The Impact of Access to Health Services on Infant and Child Mortality in Rural Uganda

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ABSTRACT

This paper examines the impact of access to health facilities on infant and child mortality in Uganda. Using the proportional hazard model, the paper shows that access to health centers affects childhood mortality of rural children; however, the effect is only substantial for children born to non-educated mothers. This study was partly funded by the Rockefeller Foundation through the Macro International Small Grants Program.

INTRODUCTION

Since the Second World War, infant mortality has declined at an unprecedented rate in many developing countries. The factors underlying this decline, however, have been heatedly debated among researchers. Numerous studies have presented persuasive evidence about the impact of biomedical and socioeconomic factors, such as education, on this decline. But, surprisingly, less compelling evidence is available with respect to the impact of health services. The purpose of this study, therefore, is to examine the impact of access to health facilities on infant and child mortality in rural Uganda. Uganda provides an interesting case: owing to the predominance of small holdings in the land-tenure system and the consequent scattered settlement pattern, access to health facilities varies substantially among rural residents. Households are located at diverse distances from health facilities. Further, compared to the region as a whole, Uganda has very high infant mortality levels (about 120 deaths per 1,000 live births, according to the preliminary Uganda Population and Housing Census, 1991). This makes research in the area a priority.

Previous research on the impact of access

Although availability of health services is expected to improve health status and lower children's mortality levels, as a result of standard biological treatment of diseases and injuries and immunization and vaccination of both pregnant mothers and their children (Bimal 1991), available evidence in this regard is mixed and inconclusive. Vernon (1993) and various other medical geography studies offer evidence that access to services increases utilization and, presumably, improves health status. But Malison et al. (1987) and Chaulagai (1993) report no strong relationship between access and utilization of services. Similar ambiguity arises with respect to evidence about the relationship between access to services and infant mortality. Oruboloye and Caldwell (1975), Al-Kabir (1984), and Hossain (1989) all report evidence of a significant association between access to health services and child survival, but evidence from Katende (1992), Rosenzweig and Schultz (1982), and Meer et al. (1991) suggests that skepticism about this association is warranted.

One particularly interesting finding relates to the way access to services interacts with maternal education to influence child survival. Caldwell (1979) finds this interaction to be significant and of a complementary nature. In contrast, Rosenzweig and Schultz (1986) find this interaction to be strong but of a substitution nature. After a comprehensive review of the available evidence, Cleland and van Ginneken (1988) suggested that the nature of this interaction is context-sensitive; its nature depends mainly on the level of development of the health infrastructure.

In general, the available evidence about the impact of access to services on infant and child mortality and about the nature of the interaction between access to services and maternal education is mixed, making further research imperative. In response to this research demand, the current study tests the following major hypotheses:

1. Access to health facilities affects infant and child mortality differentials in rural Uganda. Children residing near health

facilities experience less mortality than those far from the facilities.

2. The effect of access to health facilities on child survival is expected to depend on maternal education levels; it is likely to have less effect on the mortality of children born to educated parents than on the mortality of children born to non-educated mothers.

Using a framework adapted from Mosley and Chen (1984), this study examines the effects of access to health facilities on infant and child mortality by identifying the following five mortality-proximate determinants:

- maternal risk factors (age, parity spacing)
- environmental contamination
- nutritional status
- injury
- personal illness control

Access to health facilities affects personal illness control by influencing both choice and timing of the use of curative or preventive services, as opposed to resorting to alternatives such as traditional therapy, self-treatment, or taking no action at all. Mbulu (1978) suggested that in Africa, access to health services affects child survival mainly through the non-use of preventive services, implying that utilization of curative services is minimally affected by the level of access. To test Mbulu's suggestion, the separation of health services into preventive and curative services will be given attention in this study's framework. Further, it is acknowledged that factors such as education, socioeconomic status, maternal age, child age, ethnicity, regional development differentials, and AIDS prevalence can confound the association between access to health services and infant and child mortality. These factors, therefore, are included in the analysis using statistical controls.

DATA AND METHODOLOGY

The 1988 Uganda individual-level DHS and the community (cluster) level data on service availability were combined to create a data set of children for use in this study. However, the study was limited to rural areas since proximity to health facilities is not a major issue in most urban areas in Uganda. To obtain adequate sample size for analysis of such a rare event as mortality, the reference period was extended to five years before the survey, resulting into a sample size of 3,470 children.

