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Children at Risk: Infant and Child Health in Central Asia

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Abstract

Using Demographic and Health Surveys, government statistics, and field observations I examine trends in infant and child health in Uzbekistan, Kazakstan and the Kyrgyz Republic. Health indicators (anemia and marked low weight for age) for the population under the age of 3 are examined nationally, regionally and by ethnic groups. Findings indicate the risk of compromised child health varies by ethnicity, but the effect is dramatically lessened by the introduction of household and maternal controls such as parental education, residence, and mother's health status. Findings highlight the social costs of transition, illustrate the importance of maternal health across the region, and assist in the identification of groups at highest risk for poor child health within individual countries.

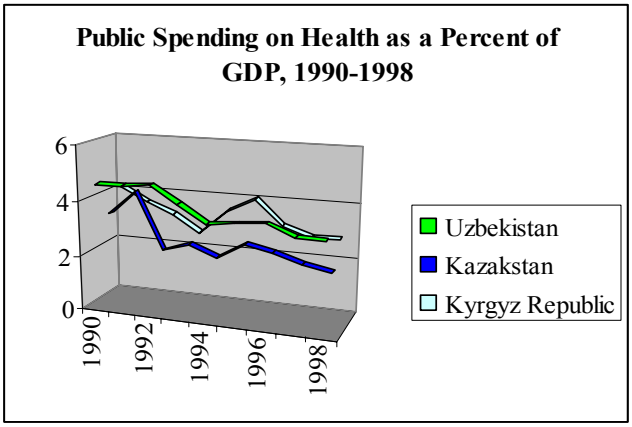
Keywords: Child Health, Central Asia, Transitionary Economies, Anemia, Stunting, Maternal Health

JEL Codes: I0, J1, N3, P2

Across the countries of the former Soviet Union, demographic upheaval marks the past eleven years. Research tends to concentrate upon significant increases in male mortality, plummeting fertility rates, and mass migratory movements. This paper concentrates upon a less studied aspect of the post-Soviet "dire demographics" by investigating socio-economic correlates of infant and child health in three countries of central Asia: Kazakstan, Uzbekistan and the Kyrgyz Republic in the mid 1990s. The early transition period in these three countries is marked by collapsing social safety nets, increasing poverty, widening wealth disparities, and deteriorating health care services (McKee, Healy, Falkingham 2002, Klugman et. al. 1997). Like other successor states, fertility declines noticeably after independence in central Asia. Unlike the European areas of the Soviet Union, fertility remains above replacement, in some regions significantly so. Examining child health differentials in this region affords unique opportunities for insight into regional and ethnic health inequities, and their relationship to household and maternal characteristics. More importantly, increased awareness of child health issues is imperative for the accurate assessment of future health prospects in the region.

In spite of their economic and political differences, Kazakstan, the Kyrgyz Republic, and Uzbekistan share significant aspects of their public health history. Lags in health care and general infrastructure development during the Soviet period meant that infectious diseases, rural/urban health differentials, infant mortality, and questionable health data in the region remained more problematic than the rest of the USSR (Velkoff and Miller 1995, Buckley 1998, Burieva 1987). Additionally, health disparities between titular ethnic groups, concentrated in rural areas, and Slavic nationalities, often more educated and urban, were thought to be significant. In the post-Soviet period the region is beset with health care funding difficulties, challenges related to the out-migration of health specialists, and increases in poverty. The

similar revenue generation and state capacity challenges faced by the region generates an overall pattern of declining public spending on health, as seen in Figure One.



Data source: Kutzin and Cashin, in Health Care in Central Asia (McKee, Healy and Falkingham 2002), p 95.

Various approaches to addressing problems with health care eligibility, accessibility, payment and financing continue to be debated, with similar outcomes. Uzbekistan President Karimov advocates employer based insurance, but private funds have yet to be established leaving people dependent on faltering state provision networks. Kazakstan's attempt at mandatory health insurance in 1996 ended in financial collapse and was reformed in 1999 to a dual payer system. The Kyrgyz Republic Mandatory Insurance Fund, established in 1997, covers approximately 70% of its population, but a very low level of care provision. Only in the Kyrgyz Republic are there plans to provide universal health coverage to those under 16. (see McKee, et, al 2002, Savas and Gedik 1999) Throughout the region there is widespread evidence of required "under the table" payments or resource exchanges in order to obtain health care, and increasing systemic problems with accountability and delivery of care (Lewis 2000), while other report that care is being rationed. (Foley 2000) However most agree, health care services in the region are inadequate to meet current needs in either an equitable or effective manner.(World Bank 2000)

