DHS Analytical Studies 1

The Substitution of Contraception for Abortion in Kazakhstan in the 1990s

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DHS Analytical Studies No. 1

The Substitution of Contraception For Abortion in Kazakhstan in the 1990s

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Contents

Preface

One of the most significant contributions of the MEASURE *DHS+* program is the creation of an internationally comparable body of data on the demographic and health characteristics of populations in developing countries. The *DHS Analytical Studies* series and the *DHS Comparative Reports* series examine these data, focusing on specific topics. The principal objectives of both series are: to provide information for policy formulation at the international level, and to examine individual country results in an international context. Whereas *Comparative Reports* are primarily descriptive, *Analytical Studies* take a more analytical approach.

The *Analytical Studies* series comprises in-depth, focused studies on a variety of substantive topics. The studies are based on a variable number of data sets, depending on the topic under study. A range of methodologies is used, including multivariate statistical techniques. The topics covered are selected by MEASURE *DHS+* staff in conjunction with the MEASURE *DHS+* Scientific Advisory Committee and USAID.

It is anticipated that the *Analytical Studies* will enhance the understanding of significant issues in the fields of international population and health for analysts and policymakers.

Martin Vaessen
Project Director

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Executive Summary

Because of the heavy reliance on induced abortion in the former Soviet Union over much of the past century, there is special interest in the growing substitution of contraception for abortion in that part of the world. The 1995 Kazakhstan Demographic and Health Survey revealed that this replacement process was well under way in Kazakhstan at the time of the survey. The completion of the 1999 KDHS afforded another opportunity to document these changes and to describe the increase in contraceptive use with more detailed data.

The evidence that the increase in contraceptive practice and the decline in abortion have continued is unmistakable and strong. Contraceptive prevalence has increased by 50 percent since the beginning of the decade and abortion has decreased by the same amount. The continuation of these trends is particularly impressive in light of the evidence of an increasing desire for smaller families in Kazakhstan.

The decline of abortion has been particularly evident in the capital city of Almaty and among the Russian ethnic minority. There has been an especially sharp increase over the past few years in the use of contraception among Kazakh women. However, despite the decline in abortion, more than a third of all women say that they would have an abortion if they became pregnant unintentionally. The covariates of this variable, as well as the characteristics of women who have used contraception *and* have had an abortion, are examined in a multivariate context.

A model of the fertility regulation process was constructed in order to examine the effects of different combinations of changes in contraceptive prevalence, failure rates, method mix, and rates of discontinuation of contraceptive use on the further reduction of abortion. The abortion rate is particularly sensitive to contraceptive failure, which is associated with about two-fifths of all abortions in Kazakhstan. Equally important is the level of unmet need in the population. If unmet need were eliminated and those women began using modern contraceptive methods, the abortion rate would drop from 48 to 22 per 1,000 women, even with existing failure rates. Discontinuation of contraceptive use is associated with about one-fifth of all abortions.

It is clear that contraceptive practice is increasing rapidly in Kazakhstan and that the abortion rate is declining. Further changes in this direction in the near future seem likely.

1 Background

Throughout most of the twentieth century, the principal method of birth control in the former Soviet Union was abortion (Popov, 1993). The reasons for this preference include permissive laws and the availability of state-supported medical facilities. The government's position on abortion has varied over the years, depending on perceptions of the birth rate and the medical establishment's attitudes toward different contraceptives. But for most years, abortion was available in government hospitals and clinics and modern methods of contraception were unavailable. In particular, oral contraceptives, which enjoyed enormous popularity in the West, were regarded as unsafe by the Soviet medical establishment. Other modern methods produced in the West were expensive to import. Condoms and IUDs manufactured domestically were crude and unpopular.

With the dissolution of the Soviet Union, this legacy of abortion began to weaken and to be replaced with contraception. This substitution is particularly evident in the Central Asian republics where Russians have been an ethnic minority and where birthrates had traditionally been high. The momentum has grown in Russia as well, but abortion rates remain higher there than in many other republics.

In Kazakhstan, which gained its independence in 1991, the replacement of abortion by contraception was documented in the 1995 Kazakhstan Demographic and Health Survey (KDHS), in Westoff et al., 1998, and in the Ministry of Health (MOH) annual registration statistics. The General Abortion Rate (GAR) declined from 71 per 1,000 women 15-49 in the 1986-1990 period to 57 per 1,000 women by the 1993-1995 period. The use of contraception increased by about 25 percent over the first half of the 1990s and, by 1995, was beginning to reach levels close to those in countries that developed earlier. The IUD has been and remains the principal contraceptive method; however, the pill, injectables and, recently, female sterilization are beginning to gain popularity.

Control of reproduction, both through contraception and abortion, is a response to the desire to have fewer children and to space births, although it is also influenced by other considerations (Bankole, Singh and Haas, 1998). In Kazakhstan, as well as elsewhere in that part of the world, the fertility rate has declined dramatically from an estimated Total Fertility Rate[1] (TFR) around 7.7 (Lorimer, 1946) in 1924, early in the establishment of the Soviet Union, to 2.05 in the 1996-1999 period (the TFR for the Kazakh population excluding minorities was 2.5 over this three-year period). Although late, by Western standards, to enter the fertility transition, the small-family norm has spread quickly in Kazakhstan. In fact, the new low level of fertility is of some concern. A group of businessmen is reported to have established a "Demography Fund," headed by the First Lady of Kazakhstan, to encourage couples to have more children.[2] The transition to low fertility is a general historical process associated with mass education, improvements in the status of women, rising levels of income, urbanization, exposure to consumer values, and the weakening of traditional and religious authority. The recent severe economic crisis in the Kazakhstan has played a role as well. Whatever the combination of causes, there is no doubt that Kazakhstan has quickly become a low-fertility country.

The main objective of this report is to document the continuing substitution of contraception for abortion in Kazakhstan.

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[1] Estimated from a Gross Reproduction Rate of 3.79 reported in Lorimer (1946: 92).

[2] The report by Naila Almagambetova (1999) stated that the families of the first 2,000 children born in the year 2000 would receive the equivalent of $1,000.

2 Sources and Quality of Data

As in the earlier report, the two sources of information are the national survey—the 1999 KDHS—and the registration system of the Ministry of Health. The first KDHS was conducted in 1995. Like that survey, the 1999 survey was based on a national probability sample of women of reproductive age. However, the sample size in 1999 (4,800 women) was larger than in 1995 (3,771). A sample of men was also added in the 1999 survey.

An important difference between the two surveys is that the 1999 questionnaire included a five-year monthly calendar that permitted reconstruction of annual trends in contraceptive use. This information allowed an analysis that was not possible with the 1995 KDHS data. In the earlier survey, the assessment of such trends relied exclusively on data from the Ministry of Health, which had some limitations. Another advantage of the monthly calendar is that it permitted the measurement of contraceptive discontinuation and the analysis of its role in abortion.

Data on abortion are notoriously underreported in most countries. This is because the procedure is illegal in many countries and, even if legality is not an issue, women are frequently reluctant to report its occurrence. In Kazakhstan and in the former Soviet Union generally, data on abortion are of higher quality. Because of abortion's long history as a standard government service and the main method of birth control available for many women, the subject is less sensitive in Kazakhstan; therefore, abortions are most likely reliably reported in surveys. For example, in the earlier Kazakhstan survey, the rate of abortion estimated for the preceding three years (1993-1995) was close to that recorded in the government's registration system. The KDHS estimate of the General Abortion Rate (GAR) was 57, and the Ministry of Health (MOH) reported a GAR of 55. This close correspondence has diminished in Kazakhstan and probably elsewhere in the region as abortions, particularly mini-abortions, are increasingly performed in the private sector and not recorded in the official system. For the three years prior to the 1999 KDHS, the survey estimate of the GAR is 48 compared with the MOH estimate of 32. This gap will probably continue to widen in the future.

Estimates of contraceptive prevalence presented here are drawn mainly from the surveys with only a limited reliance on MOH data. Trends in contraceptive use prior to 1995 are based on MOH registration data but were confined to the IUD, the pill, and injectables that nevertheless account for most use in the country. The government's family planning services are provided mostly through local primary care institutions that cover populations between 500 and 3,000 households. The insertions of IUDs and prescriptions for oral contraception are recorded for each health care block and forwarded in summary form to the national MOH, where they are tabulated and published in an annual series.

A comparison of the 1999 KDHS with the 1999 MOH estimates reveals a fairly close correspondence for the prevalence of these methods among all women 15-49 years of age. The 1999 KDHS shows 29.8 percent were currently using the IUD compared with 25.0 percent estimated by the MOH. The pill was reported by 2.2 percent in the KDHS and 4.1 percent in the MOH data. Since the pill is subject to significant discontinuation for various reasons, the MOH prescription data can overestimate current use. Injectables and spermicides were estimated at less than 1 percent in the two sources, and the condom (more recently included in the MOH system) also showed a close correspondence (4.0 percent in the KDHS and 2.4 percent in the 1999 MOH data).

The KDHS includes all methods of contraception, including traditional methods, and is therefore the preferable source of information. Since the 1999 KDHS included the five-year monthly calendar, it is possible to reconstruct recent annual trends directly. Without the calendar in the 1995 KDHS, it was not possible to measure trends, so the MOH data are used but only for the earlier period.

3 Levels and Trends in the Use of Contraception and Abortion

The basic rates estimated from the 1995 KDHS and the 1999 KDHS are shown in Table 3.1. Contraceptive prevalence and the use of modern methods increased significantly over the relatively short interval of four years. Over the same time, the abortion rates dropped commensurately. The effect of the increase in contraceptive prevalence more than compensated for the decline in the abortion rate as suggested by the sharp drop in the Total Fertility Rate from 2.5 to 2.0 in just four years.

