.47
Severe panic / depression	316	3.10
I have chronic illnesses	4969	48.74
Gastro-intestinal	1590	15.59
Cardiac	1525	14.96
Spine	1507	14.78
Liver	888	8.71
Kidneys	791	7.76
Lungs	521	5.11
Other	2221	21.79
I have mobility problems	1701	16.69
Some mobility problems	1653	16.21
Bedridden	48	0.47
I have difficulty carrying out daily tasks because of health	1490	14.61
Some difficulty	1359	13.33
Cannot function without aid	131	1.29
My health status is not good	1430	14.03
Poor	1213	11.90
Very poor	217	2.13
I am assigned a disability group	886	8.69
I receive a disability pension	551	5.41
Primary occupation: disabled	167	1.64

Table 3

Number of disability pensioners and average disability pension, Russian Federation, 1970-2002

	1970	1975	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Number of pensioners (thousands)																	
All pensioners	22513	24684	27417	30291	32848	34044	35273	36100	36623	37083	37827	38184	38410	38381	38411	38630	38532
Disability pension recipients	3865	3487	3469	3462	3514	3385	3363	3562	3910	4270	4542	4813	4816	4816	4822	4848	4551
Receiving disability pension, percent of total	17.2	14.1	12.7	11.4	10.7	9.9	9.5	9.9	10.7	11.5	12	12.6	12.5	12.5	12.6	12.5	11.8
Average monthly pension amount, thousand rubles (after 1998: rubles)																	
All pensioners	0.036	0.049	0.059	0.076	0.113	0.419	3.5	43.1	120.1	242.6	320.1	366.4	402.9	521.5	823.4	1138	1462
Disability pensions, rubles	0.033	0.048	0.057	0.07	0.101	0.405	3.2	37.3	104.5	218	299.6	333.7	352.3	466.9	698.5	940.4	1157
Average disability pension as a percent of average of all pensions	92	98	97	92	89	97	91	87	87	90	94	91	87	90	85	83	79

Source: *Russian Statistical Yearbook (Social Conditions and Living Standards in Russia)*, Goskomstat RF, 2003a.

Table 4
Adult (age 18+) Disability incidence, Russia

Year	*Newly Disabled per thousand population*	*Total Disabled per thousand population*	*Newly Disabled per thousand population, by group*		
			Group I	*Group II*	*Group III*
1991	6.15	22.85	0.81	4.22	1.13
1992	7.57	22.87	1.08	5.34	1.14
1993	7.77	24.21	0.98	5.59	1.20
1994	7.65	26.61	0.92	5.49	1.24
1995	9.11	28.88	1.03	6.76	1.32
1996	7.99	31.02	0.96	5.66	1.37
1997	7.77	32.75	0.92	5.31	1.55
1998	7.76	33.04	0.95	5.09	1.72
1999	7.23	33.16	0.95	4.51	1.77
2000	7.67	33.35	0.97	4.86	1.85
2001	8.29	33.49	0.99	5.30	2.01
2002	8.25	31.71	1.06	5.19	2.00

Source: *Russian Statistical Yearbook (Health Care in Russia)*, Goskomstat RF, 2003.

Table 5				
Adult (age 18+) Disability incidence, Russia 2003				
Region	*Total Disabled per thousand population*	*Disabled per thousand population, by group*		
		Group I	*Group II*	*Group III*
Central Federal Area	88.68	10.68	59.20	15.34
North-Western Federal Area	88.92	9.28	60.90	15.29
Southern Federal Area	72.46	8.76	46.53	13.34
Volga Basin (Privolzhskiy) Federal Area	79.95	11.24	49.01	16.45
Ural Federal Area	57.87	9.43	34.15	11.57
Siberian Federal Area	67.87	11.20	41.22	12.81
Far Eastern Federal Area	56.67	11.41	35.60	8.46
Russian Federation	**75.64**	**10.35**	**48.51**	**13.73**

Source: *NOBUS survey*, Goskomstat RF, 2003.