In a context of such change and uncertainly it is a particularly poor time to be an infant or young child in this region, but among the very young precisely who is at most risk for poor health? In order to assess correlates of child health and well being Kazakstan, Uzbekistan, and the Kyrgyz Republic I utilize data from the Demographic and Health Surveys conducted in 1995, 1996, and 1997 in each country respectively. This round of DHS surveys gathers a wide variety of information from women 15-49 years of age concerning family planning, maternal well being, and child health. I focus my analyses on the DHS children's files, examining those born within 36 months of the survey date. This focus enables me to investigate the health status of children born during the transition, while also narrowing in on an often understudied and vulnerable population sub-group. I restrict my analyses to children under the age of three, who are still alive at the time of the survey, weighting the data to increase regional representation.[1]

I focus on two specific health problems among infants and young children, anemia and low weight for age. Anemia in Russia and other successor states has garnered a great deal of attention in the press. Presidential calls to address high rates of anemia among children, and especially expectant mothers, have been made by Karimov, Nazerbayev, and Akaev on numerous occasions. Overall levels of severe anemia are modest among young children, but nearly one in four children under three years of age among these countries has severe or moderate anemia. Overall anemia rates are the highest in Kazakstan, with 39% of children tested either severely or moderately anemic. In Uzbekistan, 27% and in the Kyrgyz Republic 26% fell into this category. The overall rates of severe or moderate anemia are not outside the expected

[1] It should be noted that the original sample is designed to be a random sample of women in the reproductive ages, *not* a random sample of those giving birth in the past 3 years, therefore even with the employment of the sample weights, the true representative nature of the data concerning children under three is not assured.

range[2], but do raise concerns. Complications often arise when anemic children suffer diarrhea, as vitamin A levels in addition to iron fall and some evidence indicates a decreased ability to absorb nutrients. With over 15% of the children surveyed reporting some diarrhea in the past two weeks, the possibility for long term negative effects increases, especially in a context of high infectious disease rates and questionable water quality. Secondly, severe or moderate anemia among those under three indicates poor overall nutritional quality, which if not checked can generate long term developmental delays and compromised intellectual capacity. (WHO 1986, Jameson 1977)

Low weight for age is the second focus of the analysis. Children with a reported weight more than two standard deviations below UN/WHO recommendations for their age, are considered at significant risk for developmental delays, compromised intellectual capacity, increased susceptibility to infection, and generally increased morbidity and mortality. (WHO 1986, DeOnis et. al. 2000, Matrorell 1992). While this measure does not enable to precise differentiation between stunting (height for age) and wasting (weight for height), longitudinal studies indicate that children experiencing very low weight for age before their fifth birthday face permanent health risks, regardless of nutrition and weight later in life. While the number of underweight children has received less press attention, it represents a significant short term and long term health risk. In the Kyrgyz Republic, 11% of children under 3 were more than 2 standard deviations below recommended weight for their age, as were just under 10% of children measured in Kazakstan. In Uzbekistan, 19% of the children measured were significantly under weight for age.

[2] Personal communication with Almaz Sharmanov, who cited other countries with similar levels of development, such as Egypt, with similar rates of occurrence.

Identifying the correlates of severe and moderate anemia and low weight for age can assist in the identification of children with clear health risks, in turn enabling the efficient utilization of limited health care resources. Secondly, the correlates of compromised child health can extend our understanding of who pays the social costs of the transition through a better understanding of what family characteristics increase or decrease the probability of compromised child health. Three domains of correlates are tested, ethnicity and residence, household and parental characteristics, and maternal health. I use bivariate logistic regression models to assess the risk of negative health outcomes associated with each individual predictor.

Ethnicity and Residence

Central Asia witnessed substantial immigration of Russian, Germans, and Ukrainians during the Soviet period. These immigrants were often concentrated in cities, possessed greater economic influence, and were more educated that the titular ethnic groups. While substantial out migration of ethnic Slavs and Germans has taken place in the past 11 years, the popular perception of the titular ethnic group as embattled and disadvantaged persists (see Beissinger 2002, Tishkov 1995). Regional ethnic groups (including the members of the three titular ethnicities residing in a neighboring country, along with Tajiks, Karakalpaki, and Turkmen) may share this disadvantage, illustrating a general "local disadvantage" against a reference category comprised primarily of Russians, Ukrainians, and Germans. While independence in the region has brought political power back to hands of titular ethnic groups, at the individual and household level I expect to find regional ethnic groups at higher risk of poor child health in comparison to their Slavic neighbors.