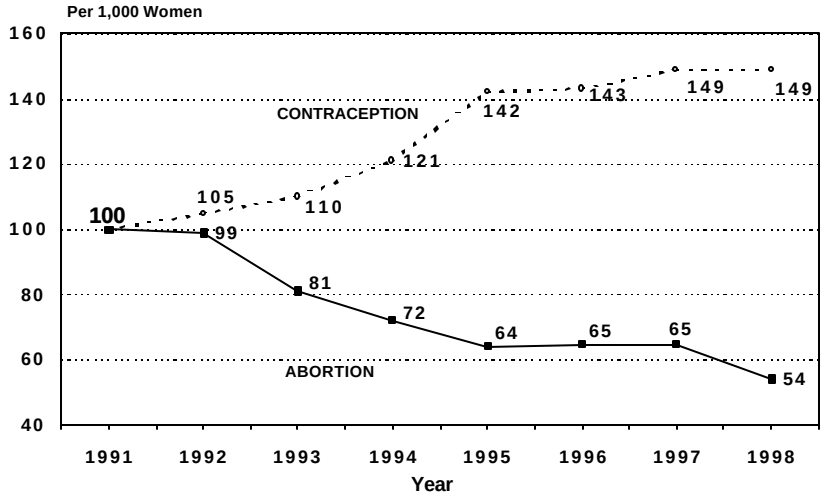
Table 3.1 Contraceptive use, abortion estimates, and total fertility rates from the 1995 KDHS and 1999 KDHS

	1995 KDHS	1999 KDHS
Percentage using any method (married women)	59.1	66.1
Percentage using modern method (married women)	46.1	54.4
Total Abortion Rate[1] (per woman)	1.75	1.44
General Abortion Rate[1] (per 1,000 women)	53	48
Mean number of abortions for women 40-49	2.6	2.0
Total Fertility Rate[1] (per woman)	2.5	2.0

[1] Past three years

Using data from the Ministry of Health prior to 1995 and from the 1999 KDHS data for the past four years,[3] the replacement of abortion by contraception is depicted dramatically in Figure 3.1, which plots annual percentage changes from the base year 1991. By 1998, contraceptive prevalence (for the IUD, the pill, injectables, and spermicides) had increased by 50 percent since 1991, while the abortion rate had decreased by a similar amount. The changes at each age (based on KDHS data) are shown for contraception and abortion, respectively, in Figures 3.2 and 3.3. They show a similar pattern of change at almost every age across the short interval of four years.

Figure 3.1 Trends in contraception and abortion, 1991-1998



Note: Contraception includes the IUD, the pill, spermicides, and injectables.
Source: 1991 to 1994 (MOH); 1995 to 1998 (1999 KDHS).

[3] The estimates for both abortion and contraceptive use are derived from the five-year monthly calendar based on women 15-44 in each year. These rates were then adjusted for the experience of women 45-49 and for the subset of contraceptive methods included in the MOH series.

Figure 3.2 Contraceptive use among married women by age, 1992-1995 and 1996-1999

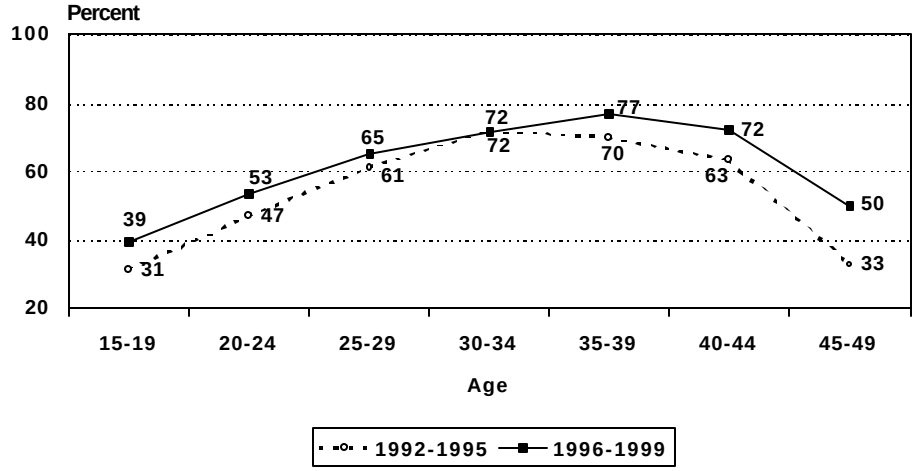


Figure 3.3 Abortion rates by age, 1992-1995 and 1996-1999

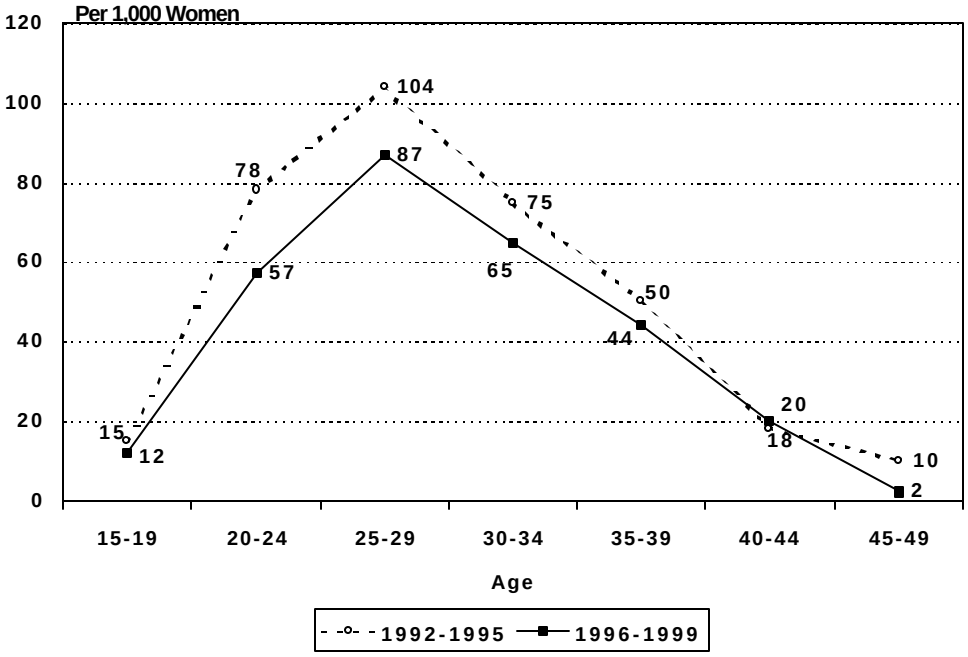


Table 3.2 Trends in abortion rates (per 1,000 women) by age, and total abortion rates for women age 15-39, 1975-1999

	Period				
Age	1995-99	1990-94	1985-89	1980-84	1975-79
15-19	12	20	12	11	12
20-24	68	82	100	113	134
25-29	81	93	124	139	205
30-34	60	79	84	115	181
35-39	40	44	55	89	(119)
40-44	19	21	32		
45-49	2	14			
TAR 15-39	1.30	1.59	1.87	2.33	3.25

Note: Rates are the average of two observations from the 1995 KDHS and 1999 KDHS for periods that overlap.
TAR = Total abortion rate (per woman)
( ) Estimated rate

A detailed reconstruction of age-specific abortion rates over the past 25 years shows a dramatic and uninterrupted decline (Table 3.2). The Total Abortion Rate for women age15-39 declined from 3.2 in the period 1975-1979 to 1.3 in the period 1995-1999.

Unlike the West, almost all abortions in Kazakhstan (98.6 percent) occur among ever-married women. Only 4.1 percent of never-married women reported ever having had an abortion. Similar declines in abortion rates are evident at all durations of marriage.

The trends in contraceptive prevalence and abortion reconstructed from the 1999 KDHS five-year monthly calendar are shown in Table 3.3 for women (and for women who ever had sex) who were 15-44 in each of the five years. These estimates[4] show a progressive increase each year in contraceptive use and an irregular but overall decline in the abortion rate.

Another perspective on the replacement process is presented in Table 3.4 and Figure 3.4, where proportions of women who first used contraception or who had a first abortion before they had a second child are shown by age. There is a clear picture of progressively earlier use of contraception and a generational change in the opposite direction for the first use of abortion. The women who first used contraception before the birth of a second child increased from 37.7 percent among the oldest women (50-54)[5] to 64.2 percent for women 20-24. Conversely, those who had a first abortion before they had two children declined from 43.2 percent to 15.7 percent across this generational span.

[4] The estimates of contraceptive prevalence derived from the calendar are somewhat higher than a current use definition would yield because they refer to use at any time during each calendar year.

[5] Based on the women 45-49 in the 1995 KDHS.

Table 3.3 Trends in contraceptive use and abortion for all women 15-44 and for women who ever had sex, 1994-1998

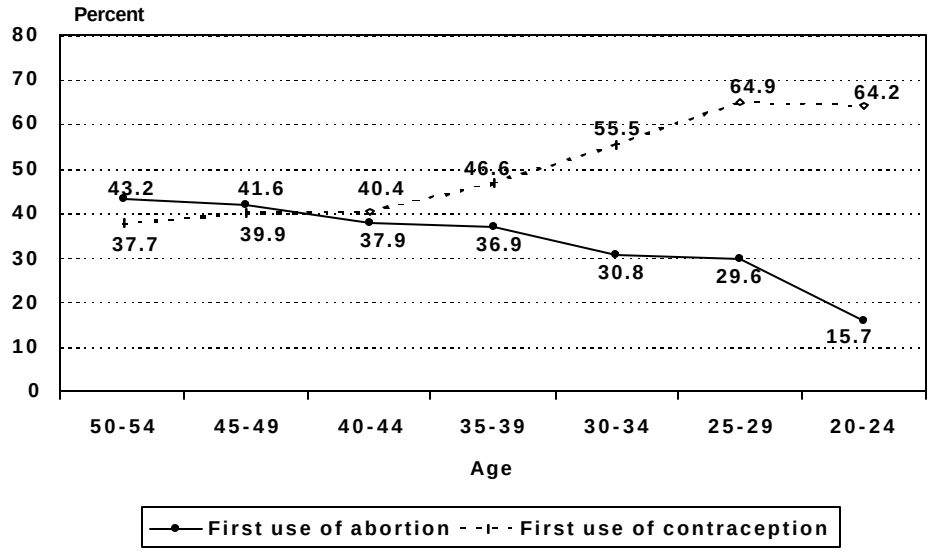
	All women 15-44			Women 15-44 who ever had sex		
Year	Percentage who used any method	Percentage who used modern method	Abortions per 1,000 women	Percentage who used any method	Percentage who used modern meth-od	Abortions per 1,000 women
1994	50.5	42.0	49	59.6	49.7	58
1995	52.8	44.3	46	63.0	52.9	56
1996	54.0	44.8	47	65.6	54.5	57
1997	55.4	46.5	47	68.2	57.2	58
1998	55.6	46.4	39	70.3	58.7	50

Source: Calendar data in the 1999 KDHS.