Table 6

Adult (age 18+) Disability incidence, Russia, 2003

Region	*Total Disabled per thousand population*	*Region*	*Total Disabled per thousand population*
Russian Federation	**75.64**		
Central Federal Area	**88.68**	**Volga Basin Federal Area**	**79.95**
Belgorodskaya oblast	154.34	Bashkorstan Republic	53.91
Brianskaya oblast	99.15	Mariy El Republic	80.72
Vladimirskaya oblast	106.53	Mordovia Republic	99.21
Voronezhskaya oblast	85.47	Tatarstan Republic	60.12
Ivanovskaya oblast	66.30	Udmurtskaya Republic	61.62
Kaluzhskaya oblast	67.62	Chuvashskaya Republic	93.43
Kostromskaya oblast	89.71	Kirovskaya oblast	84.34
Kurskaya oblast	74.38	Nizhegorodskaya oblast	107.23
Lipetskaya oblast	96.98	Orenburgskaya oblast	99.67
Moskovskaya oblast	69.10	Penzenskaya oblast	66.46
Orlovskaya oblast	74.88	Permskaya oblast	91.11
Riazanskaya oblast	95.59	Samarskaya oblast	97.92
Smolenskaya oblast	61.98	Saratovskaya oblast	44.30
Tambovskaya oblast	111.83	Ulianovskaya oblast	88.44
Tverskaya oblast	56.02	**Ural Federal Area**	**57.87**
Tulskaya oblast	60.50	Kurganskaya oblast	58.47
Yaroslavskaya oblast	101.16	Sverdlovskaya oblast	76.97
Moscow	108.83	Tumenskaya oblast	42.22
North-Western Federal Area	**88.92**	Cheliabinskaya oblast	53.76
Karelia Republic	93.02	**Siberian Federal Area**	**67.87**
Komi Republic	62.36	Altai Republic	69.89
Arkhangelskaya oblast	71.77	Buryatia Republic	65.69
Vologodskaya oblast	59.38	Altaiskiy krai	83.11
Kaliningradskaya oblast	44.78	Krasnoyarskiy krai	66.29
Leningradskaya oblast	98.36	Irkutskaya oblast	73.42
Murmanskaya oblast	46.10	Kemerovskaya oblast	58.66
Novgorodskaya oblast	103.80	Novosibirskaya oblast	56.87
Pskovskaya oblast	94.81	Omskaya oblast	80.57
St.Petersburg	158.98	Tomskaya oblast	51.16
Southern Federal Area	**72.46**	Chitinskaya oblast	81.49

Adygeia Republic	105.47
Dagestan Republic	78.13
Ingushetia Republic	40.13
Kabardino-Balkarskaya Republic	60.46
Kalmykia Republic	45.87
Karachaevo-Cherkesskaia Rep.	98.29
Severnaia Osetia-Alania Rep.	66.35
Krasnodarskiy krai	69.34
Stavropolskiy krai	102.15
Astrakhanskaia oblast	42.03
Volgogradskaya oblast	64.96
Rostovskaya oblast	88.22
Far Eastern Federal Area	**56.67**
Sakha (Yakutia) Republic	58.23
Primorskiy krai	68.00
Khabarovskiy krai	51.15
Amurskaya oblast	81.43
Kamchatskaya oblast	34.64
Magadanskaya oblast	24.39
Sakhalinskaya oblast	53.23
Evreiskaya avtonomnaya oblast	70.92
Chukotskiy avtonomnyi okrug	6.33

Source: *NOBUS survey*, Goskomstat RF, 2003.

Table 7
Disability category annual transition probability, RLMS average

Disability Group transition matrix (adults over 16 years old), RLMS weighted average for rounds 12-14 (2003-2005)

		Round t + 1				
		Not Disabled	*Group I*	*Group II*	*Group III*	Total
Round t	*Not Disabled*	90.44%	0.16%	0.82%	0.43%	91.85%
	Group I	0.02%	0.81%	0.03%	0.02%	0.88%
	Group II	0.18%	0.18%	4.98%	0.15%	5.49%
	Group III	0.15%	0.05%	0.14%	1.43%	1.77%
	Total	90.79%	1.20%	5.97%	2.03%	100.00%

		Round t + 1				
		Not Disabled	*Group I*	*Group II*	*Group III*	Total
Round t	*Not Disabled*	98.5	0.2	0.9	0.5	100
	Group I	2.3	92.0	3.4	2.3	100
	Group II	3.3	3.3	90.7	2.7	100
	Group III	8.5	2.8	7.9	80.8	100
	Total	90.79%	1.20%	5.97%	2.03%	100.00%