Difficulties with health care delivery, and the persistent concentration of economic opportunity indicate a potential protective effect of capital city residence. On the other end of the scale, each one of the countries in the investigation has one region which lags significantly behind the rest of the country in socio-economic development, and may represent a health risk in comparison to the country outside the capital. The Ferghana valley in Uzbekistan and the Kyrgyz Republic and the southwestern sections of Kazakstan are identified as disadvantaged regions. The importance of ethnicity and region constitute the first predictive domain and are presented in the first model.

Household and Maternal Health

In the full model, household characteristics and indicators of maternal health are added to in order to evaluate the stability of the regional and ethnic effects as well as access the importance of household characteristics for child health. Home sanitation, measured by the existence of both piped water and a flush toilet in the home, is anticipated to have a health protective effect both as an indication of hygiene and a measure of household wealth. The presence of two or more children under the age of five in the household (regardless of sibling standing) is thought to increase the chance of compromised health, as is high parity (measured here as parity 3 or higher). Larger numbers of children increase demands on caretakers and on nutritional resources, and may increase health risks. Lastly, parental education is thought to have a health protective effect, as those with high education may be more informed on health issues and parenting.

Mother's health status is also added as indicators of compromised child health. If a mother is underweight (BMI under 20), or if a mother is moderately or severely anemic, it should

increase the probability of a negative child health outcome. Lastly, children of a mother who has experienced child loss may be at elevated risk for negative health outcomes compared to those with mothers who have never lost a child. While the final variable is rather imprecise, it should pick up on unobserved household risk factors.

Findings

Table One presents estimated log odds for ethnicity and residence indicators as predictors of risk of moderate or severe anemia. In the absence of control variables, ethnicity and region appear significant in most, but not all cases. Ethnicity significantly elevates the risk of anemia in Uzbekistan and Kazakstan. Ethnic Kazak children in Kazakstan are more than three times as likely to be anemic in comparison to the primarily Slavic reference category, although the significance level is low (.10). Similarly, ethnic Uzbek children in Uzbekistan are more than twice as likely to be anemic than the primarily Slavic reference category. Interestingly, non titular regional ethnicities (in this case primarily Tajik) in Uzbekistan are more than four times as likely to be anemic, but are not at a significant health risk in either of the other two countries examined here. A Slavic health advantage emerges strongly in Uzbekistan and in Kazakhstan, and is absent in the Kyrgyz Republic. Capital city residence has significant health protective effects in the Kyrgyz Republic, with children residing in Bishkek 67% less likely than children residing anywhere but the Ferghana valley, to be anemic, albeit at a low level of significance (.10). Oddly enough, in the Kyrgyz Republic residing in the region of disadvantage (the region near Osh), *reduces* the risk of anemia by nearly 25%, but at a low level of significance. Children in Tashkent, are 74% less likely to be anemic than those resident elsewhere in Uzbekistan (with the exception of the Ferghana Valley). In the absence of other control variables, ethnicity and

region do influence the anemic likelihood across the countries analyzed, although the patterns and size of effect vary by country. Only in Uzbekistan do the anticipated risks for regional ethnic groups and disadvantaged regions generate the anticipated results. In this basic model, there is little support for targeting disadvantaged regions within the countries investigated.

Table Two presents the full model odds ratio estimates on moderate or severe anemia for each country. Once household characteristics and maternal health are controlled for, the risk associated with titular ethnic group remains important only in Kazakstan, where ethnic Kazaks remain almost three times as likely as the primarily Slavic reference group to be anemic, an effect sizable larger than the only other significant factor, mother's anemia (which increases the risk by 75%). The pattern in Uzbekistan is markedly different. As in the first model, regional ethnic groups are at a sizable elevated risk of anemia, while central city residents enjoy a 75% reduction in the likelihood of anemia, an effect shared with the Kyrgyz pattern. More than two children under the age of 5 in a household increases the odds of severe or moderate anemia by 50%, but oddly high parity has a health protective effect, reducing the change of anemia by 30%. This might indicate that younger children benefit from the presence of older siblings who can assist with their care. While Mothers education has not marked effect, father education serves as a strong and sizable health protector in Uzbekistan. Children whose father has higher education are half as likely to have anemia, in comparison to other children in Uzbekistan, while parental education fails to exert a significant effect on anemia probability in either Kazakhstan or the Kyrgyz Republic.

