



NEPAL FURTHER ANALYSIS

Trends in Economic Differentials in Population and Health Outcomes

**Further Analysis of the 2006
Nepal Demographic and Health Survey**

This report presents findings from a further analysis study undertaken as part of the follow up to the 2006 Nepal Demographic and Health Survey (NDHS). Macro International Inc. provided technical assistance for the project. Funding was provided by the U.S. Agency for International Development (USAID) under the terms of Contract No. GPO-C-00-03-00002-00. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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Additional information about the 2006 NDHS may be obtained from Population Division, Ministry of Health and Population, Government of Nepal, Ramshahpath, Kathmandu, Nepal; Telephone: (977-1) 4262987; New ERA, P.O. Box 722, Kathmandu, Nepal; Telephone: (977-1) 4423176/4413603; Fax: (977-1) 4419562; E-mail: info@newera.wlink.com.np. Additional information about the DHS project may be obtained from Macro International Inc., 11785 Beltsville Drive, Calverton, MD 20705 USA; Telephone: 301-572-0200, Fax: 301-572-0999, E-mail: reports@macrointernational.com, Internet: <http://www.measuredhs.com>.

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1 Introduction

1.1 Background and research question

During the course of the past ten years, Nepal has been characterized by an unusual irony: while conflict in the form of a Maoist insurgency has claimed the lives of around 15,000 people and displaced about 100,000 (United Nations 2007), the population as a whole has experienced improvements in key economic, health and population outcomes. For example, the incidence of poverty fell from 42 percent to 31 percent (Central Bureau of Statistics 2006), the proportion of females who achieved a 5th grade education increased from 17 percent in 1996 to 35 percent in 2006 (NDHS), and the average number of births per woman fell from 4.6 in 1996 to 3.1 ten years later.

Poverty and a generalized lack of economic opportunity in rural Nepal are believed to have served as both the spark and the fuel for the Maoist insurgency, which began in 1996 in the Midwest hills (Central Bureau of Statistics 2006). Political instability at the national level also contributed to the conflict: between 1990 and 2006, there were fifteen changes in government leadership (Graybow 2004). Despite this context of uncertainty, the economy grew from US \$3.6 billion to over US\$8 billion in current US dollars between 1990 and 2006 (UN Statistics Division). Additionally, private remittances from migrant workers almost quadrupled between 1995-96 and 2003-04, increasing from \$203 million to \$794 million (Central Bureau of Statistics 2006). At a time of violence and instability, this inflow of cash provided critical support to individual households and had a stabilizing effect on the economy as a whole.

Economic growth and remittances from migrant laborers have mitigated to some degree the adverse effects that are typically associated with political violence and instability, and are likely the drivers of recent improvements in national population, health and development indicators.¹ However, such improvements at the national level may mask increasing economic inequalities in health and population outcomes. This report therefore takes a closer look at the economic distribution of selected demographic and health outcomes during the period 1996-2006 using data from three Nepal Demographic and Health Surveys (1996, 2001, and 2006). Specifically, we use the DHS Wealth Index (Rutstein and Johnson 2004) to assess changes in distributional equity in key outcomes over time. Identifying trends that reflect increasing inequities in the distribution of key population and health outcomes provides an empirical basis for the advocacy of typically pro-poor programmatic and policy interventions.² In addition to providing a descriptive analysis of such trends, we also use multivariate methods to analyze three selected health outcomes (trained care at delivery among new mothers, and vaccination and nutritional status of children), with a particular focus on trends in the role of household economic status as a determinant of improved health outcomes.

1.2 Data: The Nepal Demographic and Health Surveys

Between 1996 and 2006, Nepal conducted three DHS surveys at 5-year intervals—in 1996, 2001 and 2006. Nepal also conducted earlier related surveys through its participation in the Contraceptive Prevalence Surveys and World Fertility Surveys; however, data prior to the 1996 DHS are not considered here. Nepal's nationally-representative DHS surveys are ideal for studying national trends over time in key population and health indicators, as well as for studying the linkages between

¹ Other explanations for recent achievements in health and population indicators may include improved provision of primary health care services, the expansion of communication facilities, and educational expansion in the country, especially increased literacy of women in their twenties when most births occur.

² Pro-poor policy and programmatic interventions focus on ensuring that outcomes are improved among the poorest, rather than focusing only on improvement of national-level indicators. In some instances, less desirable outcomes are more likely to be found among the wealthy, such as the use of bottles for infant feeding or the excessive use of medical technologies like Caesarean section. In this case, the interventions required to improve health practices would not necessarily be pro-poor.

household wealth and those key indicators—and the ways in which those linkages might themselves change over time.