Table 8
Disability category annual transition probability, RLMS average (rounds 5-11, 1994-2002)

		Disability status at time *t+1*			
		Not Disabled	*Categories I & II*	*Category III*	Total
Disability status at time *t*	*Not Disabled*	98.5	0.6	0.9	100
	Categories I & II	23.7	59.0	17.3	100
	Category III	28.9	14.1	57.0	100
	Total	95.60	1.98	2.42	100

Table 9: Disability transition from healthy to disabled status
Multinomial logit estimation results

	Regression (1)	Regression (2)	Regression (3)	Regression (4)	Regression (5)
Interval	All sample	Men	Women	Age 35 to 55 (60)	Age over 55 (60)
	Movement from healthy to Groups I & II (severely disabled)				
I nclmod	0.000008	-0.000014	0.000059	-0.00012 **	0.000033 **
LogAge	3.400 ***	3.651 ***	3.295 ***	5.459 **	4.865 ***
Female	-0.756 **			-1.378	-0.609 **
Grdlev	0.0760	0.141	0.0478	-0.205	0.113
Married	-0.229	-0.729	-0.170	-0.0979	-0.0648
Num	-0.0005	-0.0063	0.0090	0.0315	-0.0016
Healthgood	-1.928 ***	-2.752 ***	-1.410 ***	-2.732 ***	-1.515 ***
Alco	-0.230	-0.553	-0.0164	-0.456	-0.0739
Smokes	-0.177	-0.0056	-1.198	0.153	-0.109
Urban	0.0127	-0.0793	0.0422	-0.0606	-0.0205
	Movement from healthy to Group III (partially disabled)				
Inclmod	-0.000077 *	-0.000059	-0.00011	-0.000073	-0.000024
LogAge	2.263 ***	2.026 ***	3.002 ***	3.480	-2.062
Female	-1.316 ***			-1.580 *	-1.030 **
Grdlev	0.185 **	0.222 *	0.170 *	0.0771	0.0610
Married	0.686	0.0404	0.897	-0.395	1.069 *
Num	-0.275 ***	-0.236 *	-0.312 **	-0.236	-0.285 **
Healthgood	-1.712 ***	-2.361 ***	-1.130 **	-2.685 ***	-1.208 ***
Alco	-0.970 **	-1.305 ***	-0.479	-0.763	-1.134 **
Smokes	-0.425	-0.656	0.618	0.132	-1.034
Urban	0.0059	-0.0958	-0.0275	-0.285	0.255
Number of observations	8153	3468	4685	3199	1747
Wald chi^2	320.92	223.91	165.53	201.74	110.33
Prob > chi^2	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.22	0.29	0.18	0.24	0.10
Small-Hsiao Test of IIA Assumption (chi^2)	Alt. 1: 8.017 Alt. 2: 9.157	Alt. 1: 13.16 Alt. 2: 24.42 ***	Alt. 1: 4.727 Alt. 2: 69.11 ***	Alt. 1: 5.250 Alt. 2: 9.356	Alt. 1: 463.7 *** Alt. 2: 20.51 **

*** – Significant at 1%, ** – significant at 5%, * – significant at 10%   *Note: Disability status defined by disability group assigned*

Table 10: Disability transition from severely disabled to non-disabled and partially disabled statuses
Multinomial logit estimation results

	Regression (6)	Regression (7)	Regression (8)	Regression (9)	Regression (10)
Interval	All sample	Men	Women	Age 35 to 55 (60)	Age over 55 (60)
	Movement from Groups I & II (severely disabled) to healthy				
Inclmod	0.00002	0.000089	0.000044	Not enough observations	0.000008
LogAge	-2.748 ***	-4.834 ***	-0.841		-2.090
Female	-0.0548				0.281
Grdlev	0.0694	0.481	0.0275		-0.0609
Married	-0.187	-1.484	0.260		-0.543
Num	0.244 **	0.593 **	0.118		0.317 **
Healthgood	1.499 ***	1.588	1.789 **		1.677 *
Alco	-0.051	1.500	-0.341		-0.427
Smokes	-0.445	-2.397	1.369		0.242
Urban	0.585	0.932	-0.217		.0482
	Movement from Groups I & II (severely disabled) to Group III (partially disabled)				
Inclmod	-0.00033	-0.00015	-0.00069	Not enough observations	-0.000060
LogAge	-2.225 ***	-1.829	-6.344 *		5.846
Female	-0.541				0.827
Grdlev	0.225	0.217	-0.0271		-0.292
Married	-0.654	0.665	-2.090		0.307
Num	0.0286	-0.598	0.361		0.243
Healthgood	0.783	0.553	0.891		0.0820
Alco	2.393 ***	21.448 **	1.057		0.260
Smokes	-0.194	0.567	-35.79		3.965
Urban	0.362	-0.336	23.86		21.28
Number of observations	582	205	377	97	457
Wald chi^2	75.90	48.62	40.33		16.37
Prob > chi^2	0.0000	0.0001	0.0019		0.6931
Pseudo R^2	0.24	0.43	0.26		0.15
Small-Hsiao Test of IIA Assumption (chi^2)	Alt. 1: 38.86 *** Alt. 2: 16.22	Alt. 1: 0.001 Alt. 2: 2238 ***	Alt. 1: 323 *** Alt. 2: 186 ***		Alt. 1: 164 *** Alt. 2: 625 ***