Maternal health, not surprisingly, emerges as a consistent and strong predictor of children's health status, in terms of anemia, across the region. Underweight mothers in the

Kyrgyz Republic and in Uzbekistan are more likely to have anemic children, while children with anemic mothers, controlling for other factors, are significantly more likely to be anemic themselves. The results in Tables One and Two provide some preliminary support for the expectations discussed above, but also highlight the differences in variable significance and size across the three countries examined here. The common links between the region are significant, but in determinants of anemia risk, significant factors appear country specific. The importance of ethnicity and region do persist in the some cases, but are missing or partitioned out by the addition of context specific variables. Indeed efforts to focus on anemic mothers appear to be the best consist policy across the region for combating childhood anemia.

Table Three examines the importance of ethnicity and residence in determining the risk of low weight for age. At low levels of significance (.10), titular ethnic groups in the Kyrgyz Republic and Kazakstan face an elevated risk of low weight for age, the former a sizeable risk (with ethnic Kyrgyz over 3 times as likely to have low weight for age in the Kyrgyz Republic). Children in the lowest ranked region on socio-economic indicators in Kazakstan and Kyrgyz Republic face elevated odds of low weight for age, while central city residents in Tashkent, enjoy significantly decreased odds of this health risk. The effects of ethnicity disappear however in the full model.

Table Four presents estimated odds ratios for correlates of low weight for age for each country. Residence in Tashkent remains a significant health protector, even at low significance (.10), while living in the Ferghana Valley in the Krygyz Republic nearly doubles the risk of low weight for age. As in the model for anemia, number of children under 5 in the household and parity are important only in for Uzbekistan, with high parity increasing the odds of low weight

for age. Once again, mother's health status appears the most important, with maternal low weight more than doubling the risk of being low weight for age for children in Kyrgyz Republic and Kazakstan. The previous loss of a child is also a significant risk for low weight for age in both Kazakstan and Uzbekistan.

The full models examining low weight for age echo and intensify the inter country differences found in the examinations of anemia. No one predictive factor appears significant across the three countries of the study, although maternal health indicators are important for both Kazakhstan and Kyrgyz Republic. Household characteristics, such as father education, are only important predictors for Uzbekistan, while housing quality indicators fails to exhibit a significant effect in any of the countries.

Conclusions

These preliminary analyses generate a number of interesting findings concerning model specification, the comparability of the three cases examined, the importance of maternal health, and the need for additional research. The poor performance of the housing variable as a risk factor for either anemia or low weight for age is odd given the importance of water supply and toilets for child health indicators in other developing country settings. Additional investigations, examining the water sources and regional context might shed light on this issue. The importance of economic status, a prime risk factor for compromised child health generally, is difficult to assess in these models. The use of parental education proxies delivers mixed results. As with housing and water quality, further investigations into economic status and household assets is justified.

The importance of ethnicity, while significant in simple models, is dramatically lessened when socio demographic variable are controlled. While the small sample size hindered detailed analyses of smaller regional ethnicity in this investigation, findings justify further work examining the risks associated with titular nationalities in their own country and in other countries of the region. Does the strong risk associated with Kazak ethnicity towards anemia only work in Kazakstan, or are Kazaks in the Kyrgyz Republic also disadvantaged? Similarly, if Kyrgyz face no significant health risk within the Kyrgyz Republic, what is their comparative health status in other regions, such as Kazakhstan? Shifting to the larger sample of individual respondents in the primary DHS data set, might enable this type of analysis for adult health risks. The incorporation of language use in future analyses is critical to assess the origins of the observed effect of ethnicity.

As mentioned above, the similarities of these three cases are important, however the patterns generated by the full models for both anemia and low weight for age indicate that one "size does not fit all". The differences in ethnic composition are significant and perhaps are exacerbated by differences in health risk prevalence and level of economic development (Kazakstan's per capital GNP is several times larger than that of Uzbekistan). While analyses across the region are useful, particularly in assessing ethnic patterns, individual country models may unpack the risk factors associated with compromised child health most efficiently.

In these analyses, maternal health emerges as a key variable in determining the relative risk of compromised child health across the region in terms of anemia, and for low weight for age in Kazakhstan and the Kyrgyz Republic. Mothers who are under weight or have anemia are likely to have children with similar afflictions, even when ethnicity, residence, parental

education and family size are controlled. Targeting women of reproductive age for nutritional treatment and health education may have added benefits in improving child health and welfare, especially if such programs take place outside of central cities and target the least developed regions in countries such as the Kyrgyz Republic.

The compromised child health status uncovered in the DHS data point to a serious short and long term health problem in these three countries. While some residents of countries in transition may take the option of "waiting out" periods of intense economic difficulty, addressing problems with children's health cannot wait without running the risk of serious and costly long term problems associated with compromised cognitive ability and long term physical development. Additional information on the prevalence and correlates of compromised child health, focusing on basic health care access, immunizations, anemia, nutrition and growth is needed to target children most at risk. As the region moves ahead health care reforms, increased analyses of existing information concerning child health and nutrition can assist in the development of effective risk alleviation strategies.