The hazard model used in this analysis is presented in the equation below. It conveniently handles censoring and accounts for duration of exposure to the mortality risk.

where: $h_i(t;z)$=the hazard of death at age t for child i with covariates z

$h_o(t)$=baseline time function

Z'_i=a vector of the explanatory variables for child i

B=vector of the coefficients of the explanatory variables

This equation expresses the mortality hazard rate as a function of time and independent variables. Using partial likelihood, the model's coefficients can be estimated without specifying the shape of the time baseline function (Cox 1972). This estimation method, however, presumes that the effect of the explanatory variables does not vary over time, an assumption that is necessarily adopted in this analysis. The estimated coefficients have to be exponentiated in order to be interpreted as percent changes in the mortality risk due to changes in an explanatory variable. The explanatory variables were operationalized as follows:

1. Access variables were measured by continuous natural log scale variables that indicated the distance from a cluster to a hospital, health center, or private clinic.
2. Utilization of health facilities was operationalized by information on whether (a.) a mother received a tetanus shot, or (b.) prenatal care and delivery assistance were provided by trained personnel; or else by a continuous variable indicating the percent cluster child immunization (BCG, DPT and POLIO1) coverage.

3. Maternal education was operationalized by a variable indicating whether the child's mother had some education or none.
4. The type of roof of the household's residence was used to indicate socioeconomic status: papyrus or thatch roofs were considered to reflect low socioeconomic status, while tiles, concrete, asbestos, corrugated, or iron sheets were considered to reflect high socioeconomic status. Low socioeconomic status was specified as the reference category.
5. Type of access road was used to reflect local transport infrastructure and mode of transportation. Tarmac or graded murram, the designated reference category, reflect good infrastructure and access to motorized transportation; other types of access roads reflect poor infrastructure.
6. Administrative regions: Central, the reference category; East; West; South West; and West Nile. These were used as dummy variables to reflect ethnicity and other regional differences.
7. A district level index indicating HIV seroprevalence level was included in the analysis as a continuous variable. The indices were estimated using a model in which proximity to areas of high AIDS prevalence (Kampala, Masaka, Rakai) predicted the district seroprevalence rates. The estimation was based on data from the Ministry of Health AIDS Surveillance Report of December 1991, which reported on seroprevalence among various hospitals' prenatal clinics attendants.

This study faced the following limitations:

1. The source of water was excluded due to lack of proper information.
2. Geographical distance to a cluster is not a perfect proxy for access.
3. The study is limited because of the cross-sectional nature of the data.
4. The methodology used is vulnerable to various biases due to internal migration, to the assumption that health facilities are randomly located, and to the assumption that siblings' mortality is independent.

The criterion for locating government health facilities in Uganda is geographical administrative units; hence this location is not expected to be associated with area mortality differentials. A partial correlation test of siblings' survival status was done and showed that there was no evidence of strong correlations among siblings' mortality. Moreover, as argued by Guang (1993), in high infant mortality populations it is unlikely that unobserved familial effects (mostly genetic) constitute a strong influence on mortality levels. Finally, it was assumed that within rural areas, internal migration occurred randomly among populations and was therefore not significantly associated with distance to health facilities.

Sample Characteristics

As expected, more children had access to health centers than to either hospitals or private clinics (see Figure 1). The average distances to a health center, a hospital, and a private clinic were 11, 19 and 15 kilometers respectively. Of major concern is the 20% of the population that reported being more than 10 kilometers away from any facility. It is also notable that 50% of the population were at least 15 kilometers away from the nearest hospital; this population bears substantial difficulties when faced with a medical case that cannot be handled by health centers.

Out of the 3,743 children born in the five years preceding the survey, 469 had died. Many of the deaths, 33%, occurred in the first month. Children residing far from health facilities have higher death probabilities than those residing near the facilities (as shown in Figures 2 through 5). The difference in death probabilities increases with age; it is higher during childhood years than during infancy. The sample distribution of other selected variables and the correlation amongst them are shown in appendices I and II respectively.

Multivariate Analysis and Results

Multivariate analysis was used to examine the net effect of access to health facilities on child survival, after controlling for the other mortality correlates. The analysis was done separately for neonatal, post-neonatal, and childhood mortality. Access to health services had no significant effect

on neonatal or post-neonatal mortality, hence these results are not presented. Only childhood mortality results are reported below.