Table 3.4 Among women who ever had sex, percentage who first used contraception or who had a first abortion before they had two children, by age, Kazakhstan 1999

Age	Used contraception before second child	Had an abortion before second child
20-24	64.2	15.7
25-29	64.9	29.6
30-34	55.5	30.8
35-39	46.6	36.9
40-44	40.4	37.9
45-49	39.9	41.6
50-54	37.7	43.2

Figure 3.4 Among women who have ever had sex, percentage who first used contraception or abortion before the second child, by age, Kazakhstan 1999



3.1 Method Mix

The increase in contraceptive prevalence has occurred only for modern methods. These methods collectively increased from 46.1 percent in 1995 to 54.4 percent in 1999. The use of all traditional methods declined over the period (Table 3.5). This change is important for potential abortion rates because the failure rate for modern methods is significantly lower than for traditional methods, and, as described in Section 7, contraceptive failure is a major precursor to abortion.

Table 3.5 Trends in current use of contraception among currently married women by method, 1995 KDHS and 1999 KDHS

Method	1995 KDHS	1999 KDHS
Any method	59.1	66.1
Any modern method	46.1	54.4
IUD	39.6	42.0
Pill	1.8	2.4
Condom	3.7	4.5
Other modern methods	1.0	5.5
Any traditional method	13.0	11.7
Periodic abstinence	6.5	4.7
Withdrawal	3.2	2.9
Douche	5.3	3.9

4 Covariates of Abortion and Contraception

4.1 Covariates of Abortion

The association of abortion with four important background characteristics—urban-rural residence, region, education and ethnicity—is shown in Table 4.1. Three measures of abortion—the percentage of pregnancies aborted in the past three years, the percentage of women who have ever had an abortion, and the Total Abortion Rate—are presented for both 1995 and 1999 to elucidate trends for different sectors of the population.

Table 4.1 Abortion indicators by background characteristics, 1995 KDHS and 1999 KDHS

Background characteristic	Percentage of pregnancies that ended in abortion[a]		Percentage of women who ever had an abortion		Total abortion rate (per 1,000 women)[a]	
	1995	1999	1995	1999	1995	1999
Residence						
Urban	46.7	45.8	50.0	45.0	1.97	1.63
Rural	28.8	27.6	29.9	32.8	1.48	1.20
Region						
Almaty City	59.0	58.4	54.5	47.0	3.04	1.80
South	18.1	25.0	24.5	28.5	0.89	1.11
West	24.2	28.3	30.7	30.5	1.03	1.05
Central	33.4	37.4	43.7	45.0	1.57	1.17
North	55.9[b]	47.5	55.6[b]	49.7	2.54[b]	1.97
East		46.7		45.7		1.59
Education						
Primary/Secondary	31.2	31.7	29.3	29.8	1.61	1.50
Secondary-special	40.2	40.6	49.3	49.4	1.89	1.56
Higher	42.5	38.9	45.4	39.6	1.62	1.14
Ethnicity						
Kazakh	23.4	26.9	25.0	27.1	1.11	1.06
Russian	57.8	48.6	60.7	55.4	2.74	1.75
Other	37.8	51.5	44.1	51.9	1.72	2.30
Total	37.7	36.8	41.3	39.6	1.75	1.44

[a] Past three years
[b] North and East regions combined

Abortions are clearly more common among residents of cities than of rural areas, although their use is declining in both populations. Women in Almaty City and the North and East regions are much more likely to use abortion than women in the South and West regions. Over the four-year period, the Total Abortion Rate (TAR) declined from 3.04 to 1.80 in Almaty City. In the North and East regions (combined in the 1995 KDHS), the TAR was 2.54 but, by 1999, had dropped to 1.97 in the North region and 1.59 in the East region.

Table 4.2 Among women who have ever had sex, odds ratios of ever having an abortion and of having more than one abortion, Kazakhstan 1999

Covariate	Ever had an abortion	Had more than one abortion
Age (in single years)	1.08	1.07
Children ever born		
< 2	1.00	1.00
2	2.48	1.87
> 2	2.38	1.93
Wants more children		
Yes	NS	1.00
No		0.69
Knows source of method	NS	NS
Ever used a method		
No	1.00	NS
Yes	3.97	
Family planning media	NS	1.15
Mass media exposure	NS	NS
Female autonomy (index)	1.12	NS
Years of schooling	0.95	0.94
Currently working		
No	1.00	NS
Yes	1.21	
Wealth (index)	1.09	NS
Religion		
Other	1.00	1.00
Muslim	0.72	0.65
Ethnicity		
Kazakh	1.00	NS
Russian	1.98	
Residence		
Rural	1.00	NS
Urban	1.46	
Region		
South	1.00	1.00
Almaty City	1.40	1.75
West	NS	NS
Central	NS	NS
North	1.76	NS
East	1.58	NS
Number of women	3,611	1,829
Chi squared	978	190
R squared	0.196	0.079

NS = Not significant at .05 level

Education shows a mixed relationship with abortion. The proportion of women who ever had an abortion is lowest for the least educated but a different pattern appears with the TAR. Regardless of the measure, however, the decline over the four-year period is concentrated in the highest educational category.

Compared with the Kazakh population, the Russian minority has had a much higher abortion rate. In the three years prior to the 1999 KDHS, 48.6 percent of all pregnancies to Russian women were aborted compared with 26.9 percent for Kazakh women. However, most of the decline in abortions has been among the Russian minority. The recent migration of ethnic Russians from Kazakhstan to Russia complicates the picture, but it is clearly the Russian ethnic minority (now about 30 percent of the female population of reproductive age) that has experienced the sharpest decline in abortion in the last few years. Their TAR dropped from 2.74 in the three years preceding the 1995 survey to 1.75 in the three years prior to the 1999 KDHS; however, the decline of the TAR in the Kazakh population was much more modest, from 1.11 to 1.06. The ethnic difference in the trends in contraceptive prevalence and abortion are examined more closely in a later section.

The interpretation of these differentials in general is complicated by uncontrolled interactions with other variables. For example, the higher rate of abortions among city residents or in the Russian minority is likely to be influenced by their preferences for smaller families. The Kazakh population consists of higher proportions of Muslims while the Russians are mostly Christian; therefore, the ethnic difference in abortion rates may reflect differences in religion. There are many other interactions that suggest the desirability of a multivariate analysis in which a variety of covariates of abortion are examined simultaneously. Such an analysis is summarized in Table 4.2, which shows the odds ratios or "effects" of each predictor with all other covariates controlled. The analysis is confined to women who have ever had sex. Two dependent variables have been selected: (1) whether a woman has ever had an abortion; and, (2) whether women who have had an abortion have had one or more than one.

For obvious reasons, the older a woman is the more likely she is to have had an abortion. Age is entered here mainly as a control although it also has some generational significance. Compared with women who have had fewer than two children, those with more than two are more than twice as likely to have had an abortion. More surprising is the strong positive association of abortion with whether the woman has ever used contraception, which probably reflects a strong motivation to avoid pregnancy and contraceptive failure.

An index of women's autonomy was constructed based on 14 questions about her views on the circumstances that could justify refusing to have sex with her husband, who has the final say about different decisions, and the circumstances under which a husband might be justified in beating his wife. The higher end of this index means more female autonomy and is positively associated with the likelihood of having had an abortion. Years of schooling, however, is negatively correlated with abortion in this multivariate context, a result that would not be expected from the bivariate relationships in Table 4.1

Women who work and those with more possessions (represented as the wealth index) are more likely to have had an abortion.

Religion and ethnicity both show significant effects so we cannot interpret the lower abortion rates of Kazakh women as a function of the Muslim religious tradition, or vice versa. Muslim women are less likely and Russian women are more likely to have had an abortion, and both factors exert independent effects.

The association of abortion with urban residence persists with all of these other variables controlled, and the regional effects noted in Table 4.1 also retain their predictive power.

In general, this statistical portrait of the factors contributing to the likelihood of a woman having had an abortion is similar to associations described in the analysis of the 1995 data.

4.2 Repeat Abortions

Of the women who have ever had an abortion, nearly two-thirds have had more than one. The second column of Table 4.2 focuses on these women and applies the same model of covariates to differentiate women who have had one abortion from those who have had more than one abortion. As the summary statistics at the bottom of the table suggest, the model does not fit well when applied to women who have had more than one abortion. Age, number of children, years of schooling, and residence in Almaty City all show effects similar to those in column 1, but other variables related to ever having had an abortion fail to show significant effects, and different variables emerge as relevant. For example, women who want no more children are paradoxically less likely to have had more than one abortion. The explanation for this finding lies in the interactions with the age variable. If age is removed, the sign for the reproductive intentions variable reverses to the expected direction. Another puzzling result is that women who report exposure to media messages about family planning are more likely to have had more than one abortion (possibly due to some self-selection by those concerned about control of fertility).