*** – Significant at 1%, ** – significant at 5%, * – significant at 10%

Notes: Disability status defined by disability groups; regressions did not converge for under 35 age group..

Table 11: Disability transition from partially disabled to non-disabled and severely disabled statuses
Multinomial logit estimation results

	Regression (11)	Regression (12)	Regression (13)	Regression (14)	Regression (15)
Interval	All sample	Men	Women	Age 35 to 55 (60)	Age over 55 (60)
	Movement from Group III (partially disabled) to healthy				
Inclmod	-0.000046	0.00014	-0.00034	0.000033	Not enough observations
LogAge	-1.399 *	-0.321	-3.573 *	-0.263	
Female	-0.402			-0.579	
Grdlev	0.155	0.307	0.455	-0.386	
Married	1.516	1.450	19.73 **	0.945	
Num	0.0294	-1.069 ***	0.639 *	0.0349	
Healthgood	0.488	0.341	-0.393	1.0074	
Alco	-1.089	-2.244 **	-0.482	-2.873 ***	
Smokes	-0.464	0.724	-39.20	0.0058	
Urban	-0.641	-0.794	-2.181 *	-1.598 *	
	Movement from Group III (partially disabled) to Groups I & II (severely disabled)				
Inclmod	0.000044	0.000031	-0.000018	0.000071	Not enough observations
LogAge	-0.342	1.981	-2.393	-6.832 **	
Female	-0.393			-0.390	
Grdlev	-0.193	-0.167	-0.237	0.0462	
Married	-0.124	-0.971	1.043	0.714	
Num	0.147	-0.0365	0.382	-0.594 *	
Healthgood	-0.370	0.507	-1.469	-0.292	
Alco	-0.897	-0.637	-0.968	-1.037	
Smokes	-0.180	-0.288	-2.043	-0.0347	
Urban	-0.731	-0.400	-1.273	-1.364	
Number of observations	169	86	83	87	55
Wald chi^2	35.06	37.75	36.67	36.65	
Prob > chi^2	0.0198	0.0042	0.0058	0.0129	
Pseudo R^2	0.11	0.17	0.37	0.19	
Small-Hsiao Test of IIA Assumption (chi^2)	Alt. 1: 31.12 *** Alt. 2: 42.00 ***	Alt. 1: 264 *** Alt. 2: 8.51	Not enough points	Not enough points	

*** – Significant at 1%, ** – significant at 5%, * – significant at 10%

Notes: Disability status defined by groups; regressions did not converge for under 35 age group..

Table 12
Predicted disability transition probabilities based on multinomial logit regressions (%)

Men, age 44		**Disability status at time t + 1**		
		Not Disabled	*Groups I & II*	*Group III*
Disability status at time t	*Not Disabled*	98.95	0.58	0.47
	Groups I & II	11.02	82.33	6.65
	Group III	11.10	12.37	76.53

Women, age 44		**Disability status at time t + 1**		
		Not Disabled	*Groups I & II*	*Group III*
Disability status at time t	*Not Disabled*	99.36	0.38	0.26
	Groups I & II	11.49	83.78	4.73
	Group III	11.68	7.84	80.48

Men, age 50		**Disability status at time t + 1**		
		Not Disabled	*Groups I & II*	*Group III*
Disability status at time t	*Not Disabled*	97.60	1.33	1.07
	Groups I & II	6.97	86.15	6.88
	Group III	10.27	9.50	80.23