Model 1 in Table 1 shows that access to health centers significantly affects childhood mortality. For every percentage increase in distance to a health center, the risk of childhood mortality increases by 19%. The effects of access to hospitals and to private clinics on childhood mortality are not significant. It is notable that the effect of access to private clinics is opposite from the expected direction, indicating that proximity to a clinic was associated with higher childhood mortality. Maternal age, as shown by Model 2, was not significantly associated with childhood mortality in rural Uganda, nor did controlling for it erode the significance of the access to health centers. But controlling for the utilization variables (Model 3) attenuated and turned the effect of access to health centers insignificant. The effect of access to hospitals remained non-significant but reversed the direction. The effect of access to private clinics also remained negative and non-significant. The results from Model 3 do not support the notion that utilization variables constitute a major mechanism through which access to hospitals or to health centers affects childhood mortality. It is surprising that none of the utilization variables was significant. Nor did the combined effect of these variables contribute significant explanatory power to the model.

Socioeconomic factors and year of birth, introduced in Model 4 (Table 2), substantially increase the models' explanatory power. But individually, only type of area access road and year of births are shown to have a significant effect on childhood mortality. However, controlling for these factors did not have any notable effect on access to health centers or to private clinic. The sign for access to hospital coefficient did change from positive to negative, most likely because socioeconomic factors such as good roads are highly correlated to access to hospitals.

Model 5 in Table 2 presents the results of the model with the interaction terms between education and access to health facilities. This interaction is also shown in Figure 6. The interaction is negative and significant, showing that the effect on access to health centers depends on the level of maternal education. Because non-educated mothers were equally as likely to be far from a health center as educated mothers, these results cannot be attributed to a distribution of educated mothers skewed by distance to health center. The figure shows that the impact of access to a health center on the childhood mortality experienced by educated mothers is very small, as indicated by the almost horizontal line. In contrast, the impact on childhood mortality of children born to non-educated mothers, shown by the line sloping downward from left to right, is striking; it shows that proximity to health centers substantially affects these children's survival.

Table 1

Table 2: Proportional hazard model estimaed coefficients for childhood mortality in rural Uganda. Model 4 and 5 (DHS survey 1988)

Variable (reference category	Model 4			Model 5		
	Coeff.	(SE)	RR	Coeff.	(SE)	RR
Accessibility variables	-0.078	(.120)	0.93	-0.089	(.176)	0.91
Distance (ln) to hospital	0.176	(.101)	1.19	0.415	(.145)	1.52
Distance (ln) to health center	-0.087	(.074)	0.92	-0.122	(.114)	0.89
Distance (ln) to private clinic						
Maternal risk factors	-0.179	(.098)	0.84	-0.176	(.098)	0.84
Age	0.003	(.002)	1.00	0.003	(.002)	1.00
Age squared						
Utilization variables	-0.003	(.005)	0.99	-0.003	(.006)	0.99
Average cluster immunization	-0.201	(.198)	0.82	-0.172	(.198)	0.84
Received tetanus shot	-0.328	(.247)	0.72	-0.328	(.246)	0.72
Received prenatal care	0.061	(.218)	1.06	-0.090	(.218)	1.09
Delivery by trained personnel						
Socio-economic variables	-0.024	(.189)		0.689	(.657)	1.99
Some maternal education (none)	-0.047	(.199)		0.025	(.199)	1.03
Socio-economic status	0.619*	(.252)		0.605*	(.256)	1.83
Access road (Tarmac/graded)	0.132	(.398)		0.102	(.399)	1.11
War region	0.109	(.332)		-0.024	(.341)	0.98
East region (Central)	-0.293	(.574)		-0.515	(.589)	0.60
West "	-0.589	(.319)		-0.651*	(.321)	0.52
South West "	-0.978	(.671)		-1.122	(.676)	0.33
	-0.029	(.037)			(.037)	0.96

West Nile " District HIV prevalence				-0.039		
Trend by year of birth	-0.789*	(.386)	0.45	-0.825*	(.388)	0.44
1985 (1984/83)	-1.170*	(.401)	0.31	-.191**	(.402)	0.30
1986	-0.974*	(.403)	0.38	-1.009*	(.404)	0.36
1987	-1.863**	(.517)	0.16	-.908**	(.519)	0.15
1988						
Interactions of education with:				0.037	(.221)	1.04
Distance (ln) to hospital				-0.445*	(.191)	0.64
Distance (ln) to health center				0.050	(.147)	1.06
Distance (ln) to private clinic						
-2Log likelihood	1931.45			1925.68		
Degrees of freedom	22			25		
P - value	.005			.003		
Number of cases	2321			2321		

* significant at .05 level. ** significant at .01 level.