4.3 Covariates of Contraception

The same background characteristics are shown (Table 4.3) for contraceptive prevalence (for currently married women) in both 1995 and 1999. The higher prevalence in cities continues in 1999, but the difference relative to rural areas is shrinking, and the gap is now only 3 percentage points. The contraceptive prevalence rate (CPR) has risen in every region of the country, but the rank order remains the same. The same generalization applies to the educational differential. The greatest jump in the CPR is in the Kazakh population among whom it increased from 53.5 percent in 1995 to 64.0 percent in 1999.

A multivariate analysis of the characteristics associated with contraceptive practice is shown for two measures of contraceptive behavior in Table 4.4. In the first column, the dependent variable is defined as current use of contraception among women who have ever had sex. The significant predictors of use are age (younger women are more likely to be using a method), having had children, wanting no more children, and having had an abortion. Also, education, participation in the labor force, and wealth are all positively correlated with current use. The same regional patterns are seen as noted in Table 4.3.

The second column in Table 4.4 confines the question to the covariates of contraceptive use among women whose last pregnancy ended in abortion. Two-thirds of these women were currently using contraception. Essentially, the same covariates are significant here with a few exceptions. For example, the female autonomy measure suggests that women with a low score are more likely to be using contraception after an abortion while Muslim women are less likely to be using contraception after an abortion. Unlike the regional covariates of current contraceptive practice in the first column of Table 4.4, there are no significant regional effects for use after abortion.

Table 4.3 Percentage of currently married women who are currently using contraception, by background characteristics, 1995 KDHS and 1999 KDHS

Background characteristic	Percentage using any method	
	1995	1999
Residence		
Urban	61.9	67.4
Rural	55.6	64.6
Region		
Almaty City	64.4	70.1
South	50.2	59.6
West	51.9	60.2
Central	66.2	71.5
North	66.0[a]	69.7
East		73.8
Education		
Primary/Secondary	51.9	63.5
Secondary-special	62.0	66.2
Higher	64.0	70.6
Ethnicity		
Kazakh	53.5	64.0
Russian	65.1	70.1
Other	59.9	65.5
Total	59.1	66.1

[a] North and East regions combined

Intention to use contraception among women who are not currently using a method has proved to be a strong predictor of future use (Curtis and Westoff, 1996). In 1999, 63 percent of currently married nonusers in Kazakhstan stated that they did not intend to use a method but three-fourths of these women were subfecund or at low risk of conception for other reasons. Nearly 20 percent reported that they intended to use while the remaining 17 percent were unsure. The covariates of intention to use are examined in Table 4.5 for two groups of nonusers: women who ever had sex and women whose last pregnancy ended in abortion.

For the first category of nonusers, intention to use a contraceptive method is significantly related to being younger and to wanting no more children. Intention to use a method is also associated with knowing where to obtain a method or service and with having used a method in the past. There is also a direct correlation with years of schooling and with exposure to mass media.

Among women whose last pregnancy ended in abortion, 30.6 percent are not currently using a method of contraception. Within this group, 36.5 percent report that they intend to use a method. The multivariate analysis in the second column of Table 4.5 examines the characteristics of women who do or do not intend to use a method among nonusers whose last pregnancy ended in abortion. There is little similarity with the covariates of intention in general (in the first column of Table 4.5) other than with age and exposure to the mass media. Among nonusers whose last pregnancy ended in abortion, younger women and those more exposed to the media are more likely to intend to use a method. Other predictors also emerge for this group. The more children these women have, the less likely they are to intend to use in the future, perhaps suggesting some kind of self-selection. Intention to use is negatively correlated with wealth and directly associated with residence in Almaty City and in the North and East regions.

Table 4.4 Odds ratios of currently using or not using contraception for all women who ever had sex and for women whose last pregnancy ended in abortion, Kazakhstan, 1999

Covariate	Women who ever had sex	Women whose last pregnancy ended in abortion
Age (in single years)	0.96	0.94
Children ever born		
< 2	1.00	1.00
2	2.54	1.90
> 2	2.60	1.68
Ever had an abortion		
No	1.00	NA
Yes	1.48	
Wants more children		
Yes	1.00	1.00
No	1.39	1.63
Family planning media exposure (index)	NS	NS
Mass media exposure (index)	NS	NS
Female autonomy (index)	NS	0.89
Years of schooling	1.05	1.08
Currently working		
No	1.00	1.00
Yes	1.17	1.34
Wealth (index)	1.09	NS
Religion		
Other	NS	1.00
Muslim		0.63
Ethnicity	NS	NS
Residence	NS	NS
Region		
South	1.00	NS
Almaty City	1.55	NS
West	NS	NS
Central	1.77	NS
North	1.33	NS
East	1.57	NS
Number of women	3,611	1,205
Chi squared	252	65
R squared	0.053	0.044

NA = Not applicable
NS = Not significant at .05 level

Table 4.5 Odds ratios of intending to use contraception for nonusers who ever had sex and for nonusers whose last pregnancy ended in abortion, Kazakhstan, 1999

Covariate	Nonusers who ever had sex	Nonusers whose last pregnancy ended in abortion
Age (in single years)	0.83	0.81
Children ever born		
< 2	NS	1.00
2		0.45
> 2		0.41
Ever had an abortion	NS	NA
Wants more children		
Yes	1.00	NS
No	1.58	
Knows source of method		
No	1.00	NS
Yes	1.52	
Ever used a method		
No	1.00	NS
Yes	2.07	
Family planning media exposure (index)	NS	NS
Mass media exposure (index)	1.21	1.44
Female autonomy (index)	NS	NS
Years of schooling	1.08	NS
Currently working		
No	NS	NS
Yes		
Wealth (index)	NS	0.80
Religion		
Other	NS	NS
Muslim		
Ethnicity	NS	NS
Residence	NS	NS
Region		
South	1.00	1.00
Almaty City	NS	4.40
West	0.60	NS
Central	NS	NS
North	NS	2.57
East	1.73	3.49
Number of women	1,293	369
Chi squared	460	168
R squared	0.273	0.331

NA = Not applicable
NS = Not significant at .05 level

4.4 The Ethnic Factor

The contraceptive prevalence rate for both Kazakh and Russian women increased between the two surveys while the abortion rate declined sharply among Russian women but only slightly among Kazakh women (Table 4.6). As noted earlier, the recent migration of Russians from Kazakhstan to Russia complicates the statistical picture. The proportion of women in the population who are Russian declined from 35 percent in 1995 to 30 percent in 1999. The percentage of women currently married remained the same for Kazakh women (62 percent in 1995 and 63 percent in 1999) but dropped for Russian women from 71 to 62 percent during the same period. This is probably associated with the Russian migration but, whatever the explanation, the effect is likely to exaggerate the decline in the Russian abortion rate since abortions take place almost exclusively among married women.

Table 4.6 Indicators of reproductive behavior among Kazakh and Russian women age 15-49, 1995 KDHS and 1999 KDHS

	Kazakh women		Russian women	
Indicator	1995	1999	1995	1999
General abortion rate (per 1,000 women)[1]	36	36	84	54
Total abortion rate (per woman)[1]	1.11	1.06	2.74	1.75
Contraceptive prevalence (percent)				
All methods	36.3	44.0	52.5	53.5
Modern methods	31.3	38.4	37.3	42.3
Total fertility rate (per woman)[1]	3.11	2.50	1.69	1.38
Contraceptive prevalence (percent) by age				
15-19	2.0	2.3	16.9	13.4
20-24	22.3	26.1	53.6	52.7
25-29	46.9	50.7	61.2	70.4
30-34	62.4	60.9	68.0	71.0
35-39	51.4	70.4	71.1	71.6
40-44	51.2	68.7	62.6	58.1
45-49	33.7	39.0	29.3	41.8
Abortion rates (per 1,000 women) by age[2]				
15-19	5	2	44	31
20-24	42	35	166	84
25-29	66	60	141	117
30-34	48	50	91	76
35-39	31	37	46	31
40-44	19	14	24	17
45-49	3	0	8	2

[1] For the three-year period preceding the survey

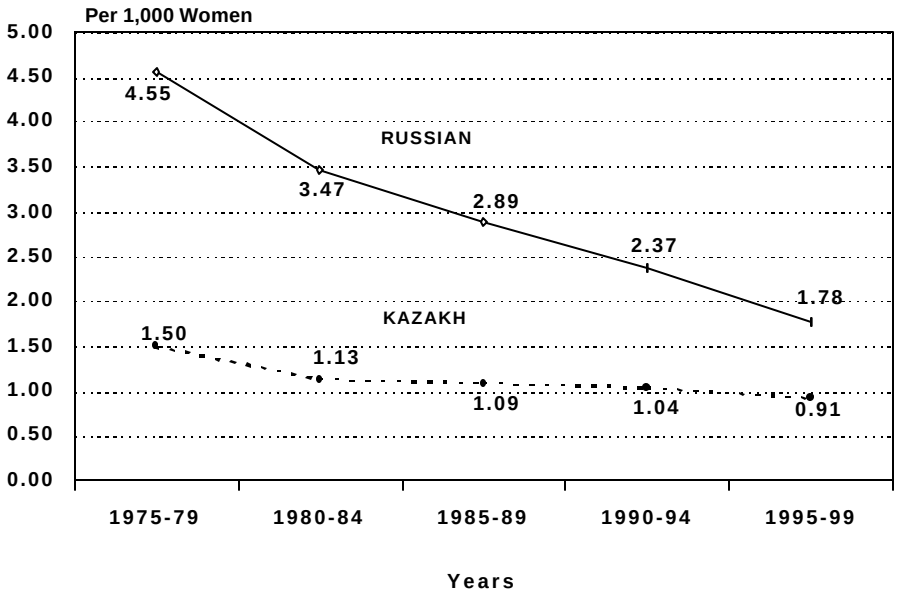
[2] For the four-year period preceding the survey; estimates for the 1992-95 period are averaged from the two surveys.