Women, age 50		**Disability status at time t + 1**		
		Not Disabled	*Groups I & II*	*Group III*
Disability status at time t	*Not Disabled*	99.11	0.58	0.31
	Groups I & II	8.79	85.89	5.31
	Group III	8.19	7.01	84.79

Table 13: Disability transition from healthy to disabled for different communities
Multinomial logit estimation results

	Regression (1) repeated	Regression (16)	Regression (17)	Regression (18)	Regression (19)
Interval	Entire Sample	Entire Sample	Male	Female	Age over 55 (60)
	Movement from healthy to Groups I & II (severely disabled)				
Inclmod	0.000008	-0.000015	-0.000024	0.000021	0.000028
LogAge	3.400 ***	3.418 ***	3.645 ***	3.441 ***	4.763 ***
Female	-0.756 **	-0.688 **			-0.579 *
Grdlev	0.0760	0.0697	0.133	0.0437	0.102 *
Married	-0.229	-0.216	-0.673	-0.151	-0.0549
Num	-0.0005	-0.00759	-0.0010	0.00088	-0.0121
Healthgood	-1.928 ***	-1.964 ***	-2.814 ***	-1.456 ***	-1.562 ***
Alco	-0.230	-0.268	-0.581	-0.0719	-0.0986
Smokes	-0.177				
Urban	0.0127				
AdminCenter		0.454	-0.164	0.769	0.157
City		-0.292	-1.019	0.0541	-0.532
Village		0.162	-0.538	0.532	-0.140
	Movement from healthy to Group III (partially disabled)				
Inclmod	-0.000077 *	-0.000087 *	-0.000070	-0.00012	-0.000040
LogAge	2.263 ***	2.342 ***	2.219 ***	2.774 ***	-1.978
Female	-1.316 ***	-1.165 ***			-0.793 *
Grdlev	0.185 **	0.172 **	0.203 *	0.155	0.0459
Married	0.686	0.715	0.0842	0.875 *	1.118 **
Num	-0.275 ***	-0.291 ***	-0.255	-0.327	-0.318 *
Healthgood	-1.712 ***	-1.738 ***	-2.381 ***	-1.145 **	-1.261 ***
Alco	-0.970 **	-1.030 **	-1.420 ***	0.442	-1.272 **
Smokes	-0.425				
Urban	0.0059				
AdminCenter		0.00576	-0.194	0.132	0.582
City		-0.817	-1.165	-0.571	-0.654
Village		-0.446	-0.746	-0.190	-0.219
Number of observations	8153	8161	3470	4691	1748
Wald chi^2	320.92	337.10	198.60	174.09	101.62
Prob > chi^2	0.000	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.22	0.22	0.30	0.19	0.11
Small-Hsiao Test of IIA Assumption (chi^2)	Alt. 1: 8.017 Alt. 2: 9.157	Alt. 1: 26.99 *** Alt. 2: 16.23	Alt. 1: 7.07 Alt. 2: 23.27 **	Alt. 1: 14.84 Alt. 2: 21.21 **	Alt. 1: 6.27 Alt. 2: 8.21

*** – Significant at 1%, ** – significant at 5%, * – significant at 10%

Notes: Disability status defined by groups. PGT is the omitted dummy..

Table 14: Disability transition from healthy to disabled for different family situations
Multinomial logit estimation results