Table 1.1 lists the three surveys included in this report, with the dates of fieldwork and household and individual sample sizes.

	Dates of fieldwork	Implementing organization	Number of households interviewed	Eligibility for women's interview	Number of women interviewed
1996	1/1996-6/1996	New ERA	8,082	Ever-married women 15-49	8,429
2001	1/2001-6/2001	New ERA	8,602	Ever-married women 15-49	8,726
2006	2/2006-8/2006	New ERA	8,707	All women 15-49	10,793

1.3 Assessing wealth and inequality: The DHS wealth index

1.3.1 The methodology

Recent advances in the use of survey-based household assets data allow researchers to reliably evaluate the relative distribution of poverty in populations (Rutstein and Johnson 2004; Filmer and Pritchett 2001). This recently developed wealth index has been tested in a large number of countries in relation to inequities in household income, use of health services, and health outcomes (Gwatkin et al. 2007). It is an indicator of wealth that is consistent with expenditure and income measures (Rutstein 1999). The wealth index is constructed using household asset data (including country-specific assets) and principal components analysis. Asset information was collected through the DHS household questionnaire, and includes household ownership of a number of consumer items ranging from a television to a bicycle or car, as well as dwelling characteristics such as type of drinking water available, sanitation facilities used, roofing and flooring of dwelling units.

Each asset is assigned a weight (factor score) generated through principal components analysis, and the resulting asset scores are standardized in relation to a standard normal distribution with a mean of zero and a standard deviation of one (Gwatkin et al. 2000). Each household is then assigned a score for each asset, and the scores are summed by household; individuals are ranked according to the total score of the household in which they reside. The sample is then divided into population quintiles: each quintile is designated a rank, from one (poorest) to five (wealthiest).

1.3.2 Examining trends in relative wealth

There are several approaches to constructing an asset-based wealth index—using essentially the same methods described above—for the purpose of examining trends in relative wealth:

First approach: The wealth index may be constructed using all the asset questions contained in each of the surveys covered. Because the questions may change from survey to survey, this means constructing the index using somewhat dissimilar assets for each survey included in the trend analysis. For each survey, the population is divided into quintiles as in the standard method described above.

Second approach: The wealth index may be constructed using a common subset of asset questions appearing in each survey, so that the index is comprised of exactly the same assets for each survey included in the trend analysis. As in the first approach, for each survey, the population is divided into quintiles.

Third approach: As in the second approach, the wealth index is constructed using the same subset of asset questions in each survey covered. For the first survey in the series, the population is

divided into quintiles as previously described. However, for the subsequent survey datasets, the population is not divided into quintiles; rather, the quintile cut-off points generated for the first survey in the series are then applied to the wealth scores in the subsequent survey datasets. Thus, the proportion of household population in each of the five groups may change from one survey to the next. For example, in settings where economic expansion was producing an increase in the overall availability of household assets/wealth, the percentage of people in the lower groups would tend to fall and the percentage in the upper groups would tend to rise.

The choice of which method to use to examine trends in wealth distribution depends on the purpose and context of the analysis. The first and second approaches generally produce very similar results. For this analysis, we use the first approach because we are primarily interested in observing whether there has been change over time in the relative equity of selected outcomes, rather than whether the poor have become less poor over time. Additionally, the first approach uses the same quintiles that are included with the DHS recode datasets available publicly, making replication of this analysis straightforward. Thus, each survey year has its own version of the wealth index comprised of survey-specific assets (all assets for which data were collected in each survey³). Appendix Table A shows the list of assets included in the wealth index for each of the three surveys.

1.3.3 Looking at economic inequalities in health outcomes

In this report, we use a low/high ratio (percent of respondents in the first/poorest quintile divided by the percent of respondents in the fifth/wealthiest quintile) to summarize the level of economic inequality in the distribution of a given outcome of interest. If a low/high ratio has the value of 1, this means that the poorest and the wealthiest experience the outcome of interest equally; if the low/high ratio is less than 1, the poorest are less likely than the wealthiest to experience the given outcome, and if the low/high ratio is greater than 1, the poorest are more likely to experience the given outcome. Examples of these relationships will be described in greater detail in the results section of this report.

Using the low/high ratio is most appropriate to summarize data where the relationship between wealth and the outcome of interest is fairly linear, either positively (where the experience of an outcome increases as wealth increases, e.g., contraceptive use) or negatively (where the experience of an outcome decreases as wealth increases, e.g., infant mortality). It may not be a sufficiently nuanced approach when trying to summarize non-linear relationships, such as the relationship of wealth to the ownership of a bicycle: the poor are unlikely to own a bicycle because they can't afford it, the wealthy are unlikely to own a bicycle because they own cars or mopeds, and so it is the middle quintiles that are most likely to own a bicycle, producing an inverted U-shaped relationship between wealth and bicycle ownership. There are, however, few outcome variables of interest in this analysis that have a non-linear relationship to wealth.