Another contributing factor is that the increase in contraceptive prevalence among Kazakhs is most striking in the 35-44 age group, that is, older than the age at which abortion most commonly occurs. Among Russian women, in contrast, the percentage using a method increases sharply at ages 25-29, which is the peak age group for abortions.

Other possible explanations have been explored but they do not shed any further light on the question. Contraceptive failure rates are higher for Russian women (an annual average of about 6 percent compared with 4 percent for Kazakhs) but this has not changed over the period between the surveys. Reproductive preferences have not changed in any way that would elucidate the ethnic difference; nor is there any indication that Kazakh and Russian women are more or less likely to abort a fetus resulting from contraceptive failure now than five years earlier.

Although the abortion rate among Kazakhs has not changed appreciably in the recent past, it has declined gradually over the past 25 years (Figure 4.1). The main finding in terms of ethnic group, however, is the dramatic decline in the rate of abortion among the Russian women.

Figure 4.1 Trends in the total abortion rate among Kazakh and Russian women ages 15-39, Kazakhstan 1975-1999



5 Probability of A Woman Having an Abortion

One measure of the probability of a woman having an abortion is the proportion of pregnancies that ended in abortion: 36.8 percent of pregnancies in the three years before the 1999 KDHS ended in abortion. The percentage of pregnancies resulting from contraceptive failure that ended in abortion (67 percent) is also an indicator. Another measure is the woman's desire to have or not have an abortion if she were to become pregnant unintentionally. In the 1999 KDHS, the following question was asked immediately after several other attitudinal questions on abortion: "Would you have an abortion if you unintentionally become pregnant sometime in the future?" The most common response (43.9 percent) was negative, but 35.4 percent of women said they would have an abortion. The remaining 20.6 percent[6] were undecided. It is useful to explore the background characteristics of women based on this measure of the likelihood that a woman will have an abortion. To sharpen the contrast, the multivariate analysis is confined to those women who replied unambiguously either yes or no.

The analysis in column 1 of Table 5.1 includes the same list of covariates as in the earlier multivariate analyses. The results indicate that women who would seek an abortion are less likely to have more than two children, more likely to want no more children, and more likely to have tried to regulate their fertility either by abortion or contraception. Region of residence is particularly relevant to this measure of the likelihood a woman will seek an abortion, with women in the South region least likely to say that they would seek an abortion.

In order to shed light on the possible role of other covariates, the analysis is repeated excluding regions (see column 2). The covariates remain the same except that urban residence and female autonomy now show significant positive associations with a woman seeking to have an abortion. Muslim women are less inclined to seek abortion than other women.

[6] These percentages exclude 2.2 percent of women who were not asked the question because they were sterilized, as well as a few missing cases.

Table 5.1 Odds ratios of having an abortion if the women were to become pregnant unintentionally, including and excluding regions, Kazakhstan 1999

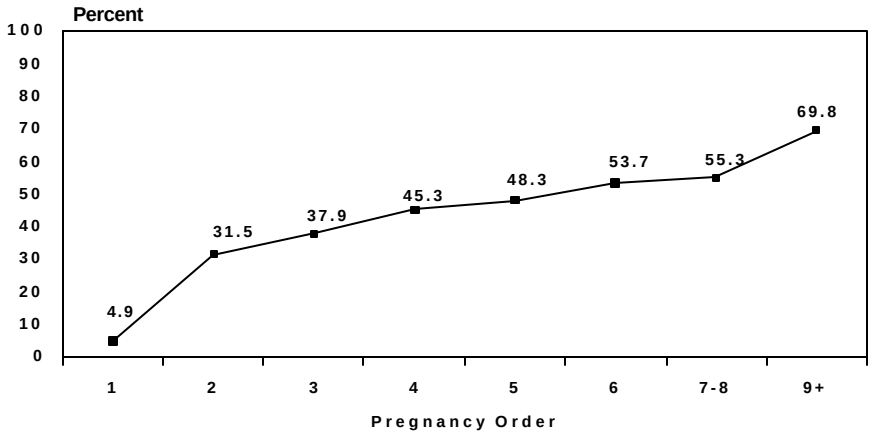
Covariate	Women who became pregnant unintentionally including regions	Women who became pregnant unintentionally excluding regions
Age (in single years)	NS	NS
Children ever born		
< 2	1.00	1.00
2	NS	NS
> 2	0.76	0.70
Wants more children		
Yes	1.00	1.00
No	2.95	2.96
Ever had an abortion		
No	1.00	1.00
Yes	2.82	2.77
Ever used contraception		
No	1.00	1.00
Yes	1.45	1.45
Family planning media exposure (index)	NS	NS
Mass media exposure (index)	NS	NS
Years of schooling	NS	NS
Female autonomy (index)	NS	1.05
Currently working	NS	NS
Wealth (index)	NS	NS
Religion	NS	
Other		1.00
Muslim		0.70
Ethnicity	NS	NS
Residence		
Rural	NS	1.00
Urban		1.26
Region		
South	1.00	
Almaty City	1.52	
West	1.44	
Central	2.73	
North	1.31	
East	1.95	
Number of women	3,431	3,431
Chi squared	795	743
R squared	0.168	0.157

NS = Not significant at .05 level

6 Other Dynamics of Abortion Behavior

One of the interesting questions is when in the family-building process abortion is most likely to occur. In this part of the world abortion is rare among unmarried women. The low occurrence is because premarital sex is much less common in predominantly Muslim countries. But the question remains whether abortion is used to space births or primarily to limit the number of births, that is, for the prevention of unwanted births after the desired number of children has been reached. In the 1995 KDHS this subject could be approached directly using responses to questions about the planning status of each pregnancy in the past three years. Such questions were not included in the 1999 KDHS, so indirect methods were used. One approach is to examine the proportion of pregnancies that ended in abortion by order of pregnancy (Figure 6.1). The probability that a first pregnancy will end in abortion remains low 5 percent but rises to roughly a third for second and third pregnancies. The low abortion rate for first pregnancies in Kazakhstan is different from many countries in the West, such as the United States, where there is a high rate of premarital pregnancy.

Figure 6.1 Percentage of pregnancies that ended in abortion, by order of pregnancy



Another approach to the question of whether abortion is used primarily for spacing or for limiting is to examine the sequences of births and abortions in women's pregnancy histories. This analysis is confined to women who have had at least one abortion and who have reached the age (40-49) at which they are likely to have had their last pregnancy. The results are the same as those described in the 1995 KDHS. The women are equally divided into three categories: those whose last pregnancy resulted in a birth but who had an earlier abortion; those whose last pregnancy ended in an abortion but who had no earlier abortions before a birth; and women whose last pregnancy ended in abortion but who had an earlier abortion followed by a birth. The first of these three categories features the use of abortion only for spacing since these women subsequently had a terminal birth. The second category of women used abortion only for limiting fertility since they had live births and then ended their childbearing with an abortion but had no abortions preceding a birth. The last category used abortion for both spacing and limiting purposes. Each of these three groups comprises about one-third[7] of women 40-49 who have a pregnancy history with at least one abortion. The conclusion is that abortion is used in Kazakhstan nearly equally for spacing and limiting of births.

[7] There is an additional small group of women (4.8 percent of the total) whose last occurrence was a miscarriage or stillbirth or whose pregnancy history was entirely abortions.

7 A model of contraception and abortion

The primary focus of this analysis has been to understand the relationship between contraception and abortion, in particular the extent to which abortion is reduced by the use of contraceptive methods. How important are increases in contraceptive prevalence compared with increases in the effectiveness of the methods used? What are the implications of contraceptive discontinuation for abortion rates? How much impact does the current level of unmet need have on abortion? Can a model be constructed to predict the abortion rate? A formal model of the trade-offs between abortion and contraception has recently been developed (Bongaarts and Westoff, 2000). A model was constructed in the earlier analyses of abortion in Kazakhstan, Uzbekistan, and Kyrgyzstan based on simulations of detailed parameters estimated from the surveys, and it is now possible to evaluate its success in predicting the abortion rate in Kazakhstan nearly five years later.

The contraceptive prevalence for all women in 1995 was 43.3 percent, which increased to 48.0 percent by 1999. The model estimate of the abortion rate based on a 10 percent increase in the CPR (from 43.3 to 47.6 percent) was a GAR of 48, down from 55. The GAR actually recorded in the 1999 survey is 48. A significant part of this change is the shift of some women from being classified as having an unmet need for family planning to being contraceptive users.[8] The success of this forecast (assuming that it was not chance) encouraged an attempt to replicate the effort based on the 1999 survey data.

7.1 Parameters of the Model

The relevant data collected in the two surveys differ in two respects. In the 1999 survey, the five-year monthly calendar was added but information on the planning status of recent pregnancies in the 1995 survey was not included. This made the assignment of abortions to the type of noncontraceptive exposure less straightforward than in the earlier model. On the other hand, the inclusion of the five-year calendar permits classification of different types of method discontinuation and estimation of the effect on abortion. Therefore, the model designed for the 1999 data is different in some respects from the 1995 version. The specific parameter values used are shown in Table 7.1 along with the corresponding values from the 1995 survey. The estimates for the two periods are quite similar The contraceptive failure rates from the 1999 survey are annualized estimates of the number of reported failures divided by the number of users over the preceding five-year period The same procedure is followed in estimating the pregnancy rate for nonusers but is limited to no experience with contraception in both the numerator and denominator.[9] Nonusers are a heterogeneous mix of women including, among women who have ever had sex, those trying to become pregnant (23 percent of all current nonusers), those with an unmet need for family planning (21 percent of nonusers), and women who feel that they are at low risk of pregnancy because of infecundity or infrequent sex (56 percent).