	Regression (1) repeated	Regression (20)	Regression (21)	Regression (22)
Interval	Entire Sample	Entire Sample	Entire Sample	Entire Sample
	Movement from healthy to Groups I & II (severely disabled)			
Inclmod	0.000008	0.000005	0.000013	0.000007
LogAge	3.400 ***	3.739 ***	3.126 ***	3.338 ***
Female	-0.756 **	-0.712 ***	-0.700 ***	-0.703 ***
Grdlev	0.0760	0.0788	0.0759	0.0736
Single		0.825		0.669
Married	-0.229	-0.0265	-0.288	-0.0263
Widowed		0.152		0.157
Divorced		0.555		0.539
Num	-0.0005	0.00959	0.0216	0.0255
NumKidsUnder18			-0.624	-0.571
Healthgood	-1.928 ***	-1.932 ***	-1.915 ***	-1.924 ***
Alco	-0.230	-0.248	-0.249	-0.247
Smokes	-0.177			
Urban	0.0127			
	Movement from healthy to Group III (partially disabled)			
Inclmod	-0.000077 *	-0.000076	-0.000070	-0.000068
LogAge	2.263 ***	2.481 ***	1.600 ***	1.854 **
Female	-1.316 ***	-1.087 ***	-1.142 ***	-1.069 ***
Grdlev	0.185 **	0.164 **	0.172 **	0.154 *
Single		0.621		0.144
Married	0.686	0.520	0.662 *	0.538
Widowed		-0.666		-0.617
Divorced		0.555		0.574
Num	-0.275 ***	-0.264 *	-0.223 *	-0.214
NumKidsUnder18			-1.112 *	-1.069 *
Healthgood	-1.712 ***	-1.714 ***	-1.683 ***	-1.692 ***
Alco	-0.970 **	-1.028 ***	-0.996 ***	-1.018 ***
Smokes	-0.425			
Urban	0.0059			
Number of observations	8153	8161	8166	8156
Wald chi^2	320.92	353.60	351.08	361.09
Prob > chi^2	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.22	0.22	0.22	0.23
Small-Hsiao Test of IIA Assumption (chi^2)	Alt. 1: 8.017 Alt. 2: 9.157	Alt. 1: 5.406 Alt. 2: 7.408	Alt. 1: 142 *** Alt. 2: 10.82	Alt. 1: 7.071 Alt. 2: 12.23

*** – Significant at 1%, ** – significant at 5%, * – significant at 10%

Notes: Disability status defined by groups; "Living together but not registered" is the omitted dummy.

Table 15: Disability transition from healthy to disabled status for different education attainment levels
Multinomial logit estimation results

	Regression (1) repeated	Regression (23)	Regression (24)	Regression (25)
Interval	Entire Sample	Entire Sample	Male	Female
	Movement from healthy to Groups I & II (severely disabled)			
Inclmod	0.000008	-0.000026	-0.000029	0.000059
LogAge	3.400 ***	3.166 ***	3.521 ***	3.417 ***
Female	-0.756 **	-0.800 **		
Grdlev	0.0760			
HasHighSchool		-0.155	-0.169	-0.0653
HasProfDiploma		-0.251	-0.639	-0.173
HasPTU/FZU		-0.263	0.0659	-0.901
HasTechDiploma		0.0284	-0.874	0.437
HasUniversity		0.418	0.396	0.380
Married	-0.229	-0.153	-0.507	-0.0068
Num	-0.0005	-0.0399	-0.0502	0.126
Healthgood	-1.928 ***	-2.120 ***	-2.719 ***	-1.577 ***
Alco	-0.230	-0.205	-0.557	-0.0029
Smokes	-0.177			
Urban	0.0127			
	Movement from healthy to Group III (partially disabled)			
Inclmod	-0.000077 *	-0.000087	-0.000065	-0.000112
LogAge	2.263 ***	2.514 ***	2.488 **	3.155 **
Female	-1.316 ***	-1.393 ***		
Grdlev	0.185 **			
HasHighSchool		0.324	0.396	0.245
HasProfDiploma		-0.219	-0.515	0.377
HasPTU/FZU		0.408	0.150	0.898
HasTechDiploma		0.842 *	0.784	0.988
HasUniversity		-0.0213	0.269	-0.967
Married	0.686	0.275	-0.0557	0.503
Num	-0.275 ***	-0.197	-0.216	-0.212
Healthgood	-1.712 ***	-1.513 ***	-2.204 ***	-0.682
Alco	-0.970 **	-0.766 **	-1.229 **	-0.0518
Smokes	-0.425			
Urban	0.0059			
Number of observations	8153	6528	2897	3631
Wald chi^2	320.92	229.36	158.18	93.03
Prob > chi^2	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.22	0.22	0.30	0.18
Small-Hsiao Test of IIA Assumption (chi^2)	Alt. 1: 8.017 Alt. 2: 9.157	Alt. 1: 8.810 Alt. 2: 12.75	Alt. 1: 12.55 Alt. 2: 19.30 *	Alt. 1: 92.39 *** Alt. 2: 14.67

*** – Significant at 1%, ** – significant at 5%, * – significant at 10%
Notes: Disability status defined by main group