1.4 Methods of analysis and organization of this report

The majority of the analysis (Sections 2 and 3) uses descriptive statistics to illustrate trends in the relationship of wealth to key population and health indicators. In these sections, we do not conduct any statistical tests of significance. However, Section 4 includes multivariate analyses of three key health outcomes, using logistic regression, with a focus on household wealth as a risk factor for each outcome.

Section Two presents a description of the characteristics of households and respondents according to wealth index quintiles. Section Three provides additional descriptive analyses of selected population and health outcomes, including fertility and proximate determinants of fertility, fertility

³ Technical note: There are exceptions to this approach: when conducting the principal components analysis, occasionally a particular variable results in an “overidentification” of the model, rendering the component matrix “not positive definite,” in which case the problematic variable is removed and the model is rerun.

preferences and family planning, infant and child mortality, child health and nutrition, and maternal health. Section Four presents the results of multivariate analyses of three selected health outcomes: medical assistance at delivery, child nutritional status, and vaccination status. Discussion and conclusions are presented in Section Five.

2 Characteristics of Households and Respondents

This section describes some of the basic characteristics of the households and respondents in the three Nepal DHS surveys. Data are presented according to wealth quintile to illustrate the ways in which the distribution of these characteristics according to wealth has changed over time. Table 2 presents trends in selected household characteristics: residence, use of improved water source, and use of improved sanitation facility.⁴

2.1 Household characteristics

The results presented in Table 2.1 indicate that Nepal is predominantly rural, but the proportion of the urban population has increased over time. This trend is visible even over the ten-year period covered by the NDHS: whereas 92 percent of the population was rural in 1996, that percentage had fallen to 85 percent by 2006. Breaking residence down by wealth quintile, the data indicate that those in the wealthiest quintile are consistently the least rural, which is due in some part to the nature of the assets included in the wealth index, many of which are more likely to be available in urban rather than rural settings. Nevertheless, any urban bias in the wealth index is likely to be expressed consistently over time. It is therefore interesting to note a trend that may be associated with increasing urbanization: rural residents are increasingly unlikely to fall into the wealthiest quintile, as illustrated by the increasing low/high ratios. Additionally, fewer rural residents fall into the third and fourth quintiles in 2006 than in previous years (Figure 2.1). This suggests that those who left rural areas in recent years to move to urban areas may have been among the wealthiest of the rural population.

⁴ Note that water source and facility type are components used in the construction of the wealth index. To avoid endogeneity, therefore, it would typically be preferable not to assess the association between water source and wealth, for example. However, in this instance, we are less interested in the precise relationship between wealth and water or wealth and sanitation and more interested in how that relationship changes over time. For that reason, we assess the trends in the associations between water, sanitation and wealth while remaining cautious about our interpretation of the data, given concerns about endogeneity.

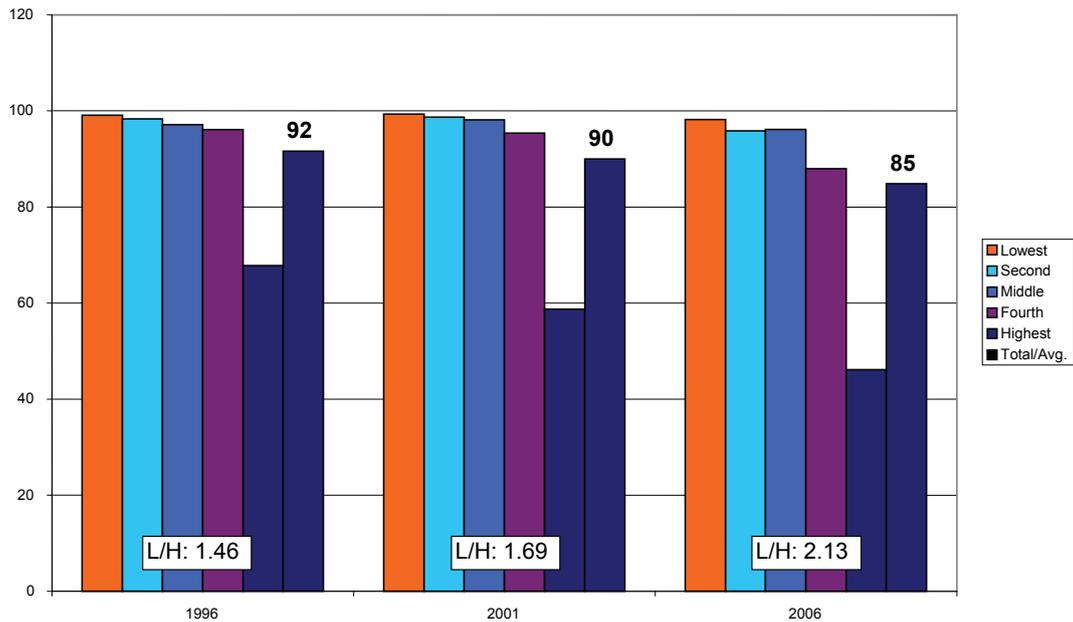
Table 2.1 Percent of household members in each category of wealth according to selected background characteristics, low/high ratio, and low-high difference, Nepal DHS 1996, 2001 and 2006