DISCUSSION

This study has found evidence that access to health centers affects childhood mortality levels in rural Uganda. The effect is most evident with respect to children born to non-educated mothers. Access to hospitals or to private clinics was not significantly related to child survival. Furthermore, access to health centers did not have a significant relationship with neonatal or post-neonatal mortality.

It is not surprising that the effect is found only with respect to childhood mortality and access to health centers. Health centers are the principal source of health services in rural areas, and health services are expected to influence mainly childhood mortality levels. Hospitals, which serve principally as referral units for complicated medical cases, only slightly improve child survival because the complicated medical procedures are not the major factor causing high childhood mortality levels. The finding that access to private clinics is associated with lower child survival is surprising and disturbing. One possible explanation for this finding is that these clinics, to avoid competition from the free government service, locate in areas that already have high mortality due to poor service. Moreover, the presence of these clinics would not alleviate the area's mortality problem because the clinics'

services may be too expensive for the majority of population.

The effect of health centers, similar to what others have suggested (Da Vanzo 1984), is largest during childhood years because of differences in age-specific mortality causes. Causes such as infectious diseases that can be controlled by access to services are more pronounced during childhood years, hence access factors are more important during this age.

According to this study, the interaction between access to health facilities and maternal education is of a substitution nature. Near a health center, access to health facilities compensates for the lack of maternal education, closing the infant and child mortality differential due to maternal education. But far from a health center, maternal education compensates for lack of access to services, widening the infant mortality differential due to maternal education. This finding is similar to that of Rosenzweig and Schultz (1982).

Evidence from this paper shows that preventive service utilization is not the major mechanism through which access to health facilities affects infant and child mortality in rural Uganda. This suggests that the main mechanism may be through non-utilization of curative services. Although the result may have been affected by the poor measurement of preventive services such as immunization, this evidence is consistent with the fact that a non-immunizable disease, malaria, is the leading cause of infant and child mortality in Uganda (Ministry of Health 1992). Curative services are the major solution to malaria and to other non-immunizable diseases that may be rampant in Uganda.

CONCLUSION AND RECOMMENDATIONS

With regard to the finding that the effect of access to health service is much more evident than that of access to hospitals, it is concluded and recommended that efforts to reduce childhood mortality should emphasize access to health centers rather than to hospitals; the latter requires much more resources but yields relatively fewer health returns. It is also recommended that the observed relationship between access to private clinics and higher childhood mortality draw monitoring attention to ensure that this association is not at all causal through poor practices or other service deficiencies. Further, private clinic should be involved in national child survival programs.

It has been shown that the effect of access to health centers is more pronounced for mothers with less education. Since the proportion of mothers with no education is substantial and efforts to expand health services are subject to resource constraints, an approach that balances strategies between increased female-education participation and increased health-service access is recommended.

In addition to the strong preventive health care campaign already in place, another campaign to increase availability and utilization of curative services should be initiated in rural Uganda. The results here suggested that curative services may be a major mechanism through which inaccess to services was influencing childhood mortality.

Uganda's new policy of government health service user fees, meant to improve health-service financing and lead to better services, should be put into perspective with other objectives such as improvement of the childhood mortality situation. The latter calls for increasing access to health services in rural areas. Efforts should be made to ensure that this new policy does not result in decreased access to health services that could lead to higher childhood mortality levels.

Finally, many people -- including health policy makers in Uganda -- may hold the view that the country's infant and child mortality poor performance is wholly attributable to the AIDS epidemic. This study shows that access to health facilities is significantly associated with childhood mortality. Although the contribution of AIDS may not have been controlled for adequately, there is no reason to suspect that the AIDS component was a confounding factor in the association observed, inasmuch as this disease has nothing to do with access to health centers. It is therefore suggested that as we blame the AIDS epidemic for many of the mortality problems in Uganda, we should not forget that some of this mortality may be due to factors such as access to health facilities.

The latter can be addressed to improve the situation.