The basic model comparing the relative contributions of users and nonusers to the abortion rate is shown in Figure 7.1. On the basis of pregnancy rates and the corresponding probability of abortion, estimated directly from the survey, the model yields an abortion rate of 48, which is the same as the direct calculation of the rate for the past three years. This correspondence increases confidence in the internal components of the abortion rate and provides a basis for "what if" calculations and for prediction in general.

[8] The increase of 4.3 percent in the CPR was drawn from a reduction of unmet need from 8.1 to 6.0 percent, from women currently pregnant (from 3.8 to 3.4 percent) and from women at low risk of pregnancy (from 17.8 to 16.0 percent).

[9] The denominator of the nonuse pregnancy rate excludes gestation time.

Table 7.1 Model parameters in 1995 and 1999

Parameter	1995	1999
Contraceptive users		
Percentage using any method	43.3	48.0
Annual failure rate	0.036	0.054
Percentage using a modern method	33.6	39.6
Failure rate	0.031	0.031
Percentage using a traditional method	9.6	8.4
Failure rate	*	0.166
Percentage of contraceptive failures that ended in abortion	77.6	67.0
Nonusers		
Percentage not using any method	56.7	52.0
Pregnancy rate (for women who ever had sex)	0.367	0.368
Percentage of pregnancies that ended in abortion	32.9	25.1
Currently pregnant		
Percentage pregnant 3 months or less	1.3	0.9
Seeking pregnancy		
Percentage seeking pregnancy	7.1	7.3
Pregnancy rate	0.654	0.634
Percentage of pregnancies that ended in abortion	7.2	5.0
Unmet need		
Percentage in need of family planning	8.1	6.8
Pregnancy rate	0.654	0.654
Percentage of pregnancies that ended in abortion	54.0	51.4
Low risk		
Percentage at low risk	17.8	18.0
Pregnancy rate	0.122	0.100
Percentage of pregnancies that ended in abortion	33.6	38.5
Exposure		
Never had sex	19.9	20.0
Number of women	3,771	4,800

* Figure suppressed because of small number of cases

The model indicates that 38 percent of the abortion rate results from contraceptive failure and the remaining 62 percent from pregnancies following nonuse. If the CPR were to increase by another 10 percent—a likely possibility in the next five years or so—then the abortion rate would theoretically decline from 48 to 44. But the magnitude of the change depends on whether the shift from nonusers is more from those with unmet need than from women who are seeking pregnancy. Moreover, this calculation ignores any move toward more effective contraception of the kind observed since 1995 (the use of modern methods

among all women increased from 34 to 40 percent, and the use of traditional methods declined from 10 to 8 percent). The components of the model depicted in Figure 7.1 are simply use and nonuse. A more detailed picture is presented in Figure 7.2 in which use is shown for modern and traditional methods separately with nonuse divided among women seeking pregnancy, those classified with a need for family planning, and women at low risk of pregnancy because of infecundity or infrequent sex.

Figure 7.1 Contributions of users and nonusers of contraception to the abortion rate, Kazakhstan 1999

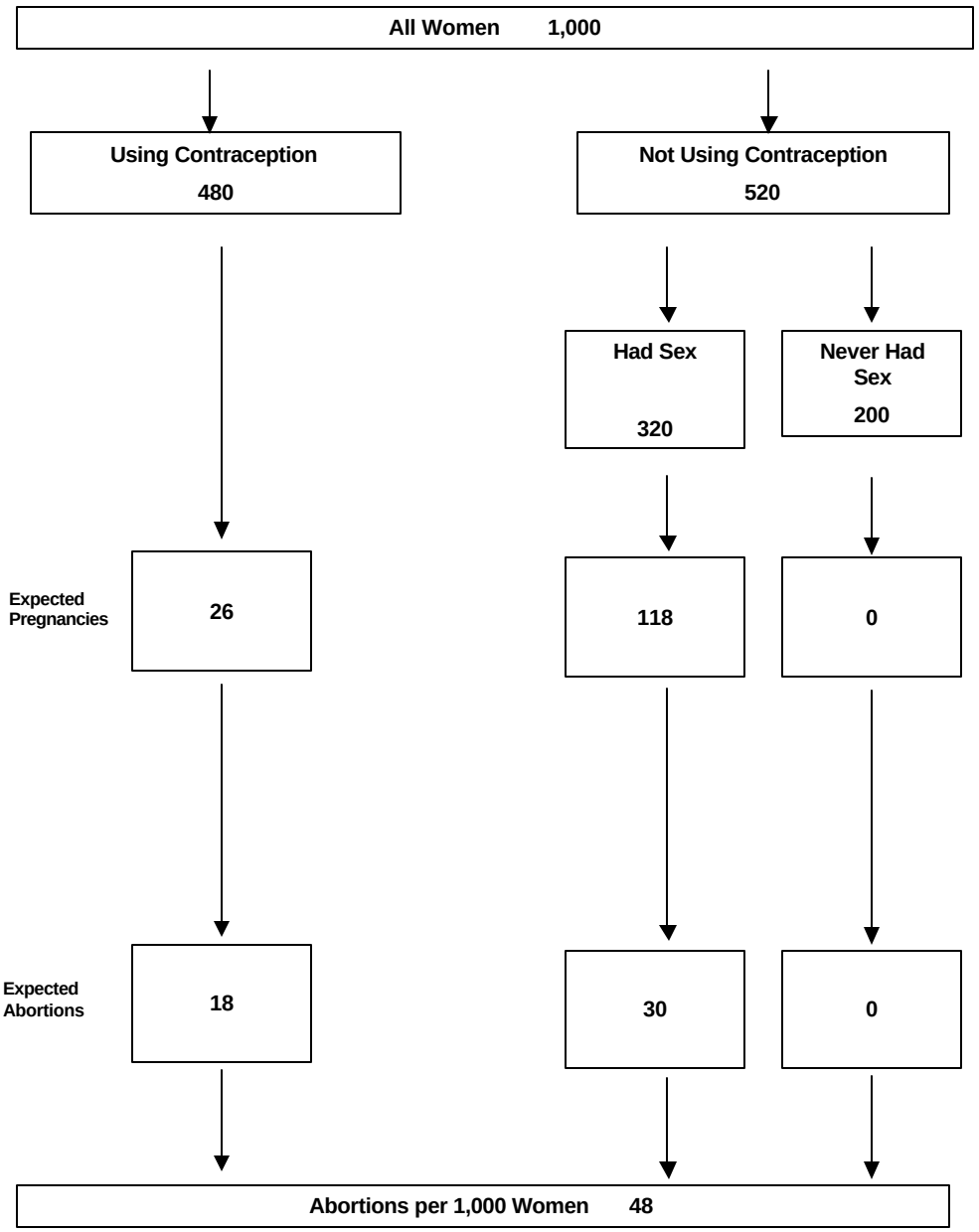
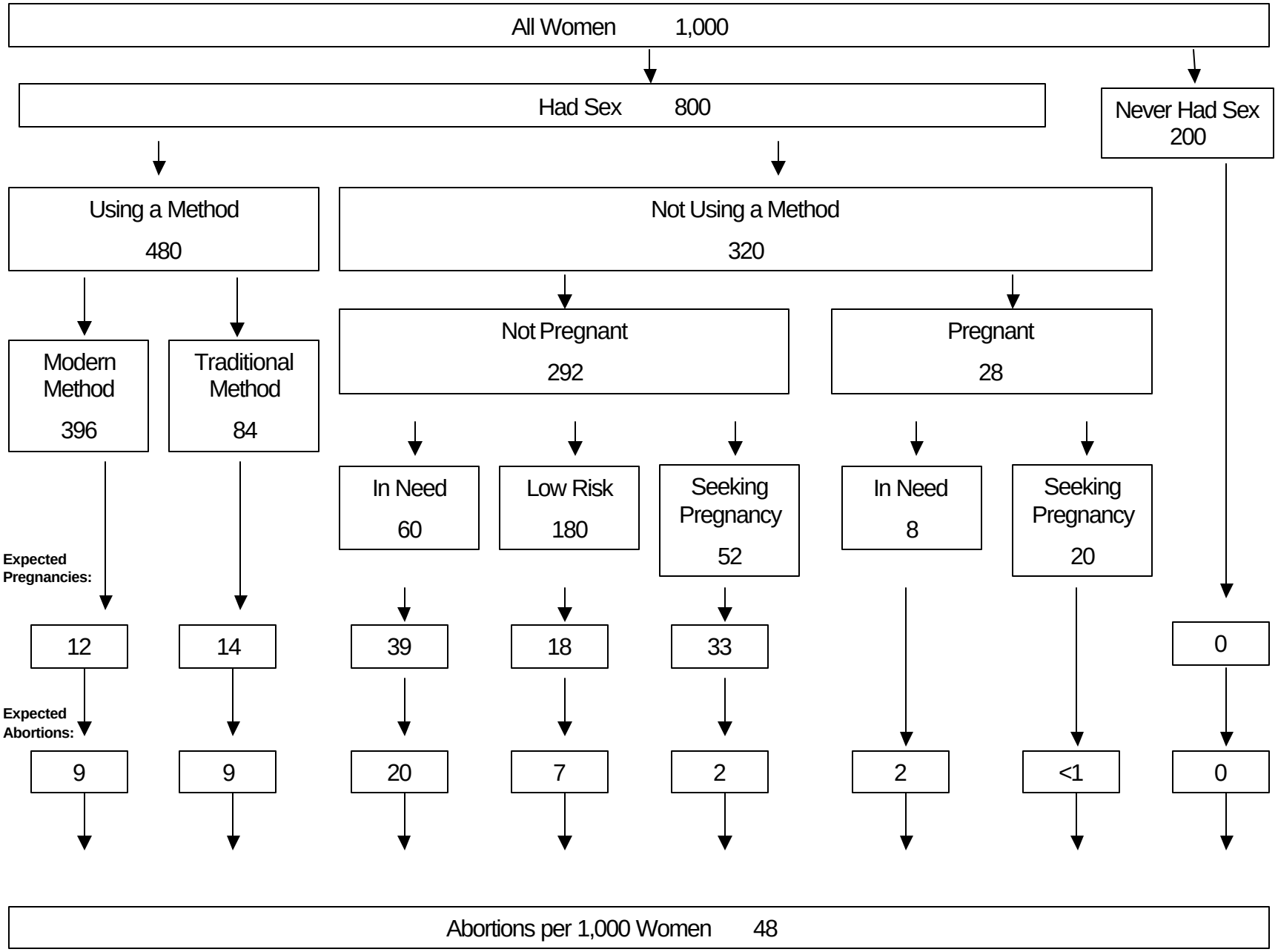