Characteristic		Quintiles					Total/Avg.	Low/High Ratio	Low-High Diff. (Abs. Val)	N
		Lowest	Second	Middle	Fourth	Highest				
Rural residence	1996	99.1	98.3	97.1	96.1	67.8	91.6	1.46	31.30	46,483
	2001	99.3	98.7	98.1	95.4	58.7	90.0	1.69	40.62	44,086
	2006	98.2	95.8	96.1	88.0	46.1	84.8	2.13	52.08	41,947
Region	1996									46,483
	Eastern	18.9	25.6	21.5	25.7	28.8	24.1	0.66	9.95	10,420
	Central	28.8	31.7	31.5	31.0	42.3	33.1	0.68	13.53	14,182
	Western	16.4	16.3	19.8	25.7	17.4	19.1	0.94	0.96	8,302
	Midwestern	24.2	18.3	16.4	8.4	6.1	14.7	3.94	18.10	6,038
	Farwestern	11.6	8.1	10.9	9.3	5.3	9.1	2.19	6.34	3,921
	2001									44,086
	Eastern	20.8	20.8	22.7	30.7	30.3	25.1	0.69	9.44	11,062
	Central	28.5	29.5	31.4	30.9	36.8	31.4	0.78	8.24	13,851
	Western	14.2	14.9	25.5	23.5	22.6	20.2	0.63	8.49	8,891
	Midwestern	20.3	22.6	11.7	8.0	6.0	13.7	3.36	14.26	6,038
	Farwestern	16.2	12.2	8.7	6.9	4.2	9.6	3.81	11.91	4,243
	2006									41,947
	Eastern	16.4	21.6	25.5	30.0	16.3	22.0	1.01	0.11	9,219
	Central	25.4	30.2	31.1	31.4	49.2	33.5	0.52	23.81	14,040
Western	13.7	16.2	19.9	23.5	22.1	19.1	0.62	8.43	8,007	
Midwestern	19.2	14.3	9.8	9.2	5.4	11.6	3.53	13.75	4,848	
Farwestern	25.3	17.8	13.7	6.0	6.9	13.9	3.66	18.40	5,834	
Use of improved water source ¹	1996	31.8	57.7	71.4	74.5	86.5	64.5	0.37	54.67	46,484
	2001	55.7	73.3	72.0	82.4	87.2	74.1	0.64	31.45	44,085
	2006	85.2	87.7	84.3	87.7	79.5	79.8	1.07	5.63	41,947
Use of improved sanitation facility ²	1996	0.0	0.1	1.9	30.7	47.4	16.2	0.00	47.45	46,484
	2001	0.0	0.0	25.4	41.9	82.3	30.0	0.00	82.26	44,086
	2006	3.1	10.1	23.6	50.0	94.0	36.3	0.03	90.84	41,947

¹ The WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation estimates that half of dug wells and springs in use in Nepal are protected sources, but the 1996 and 2001 Nepal DHS questionnaires did not make a distinction between protected and unprotected dug wells or springs. For this report, it was necessary to establish a comparable definition of "improved water source" across all three surveys; we therefore define "improved water source" as piped, borehole well, rainwater or bottled water. We do not include any dug wells or springs in the "improved" category; as a result, the figure given as the total proportion of households with access to improved water sources is a slight underestimate (as of 2006, only 4 percent of households obtained water from a dug well, one quarter of which were protected; and 10 percent obtained water from springs, 80 percent of which were unprotected). This underestimate affects the equity analysis to a small degree, since poorer households are more likely to get their water from springs and dug wells.