Appendix i: Selected sample characteristics

Rural Uganda, 1988 DHS

Table i

Variable	Mean	Std dev.	No.
Distance to health centers	11.1	11.9	3449
Distance to hospitals	19.1	13.6	3473
Distance to private clinic	14.8	12.3	3314
Cluster percent of children immunized	42.1	20.5	125 (Clusters)
District seroprevalence (prenatal clinic clients)	12.1	3.6	17 (Districts)

Table ii

Variable	Percent of children (N=3743)	Variable (cntd)	
Health Utilization		**Child age**	
Mother received tetanus	52%	0-11 months	29%
Mother received prenatal care	84%		21%
Delivery assistance by trained personnel	29%		18%
Socio-economic characteristics			
Mother had some education	53%	36-47 months	17%
High socioeconomic status household	37%	48-59 months	15%
Community characteristics			

Locality with good access road	24%		
Central region	5%		
East region	21%		
West region	24%		
South West region	6%		
Nest Nile region	45%		
	4%		

Appendix ii

Figures 1 2 3

Figures 4 5 6

REFERENCES

- Al-Kabir, A. (1984) "Effects of community factors on infant and child mortality in rural Bangladesh." World Fertility Survey Scientific Papers. Voorburg, Netherlands: International Statistical Institute.
- Bimal, K. P. (1991) "Health service resource as a determinant of infant death in rural Bangladesh: An empirical review," *Social Science Medicine* Volume 32, No. 1, pp 43-49.
- Caldwell, J. (1979) "Education as a factor in mortality decline: An examination of Nigerian data, " *Population Studies* Volume 33, No. 3, pp 396-413.
- Chaulagai, C. N. (1993) "Urban community health volunteers," *World Health Forum*, Volume 14, No. 1, pp 16-19.
- Cleland, J. and K. van Ginneken (1988) "Maternal education and child survival in developing countries: The search for pathways of influence." *Social Science and Medicine*, Volume 27, No.12 pp 7357-7368.
- Cox, D. (1972) "Regression models and life tables." *Journal of the Royal, Statistical Society*. Series B 34:187-202.
- Da Vanzo, J. (1984) "A household survey of child mortality determinants in Malaysia." *Population and Development Review*. Suppl. Volume 10, pp 307-323.
- Guang, G. (1993) "Use of Sibling Data to estimate Family Mortality Effects in Guatemala," *Demography*, Vol.30. No.1 pp 15-32.
- Hossain, S. (1989) "Effect of public programs on family size and child education and health." *Journal of Development Economics*, Volume 30, No. 1 pp 145-158.
- Katende, C. (1992) The effect of accessibility to clinics on infant and child mortality: The cases of Liberia and Zimbabwe. Commissioned paper for the working group on the Effects of Child survival and General Health Programs on Mortality, Panel on the Population Dynamics of Sub-Saharan Africa, Committee on Population, National Research Council, Washington, D. C.
- Malison, M. D.; P. L. Sekitto et al. (1987) "Estimating health service utilization, immunization coverage and childhood mortality: A new approach in Uganda,"*Bulletin of World Health Organization*, Volume 65, No. 3, pp 325-330.
- Mbulu, F.; M. Smith; and T. Sharpe. (1978) "The determinants of Health service utilization in a rural community in Kenya. "*Social Science and Medicine*. Volume 12 pp 211-217.

- Meer K.; R. Bergman and J. Kusner. (1993) "Socio-cultural determinants of child mortality in Southern Peru: Including some methodological problems,"*Social Science Medicine*, Volume 36, No. 3, pp 317-331.
- Ministry of Health, Entebbe, Uganda (1992) *Health Information Quartely*, Vol 9, No.1 and 2, June 92.
- Mosley, H. and L. Chen (1984) "An analytical framework for the study of child survival in developing countries." *Population and Development Review*. Suppl. Volume 10 pp 25-45.
- Oruboloye, E. and J. Caldwell, (1975) "The impact of public health service on mortality. A study of mortality differentials in a rural area of Nigeria." *Population Studies*. Volume 129 No. 2. pp
- Roseinzweig, M. and T. Schultz. (1982) "Child mortality and fertility in Colombia: individual and community effects." *Health Policy and Education*, Volume 2 pp 305-348.
- van de Walle, E. and C. Mbacke (1992) "Socioeconomic factors and use of Health services as determinants of child mortality," *Mortality and Society in Sub-Saharan Africa*. (Eds.) Etienne van de Walle et al. Clarendon Press. Oxford.
- Vernon, A.; W. Taylor; A. Biey; K. Mundeke; A. Chahnazarian; H. Habicht; M. Mutombo and B. Makani (1993) "Changes in use of health services in a rural health zone in Zaire," *International Journal of Epidemiology*, Vol 22, Suppl. 1, pp 2S31.-