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Table One. Model One, Estimated Odds Ratios for Correlates of Severe or Moderate Child Anemia, based on Central Asian DHS Data

Risk Factors	Kazakstan (1995)		Uzbekistan (1996)		Kyrgyz Republic (1997)	
Titular Ethnic Group	**3.322**	*	**2.159**	*	1.127	
Regional Ethnic Group	1.309		**4.155**	**	1.010	
Capital City Residence (a)	0.467		**0.241**	**	**0.377**	*
Most Disadvantaged Region	0.783		1.112		**0.748**	*
Constant	**0.343**	****	**0.154**	**	**0.379**	
N (weighted)	714		1096		1021	
Est. R-square	0.095		0.091		0.016	

* .10
** .05
*** .01
**** .001

(a) Almaty is used in the Kazak model, although Astana is now the legal capital

Table Two. Full Model Estimated Odds Ratios for Correlates of Severe or Moderate Child Anemia, based on Central Asian DHS Data

	Kazakstan (1995)		Uzbekistan (1996)		Kyrgyz Republic (1997)	
Risk Factors						
Titular Ethnic Group	**2.852**	****	2.037		1.131	
Regional Ethnic Group	0.978		**3.613**	*	0.948	
Capital City Residence (a)	0.586		**0.258**	**	**0.360**	***
Most Disadvantaged Region	0.813		0.975		0.744	
Home Sanitation	0.805		1.117		1.019	
Two or More Children Under Five in Household	0.920		**1.517**	**	1.242	
Parity 3+	0.839		**0.701**	**	0.831	
Mother's Education	0.804		1.060		0.751	
Father's Education	0.873		**0.521**	***	1.172	
Mother's BMI<20	1.251		**1.488**	***	**1.642**	**
Mother Anemic	**1.748**	**	**2.014**	****	**2.840**	****
Previous Child Loss	1.617		**1.717**	**	0.685	
Constant	**0.375**	****	**0.154**	**	**0.320**	****
N (weighted)	703		1096		1026	
Est. R-square	0.121		0.091		0.071	

* .10
** .05
*** .01
**** .001

(a) Almaty is used in the Kazak model, although Astana is now the legal capital

Table Three. Model One, Estimated Odds Ratios for Correlates of Extreme Low Weight for Age based on Central Asian DHS Data

	Kazakstan (1995)		Uzbekistan (1996)		Kyrgyz Republic (1997)	
Risk Factors						
Titular Ethnic Group	**1.785**	*	1.894		**3.246**	*
Regional Ethnic Group	1.024		1.692		2.799	
Capital City Residence (a)	1.126		**0.202**	**	0.684	
Most Disadvantaged Region	**1.660**	**	1.136		**1.969**	**
Constant	**0.048**	****	**0.127**	***	**0.027**	****
N (weighted)	717		992		1031	
Est. R-square	0.029		0.021		0.040	

* .10
** .05
*** .01
**** .001

(a) Almaty is used in the Kazak model, although Astana is now the legal capital

Table Four. Full Model Estimated Odds Ratios for Correlates of Extreme Low Weight for Age based on Central Asian DHS Data

	Kazakstan (1995)		Uzbekistan (1996)		Kyrgyz Republic (1997)	
Risk Factors						
Titular Ethnic Group	1.621		1.329		2.489	
Regional Ethnic Group	0.956		1.226		2.154	
Capital City Residence (a)	1.434		**0.137**	*	0.837	
Most Disadvantaged Region	1.329		1.269		**1.910**	**
Home Sanitation	0.590		0.610		0.608	
Two or More Children Under Five in Household	1.154		**1.447**	*	1.358	
Parity 3+	1.466		**1.460**	**	1.099	
Mother's Education	0.451		**0.239**	***	1.132	
Father's Education	1.121		1.000		0.682	
Mother's BMI<20	**2.089**	**	1.050		**2.326**	****
Mother Anemic	**1.098**	**	1.195		1.503	
Previous Child Loss	**2.385**	*	**1.538**	*	1.128	
Constant	**0.047**	****	**0.137**	**	**0.022**	****
N (weighted)	704		973		1016	
Est. R-square	0.048		0.070		0.082	

* .10
** .05
*** .01
**** .001

(a) Almaty is used in the Kazak model, although Astana is now the legal capital

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