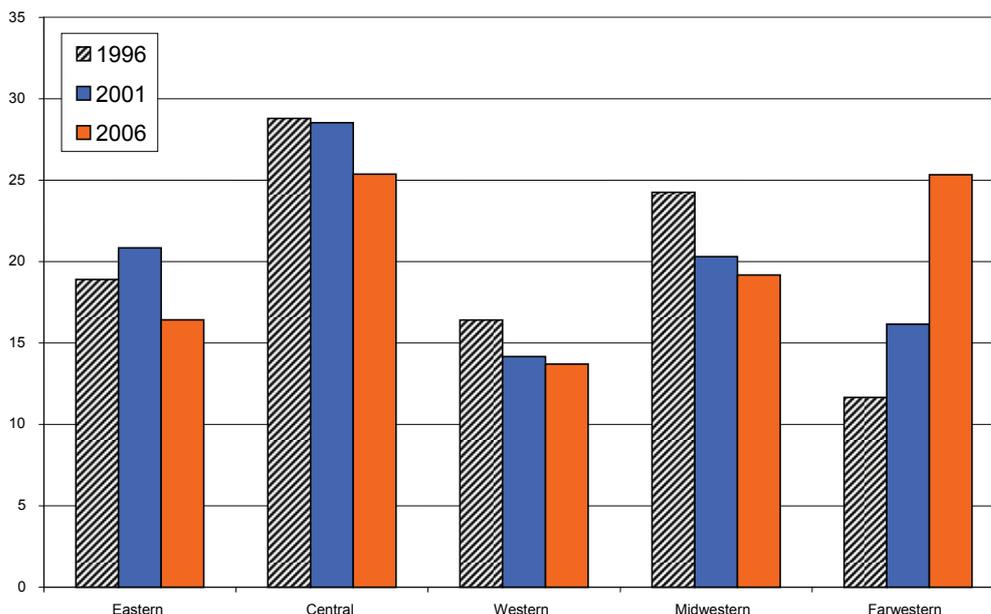
² We base our definition of improved sanitation facility on the recommendations of the WHO/UNICEF Joint Monitoring Program (JMP) for Water Supply and Sanitation, which considers the following types of sanitation facilities to be improved: connection to a public sewer, connection to a septic system, pour-flush latrine, simple pit latrine, ventilated improved pit latrine (obtained December 1, 2007 from http://www.wssinfo.org/en/122_definitions.html). The JMP only recognizes non-shared facilities as improved; however, the 1996 Nepal DHS did not collect information on whether the household sanitation facility was shared. To ensure comparability in the indicator across the three surveys, we do not discriminate according to whether the facility was shared.

Figure 2.1 Percent rural according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006



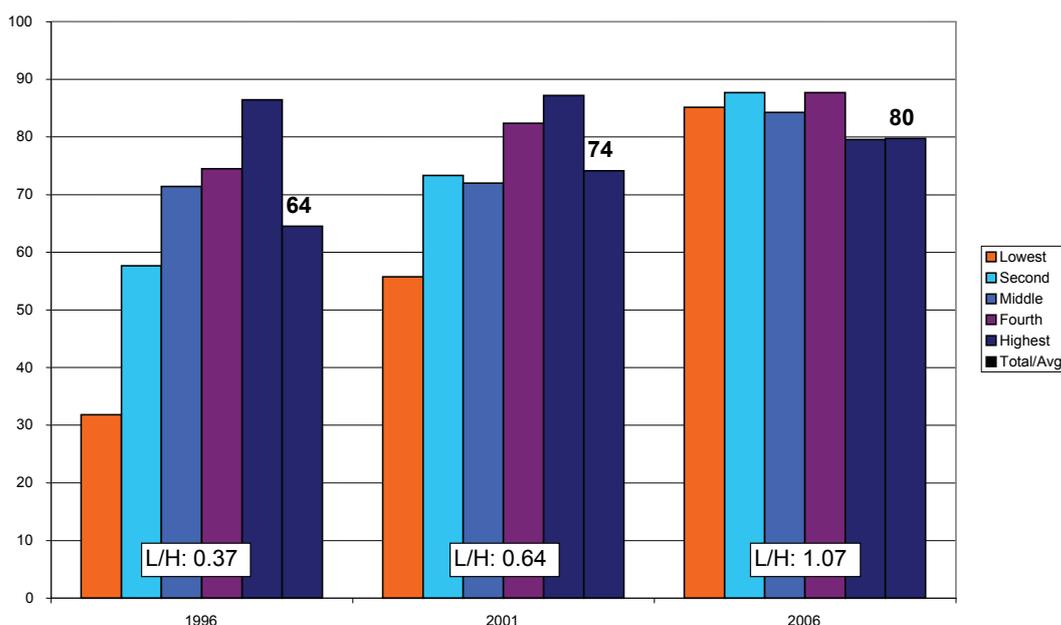
With regard to the trends in the association between region and wealth, the most important findings regard those living in the Midwestern and Farwestern regions: the populations in the two regions are the most skewed towards poverty (for example, in the Midwestern region in each survey year, residents were at least 3 times more likely to fall into the poorest category than into the wealthiest, as expressed by the low/high ratio). Also, there appears to have been a considerable shift in the population in the Farwestern region, which has both grown over the course of the study period (from 9 percent to 14 percent of the population of Nepal) and become poorer: in 1996, 12 percent of the residents living in the Farwestern region fell into the poorest quintile, but in 2001 this proportion increased to 16 percent and to 25 percent in 2006. No other region experienced such a shift towards concentrated poverty (Figure 2.2).