Figure 7.2 Specific components of the abortion rate, Kazakhstan, 1999



As indicated in Figure 7.2, slightly more than half of the method failures are associated with the use of traditional methods (mostly periodic abstinence and withdrawal). Traditional methods account for less than 20 percent of all current use but have an annual failure rate of 16.6 percent compared with 3.1 percent for modern methods. If all current use consisted of modern methods with no other changes, the abortion rate would drop from 48 to 40.

Various other scenarios can be visualized (see Figure 7.3). If *all* contraceptive use were modern methods *and* overall contraceptive prevalence increased by 10 percent, then the abortion rate would be 36. It would drop to 30 with a zero failure rate and no increase in prevalence, and to 25 with no failures and a 10 percent increase in prevalence.

Figure 7.3 Abortion rates estimated under different assumptions, Kazakhstan 1999

The category of women classified as having an unmet need for family planning is particularly important for these calculations because among nonusers they are most likely to have an abortion if they become pregnant unintentionally (see Table 7.1). There are 6.8 percent of all women in the unmet need category, a decline from 8.1 percent in 1995. The estimated annual pregnancy rate for these women is 0.65 and the likelihood of abortion is 51 percent. (The basis for these estimates for the different categories of nonusers is described in the Appendix.) If all unmet need were eliminated and these women were shifted to the user category, abortions for these women would decrease from 22 to 0 and abortions for users would increase from 18 to 20, with a net reduction of 17 abortions per 1000 women and a GAR of 31. If, in addition to eliminating unmet need, *all* use would be modern methods, then the GAR would decline to 22. At the extreme—assuming unchanged proportions of women who have never had sex, who are seeking pregnancy, or who are at low risk of pregnancy, but also assuming no unmet need and no failures—the GAR would be 9. In reality, some contraceptive failures are inevitable, the proportion of women who have never had sex will eventually decline, and the proportion seeking pregnancy will be lower. A more realistic estimate of the abortion rate five years from now would assume the following:

- The proportion that never had sex declines by 5 percent.
- Overall use increases by 5 percent.
- The increase in use implies an increase in modern method use by around 10 percent and a corresponding decrease in reliance on traditional methods.
- The failure rates remain the same.
- The proportion of women seeking pregnancy declines by 5 percent.
- Unmet need declines by 16 percent.
- The percentage at low risk of pregnancy remains the same.
- Pregnancy rates and the likelihood of abortion remain unchanged.

With these assumptions, the GAR would decline from 48 to 44. This estimate is somewhat conservative considering that the GAR declined from 55 to 48 between the three-year period before the 1995 survey and the three-year period before the 1999 survey. One reason is the assumption that the proportion of women who have never had sex will decline. However, even without that assumption, the predicted GAR would be 43. It is clear that the two main potential sources of abortion reduction are the reduction of unmet need and an increase in the use of modern methods.

A similar model has been constructed for the analysis of contraception and abortion in Turkey (Senlet et al., 2001). In that country, the potential for further reducing abortion lies primarily in the shift to more effective methods and the more effective use of traditional methods.

The scenarios for Kazakhstan all assume either the same CPR or an increase of 10 percent in the CPR. There is also the possibility, however unlikely, that the use of modern methods could decline, perhaps because of increased costs of contraception. Assuming that all else remained the same except for a reduction of 10 percent in the use of modern contraception that would be shifted to the use of traditional methods, the abortion rate would climb to 53.

7.2 Method Discontinuation and Abortion

As noted earlier, the inclusion of the monthly calendar in the 1999 survey makes possible the estimation of rates of contraceptive method discontinuation and analysis of the implications for the abortion rate. Contraceptive practice can be discontinued for many reasons other than method failure (analyzed above). Some reasons include wanting to become pregnant, health considerations, side effects, wanting a more effective method, and other reasons. Given the high rate of method discontinuation—a life table first-year discontinuation rate of 26 percent is observed (excluding contraceptive failure and intention to become pregnant)—one might expect a significant effect on unintended pregnancy and abortion rates. An estimate of 12.5 percent of all pregnancies in the five-year period followed a discontinuation of use for reasons other than contraceptive failure and intention to get pregnant. Half of these pregnancies ended in abortion (Table 7.2). The estimate is that 21 percent of all abortions in the past five years followed such method discontinuation. The largest number of abortions followed method failure (41.3 percent) and pregnancies resulting from general nonuse rather than method discontinuation (35.8 percent). The two most significant reasons (excluding failure and intention to get pregnant) for discontinuing a method, in terms of their impact on unintended pregnancy and subsequent abortion, are health concerns and side effects, which together accounted for half of the pregnancies following such discontinuations as well as half of the abortions.

Table 7.2 Percent distribution of pregnancies and abortions in the past five years by type of preceding exposure, Kazakhstan 1999

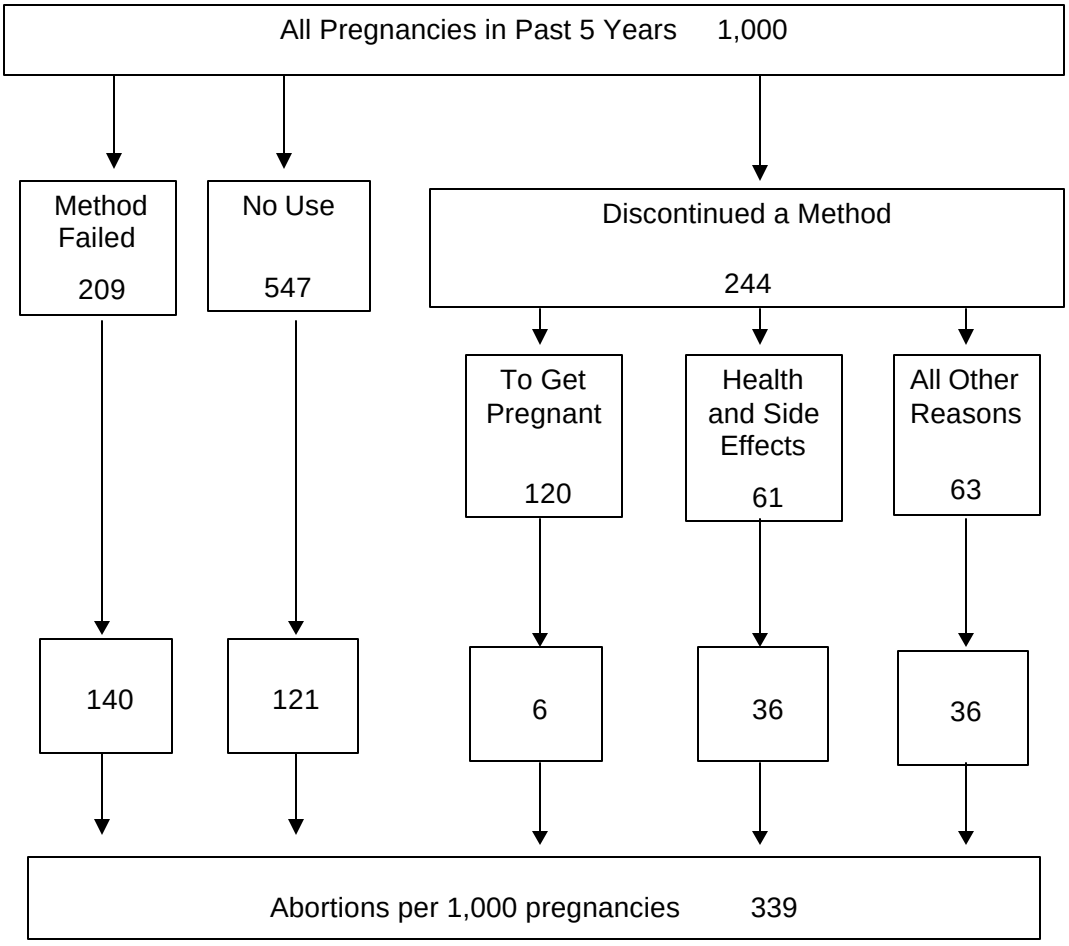
Type of preceding exposure	Pregnancies	Abortions
No method used during interval	54.7	35.8
Method failed during use	20.9	41.3
Discontinued use to become pregnant	12.0	1.8
Other types of discontinuation		
Low risk	0.5	0.7
Husband disapproved	0.7	1.4
Wanted more effective method	0.8	1.4
Health concerns	3.7	6.6
Side effects	2.4	4.0
Access/cost	0.7	1.2
Inconvenient to use	1.0	1.9
Other/DK/Missing	2.6	3.8
Total	100.0	100.0

In summary (see Fig. 7.4), contraceptive failure accounts for 41 percent of all abortions[10] in the past five years, general nonuse accounts for 36 percent, and discontinuations of contraception account for the remaining 21 percent.[11]

[10] This estimate is higher than the 38 percent estimate noted earlier because it is based on the number of abortions rather than the number of women.