Appendix ii: Table of correlations among explanatory variables

	Acc	HC	Hosp	PC	Imm	Tet	Pren	DA	Road	War	Educ	SES	Centr	East	West	WN	SW	HIV	Age
Acces	1	.58	.42	.43	-.25	-.04	-.07	-.08	.05	.26	-.02	-.09	.22	-.10	-.10	-.00	-.09	.13	.00
HC		1	.29	.06	-.12	-.05	-.08	-.01	-.10	.41	.05	.02	.30	-.20	.06	-.00	-.10	.12	-.04
Hosp			1	.27	-.29	-.18	-.06	-12	.14	.16	-.02	-.07	.18	-.15	-.07	-.07	.04	.28	-.01
PC				1	.02	.03	-.01	-.09	-.03	.03	-.10	-.12	.04	-.11	-.02	.08	.03	-.04	-.01
Imm					1	.07	.002	-.07	.07	-.06	-.04	.05	-.23	-.29	.17	.07	.33	-.34	.02
Tet						1	.34	.20	-.14	-.02	.09	.08	-.07	.19	.002	.03	-.01	-.16	-.04
Pren							1	.24	-.09	-.00	.13	.12	.05	.16	-.14	-.11	-.06	.03	-.05
D.A.								1	-.24	-.02	.21	.23	.18	.21	-.04	-.05	-.28	.11	-.10
Road									1	-.08	-.14	-.16	-.15	-.39	-.09	.13	.44	-.05	.09
War										1	.08	.05	.45	-.13	-.06	-.05	-.21	.06	-.02
Educ											1	.19	.17	.02	.02	-.13	-.11	.15	-.19
SES												1	.21	.02	-.01	-.15	-.12	.13	.10
Centr													1	-.28	-.13	-.12	-.47	.48	-.04
East														1	-.14	-.13	-.50	-.07	-.38
West															1	-.06	-.22	-.36	-.03
SWest																1	-.21	-.37	.03
WNile																	1	.01	.06
HIV*																		1	-.03
Age																			1

Source: 1988 Uganda DHS, rural sample.

* Estimated from MOH AIDS surveillance reports data

Access - Accessibility to any health facility
HC - Health center
Hosp - Hospital
PC - Private clinic
Imm - Cluster children immunization coverage
Tet - Tetanus shot during pregnancy
Pren - Prenatal care
DA - Delivery assistance by trained personnel
Road - Type of access road
War - Region experienced war
Educ - Maternal education
SES - Socio-economic status
SWest - South west region
WNile - West Nile region
Centr - Central region

Table 2: Proportional hazard model estimated coefficients for childhood in rural Uganda. Model 1, 2 and 3 (DHS survey, 1988)

Variables (Ref. category)	Model 1			Model 2			Model 3		
	Coeff.	(SE)	RR	Coeff.	(SE)	RR	Coeff.	(SE)	RR
Accessibility variables									
Access to hospital	0.021	(.105)	1.02	0.018	(.104)	1.02	-0.049	(.111)	0.95
Access to health center	0.179*	(.089)	1.19	0.176*	(.088)	1.19	0.152	(.089)	1.16
Access to private clinic	-0.093	.-(.069	0.91	-0.093	(.069)	0.91	-0.082	(.070)	0.92
Maternal risk factors									
Age				-0.147	(.094)	0.86	-0.144	(.096)	0.87
Age squared				0.002	(.002)	1.00	0.002	(.002)	1.00
Health utilization									
Average immunization							-0.007**	(.005)	0.99
Received tetanus							-0.212	(.193)	0.81
Delivery by trained personnel							-0.266	(.237)	0.77
Received prenatal care							0.138	(.237)	1.15
-2 Log likelihood		2374.83		1965.125	1959.469				
Degrees of freedom		3		5	9				
P value		0.05		0.097	0.092				
Number of cases		3290		2321	2321				

* significant at .05 level. ** significant at .01 level.