Figure 2.2 Percent of household members falling into the lowest quintile in each region, Nepal 1996, 2001 and 2006



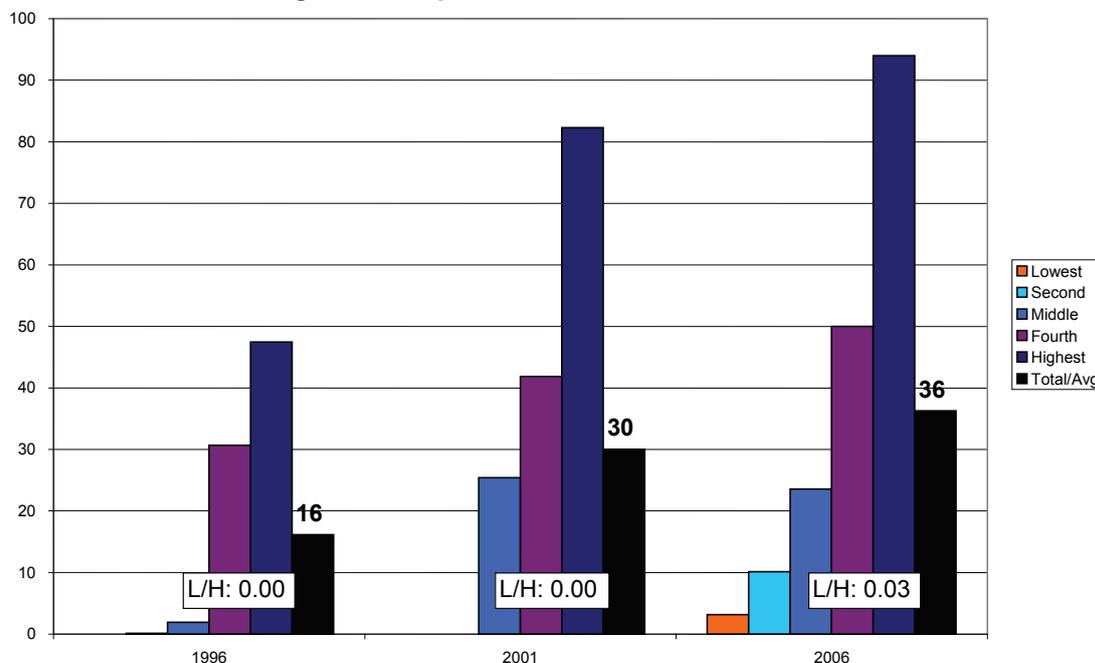
Despite worsening economic prospects in the Farwestern region, the country on the whole made significant improvements in access to safe water. Use of an improved water source for drinking water increased nationally over time from 65 percent in 1996 to 80 percent in 2006. As Figure 2.3 shows, the greatest improvements in access to safe water occurred among the poorest: while in 1996, access to safe water among the poor was only about one-third of that in the wealthiest quintile, by 2006 access to safe water was equally distributed across quintiles.

Figure 2.3 Use of improved water source according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006



Use of improved sanitary facilities has increased somewhat over time both overall and among the poorest. However, improvements in sanitation lag behind improvements made in increasing access to safe water (Figure 2.4). In 1996, 16 percent of the population had access to improved sanitation, with no one in the 2 poorest quintiles using improved sanitation in 1996 or 2001. By 2006, 36 percent used improved facilities; among the wealthiest, the corresponding figure was 94 percent and, compellingly, only 3 percent among the poorest.

Figure 2.4 Use of improved sanitation according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006



2.2 Characteristics of household members

Consistent with Nepal's recent experience of increased employment-related male out-migration, Table 2.3 shows a steady trend towards increased female household headship in Nepal, nearly doubling over the study period from 12 percent of households with female headship in 1996 to 23 percent in 2006. In 1996, there was no clear relationship between female headship and household wealth; however, in 2001 and 2006, female heads of households are somewhat overrepresented in the two poorest quintiles. Analysis of these data elsewhere (2006 NDHS) finds that increases in female household headship in Nepal have been greatest in rural areas.