[11] An additional 2 percent of abortions followed discontinuation to become pregnant.

Figure 7.4 Contributions to the abortion rate of contraceptive failure, contraceptive discontinuation and other nonuse, Kazakhstan 1999



8 Summary and Conclusions

The proposition that the occurrence of abortions can be reduced by increases in the use of contraception has been demonstrated again in the analysis of the data from the 1999 KDHS. The findings are unambiguous and the effects are strong. The results replicate those of the 1995 KDHS that covered the first half of the decade. Together, the two surveys and data from the Ministry of Health show a significant reduction in the abortion rate and a steady increase in contraceptive prevalence. From 1991, when Kazakhstan gained its independence, through 1998 the abortion rate has declined by 50 percent and contraceptive prevalence has increased by about the same proportion. The increase in contraceptive practice has been entirely in the use of modern methods with some increase in the diversity of the method mix but a continuing heavy reliance on the IUD.

There has been a dramatic decline in the fertility rate in Kazakhstan over the four-year interval between the two surveys. For the three-year period preceding the 1999 KDHS, the total fertility rate had reached the replacement level of 2.05, down from 2.5 only four years earlier. Considering the fact that fertility in Kazakhstan exceeded 7.5 births per woman when the Soviet Union came into being, this change is remarkable. The relevance here is that the recent drop is occurring at the same time that the abortion rate has been declining, which provides indirect support for the role of contraception.[12] It is also relevant because the small-family norm implies an increasing challenge to contraception. Less than 30 percent of the married women in Kazakhstan state that they want another child and 61 percent of them are currently using contraception for childspacing.

These changes have occurred in all segments of the society, but the decline in the abortion rate has been most evident in the ethnic Russian minority, which has had the highest rate. Multivariate analyses indicate that both Kazakh women and Muslim women are significantly less likely to have had an abortion. Women who are working and who are economically better off are more likely to have had an abortion. The analysis also revealed that a new measure of female autonomy was directly related to the probability of having had an abortion. Urban residence and pronounced regional effects also play a role. A similar pattern of associations is evident in the multivariate analysis of contraceptive practice.

An interesting indicator of the probability that a woman will have an abortion is a question included in the 1999 KDHS that asked whether the woman would have an abortion if she were to become pregnant unintentionally. Slightly more than a third of the women indicated that they would have an abortion under these circumstances, with another 20 percent in the "don't know" category. The most common response (44 percent) was negative.

Unlike the West, first pregnancies are rarely aborted in Kazakhstan and, in a country where premarital sex is uncommon, abortion is used infrequently by unmarried women. Analysis of the sequencing of abortions and live births indicates that abortion is used nearly equally for spacing and for limiting the number of births.

A simulation model of abortion and contraception was constructed in the earlier analysis of the 1995 KDHS and the forecast of the abortion rate was exactly on target as measured by the rate in the 1999 KDHS. A similar model was developed for the current study with some additional features made possible

[12] The association between the abortion rate and contraceptive prevalence can also be positive in the earlier stages of the fertility transition as was the case in Korea (Bongaarts and Westoff, 2000) and evidently in parts of Latin America (Singh and Sedgh, 1997).

by the monthly calendar data collected in the second survey. The model permits assessment of the relative importance of the proximate determinants of abortion and estimation of the implications for the abortion rate of varying parameters such as contraceptive prevalence, method mix, failure rates, and unmet need.

A variety of scenarios are depicted. The use of modern methods with their lower failure rates makes an important contribution to lowering the abortion rate. If the 20 percent of users currently using traditional methods were all to shift to modern methods, the abortion rate would decline from 48 to 40. If overall contraceptive prevalence were to increase by 10 percent (as it did in the preceding four years) the abortion rate would be 44 with the current method mix and 36 if the increase were combined with all modern method use.

The reduction of unmet need for family planning is especially critical for declines in the abortion rate to occur. With no other changes, if women currently classified in need of family planning (6.8 percent) were to become contraceptive users, the abortion rate would be 31 rather than 48. If such a shift were also to feature exclusive use of modern methods, the GAR would be 22.

The implications of contraceptive discontinuation for abortion have also been investigated. Discontinuation of use is associated with about one-fifth of all abortions in the past five years. There are numerous reasons for discontinuing use, but side effects of contraceptive methods and health concerns play a major role. The principal components of abortion are contraceptive failure and nonuse, which are closely tied to method mix and level of unmet need.

APPENDIX: Estimation of Model Parameters

The model of contraception and abortion requires the estimation of pregnancy rates and abortion probabilities for different categories of users and nonusers. These estimates are derived directly from the survey data but the procedures are not always straightforward. Therefore, despite the general reliability of the data collected in the survey, there is considerable uncertainty about many of these estimates.

Users

The estimate of 0.054 for the annual failure rate for the use of all methods of contraception is based on the number of pregnancies reported as having occurred while a method was in use divided by the number of months of use. These data are extracted from the five-year monthly calendar, and the rate is an annual average. The failure rate for modern methods (0.031) and for traditional methods (0.166) are based on the same kind of calculation for the different types of methods. The likelihood that a woman will have an abortion when the pregnancy resulted from contraceptive failure is 67 percent.

Nonusers

The model differentiates four kinds of nonusers: women who have never had sex, women in need of family planning, women at low risk of pregnancy, and women who are trying to get pregnant. Women who report that they have never had sex are excluded from the calculation of the pregnancy rates. The three remaining categories all involve measures based on the current status of the respondent at the time of the interview. No information is available that would permit classifying women by their earlier type of exposure. The ideal measure would be one in which the type of nonuse exposure could be classified prior to the pregnancy or abortion. The best that can be done is simply to calculate the ratio of the pregnancies that occurred to women currently in these different categories over the past 24 months to the aggregate number of months of nonuse that the women currently in that category accumulated. To illustrate the calculation of the pregnancy rate, women who are currently trying to get pregnant had 5,146 months of nonuse over the past 24 months and a total of 272 pregnancies for an estimated annual pregnancy rate of 0.634. Despite these women's current intention to become pregnant, some abortions will occur because of changes in intentions or circumstances. The crudity of measurement also obscures the possibility that the abortion may have followed an earlier unintended pregnancy that may have influenced the 5 percent estimate.

The corresponding estimates of the pregnancy and abortion rates for women at low risk of pregnancy are 0.100 and 38.5 percent, respectively. The amount of recent exposure and the pregnancy and abortion events are likely to be connected. For the unmet need estimates, there may be more of a disjuncture. It is easy to imagine that the current status of unmet need may not have been the same over the preceding 24 months so that the preceding pregnancies and abortions may be misclassified. Nevertheless, the observed pregnancy rate of 0.654, estimated in the 1995 survey on the assumption that the rate would be the same as that for women trying to become pregnant, seems reasonable. The probability of having an abortion among women currently in need of family planning followed the estimating procedure used in the 1995 study. This procedure assumes that the likelihood of a woman having an abortion would be higher for women in need of family planning who have an unintended pregnancy than for nonusers in general but lower for users who experienced contraceptive failure. The midpoint of that range is 51.4 percent, very close to the 54 percent estimated in the earlier survey.

The estimates of these different parameters are quite similar in the two surveys despite some differences in measurement (Table 7.1). In both studies the model based on these estimates resulted in a close approximation of the observed abortion rate.

References

Academy of Preventive Medicine [Kazakhstan] and Macro International Inc. 2000. *Kazakhstan Demographic and Health Survey 1999*. Calverton, Maryland: Academy of Preventive Medicine and Macro International Inc.

Almagambetova, Naila. 1999. Kazakhstan: Charity funding tackles low birth rate. *The Lancet* 353:1505.

Bankole, Akinrinola, Susheela Singh, and Taylor Haas. 1998. Reasons why women have induced abortions: Evidence from 27 countries. *International Family Planning Perspectives* 24(3): 117-127.

Bongaarts, John and Charles F. Westoff. 2000. The potential role of contraception in reducing abortion. *Studies in Family Planning* 31(3):193-202.

Curtis, Sian and Charles F. Westoff. 1996. Intention to use contraceptives and subsequent contraceptive behavior in Morocco. *Studies in Family Planning* 27(5):239-250.

Lorimer, Frank. 1946. *The population of the Soviet Union: History and prospects*. Geneva: League of Nations.

National Institute of Nutrition [Kazakhstan] and Macro International Inc. 1996. *Kazakhstan Demographic and Health Survey, 1995*. Calverton, Maryland: Macro International Inc.

Popov, Andrej A. 1990. Sky-high abortion rates reflect dire lack of choice. *Entre Nous* 16:5-7.

Popov, Andrej A. 1993. A short history of abortion and population in Russia. *Planned Parenthood in Europe* 22(2):23-25.

Russian Centre for Public Opinion and Market Research (RCPOMR), Centers for Disease Control and Prevention (CDC), and U.S. Agency for International Development (USAID). 1998. *1996 Russian Women's Reproductive Health Survey final report: A study of three sites*. Atlanta, Georgia (USA): CDC.

Senlet, Pinar, Sian L. Curtis, Jill Mathis, and Han Raggers. 2001. The role of changes in contraceptive use in the decline of induced abortion in Turkey. *Studies in Family Planning* 32(1):1-12.

Singh, Susheela and Gilda Sedgh. 1997. The relationship of abortion to trends in contraception and fertility in Brazil, Colombia and Mexico. *International Family Planning Perspectives* 23(1): 4-14.

Westoff, Charles F., Almaz T. Sharmanov, Jeremiah M. Sullivan, and Trevor Croft. 1998. *Replacement of abortion by contraception in three Central Asian Republics*. Calverton, Maryland: The Policy Project and Macro International Inc.

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