Over time, the proportion of Nepalis reporting that they are of the occupational caste or dalits has declined from 15 percent in 1996 to 12 percent in 2006. In 1996 and 2001, this group was heavily concentrated in the bottom two quintiles; however, in 2006 one can observe that the distribution of this group by wealth is more linear, with somewhat larger representation in the wealthiest quintile.

Regarding completion of primary education, Table 2.2 and Figure 2.5 show that proportions of both women and men age 15-49 who have completed primary education (fifth grade) have increased over time, with the proportion of women's completion doubling from 17 percent in 1996 to 35 percent in 2006, and men's completion rising from 46 percent to 62 percent in the same time period. The ratio of women to men in terms of completion has also become more equal, rising from 0.38 in 1996 to 0.56 in 2006 (Figure 2.6). The table and figures show the expected relationship between wealth and education: both levels and female-to-male ratios of school completion are directly and positively related to wealth—as wealth increases, education levels for both men and women, and gender equity in education, also increase.

Table 2.2. Percent of households or household members in each category of wealth according to selected background characteristics, low/high ratio, and low-high difference, Nepal DHS 1996, 2001 and 2006

Characteristic	Quintiles					Total/ average	Low/ high ratio	Low-high difference (abs. val)	N	
	Lowest	Second	Middle	Fourth	Highest					
Female household headship	1996	10.2	14.8	12.4	11.4	12.9	12.4	0.79	2.71	8,083
	2001	17.9	18.6	13.5	15.0	15.3	16.1	1.17	2.56	8,601
	2006	26.3	25.0	22.4	21.0	22.1	23.4	1.19	4.20	8,708
Occupational caste/dalit	1996	17.9	22.4	17.0	11.4	3.6	14.6	4.97	14.32	8,429
	2001	18.0	17.7	15.8	12.2	3.8	13.6	4.79	14.24	8,275
	2006	18.6	15.0	13.2	9.6	5.4	12.1	3.44	13.16	10,793
School completion ¹	1996									
	Women	4.3	5.9	10.6	17.6	45.5	17.4	0.10	41.17	10,328
	Men	25.8	29.4	39.1	52.1	74.5	46.2	0.35	48.69	8,486
	Female/male ratio	0.17	0.20	0.27	0.34	0.61	0.38	0.28	0.44	
	2001									
	Women	8.6	10.4	17.4	24.5	54.9	23.9	0.16	46.29	10,839
	Men	33.2	39.3	44.9	56.3	80.9	53.5	0.41	47.67	8,402
	Female/male ratio	0.26	0.26	0.39	0.44	0.68	0.45	0.38	0.42	
	2006									
	Women	17.6	21.2	24.8	41.9	64.0	34.8	0.27	46.41	11,045
	Men	40.5	48.3	55.5	69.8	84.4	62.6	0.48	43.92	8,265
	Female/male ratio	0.43	0.44	0.45	0.60	0.76	0.56	0.57	0.32	
School participation ²	1996									
	Girls	37.3	48.5	51.9	67.0	91.7	57.3	0.41	54.41	3,048
	Boys	61.0	70.9	73.3	80.5	94.6	74.9	0.65	33.53	3,093
	Female/male ratio	0.61	0.68	0.71	0.83	0.97	0.76	0.63	0.36	
	2001									
	Girls	53.4	57.3	61.1	74.0	92.4	66.1	0.58	39.06	3,231
	Boys	74.6	75.2	76.2	82.5	94.9	80.0	0.79	20.30	3,392
	Female/male ratio	0.71	0.76	0.80	0.90	0.97	0.83	0.73	0.26	
	2006									
	Girls	80.8	85.0	85.5	89.9	97.2	86.8	0.83	16.46	2,909
	Boys	87.1	88.6	95.4	93.6	98.3	92.3	0.89	11.18	3,092
	Female/male ratio	0.93	0.96	0.90	0.96	0.99	0.94	0.94	0.06	

¹ Percentage of household residents age 15-49 who have completed fifth grade (primary)

² Percentage of children in the household age 6-10 years old who currently attend school

Figure 2.5 Percent of women and men age 15-49 who have completed 5th grade according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006

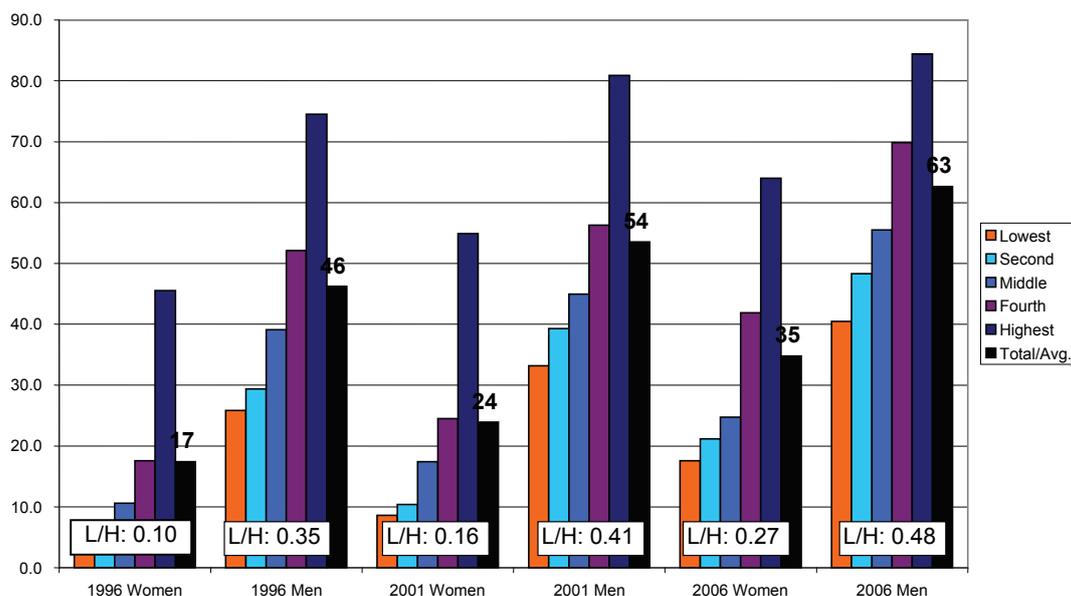
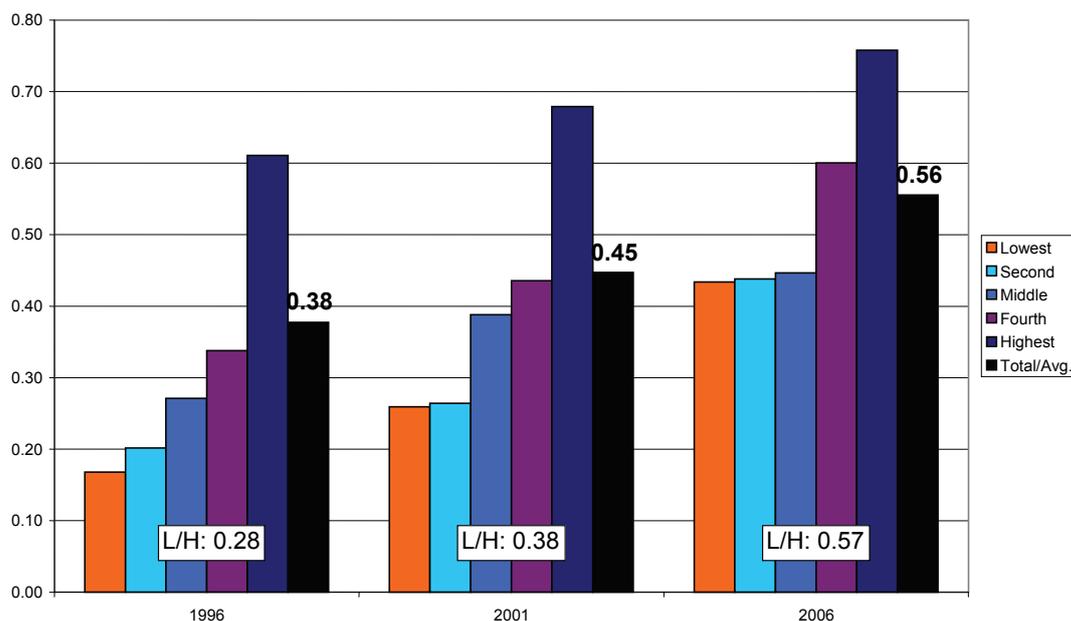


Figure 2.6 Female/male ratio of percent of those age 15-49 who have completed 5th grade, Nepal DHS 1996, 2001 and 2006



To glimpse what the future holds for Nepal in terms of an educated adult populace, we can look to the school participation of girls and boys age 6-10 (Table 2.3 and Figures 2.7 and 2.8). Between 1996 and 2006, the percent of girls currently attending school rose from 57 percent to 87 percent, while boys' attendance increased from 75 percent to 92 percent. Economic equity in school attendance registered impressive gains (clearly visible in Figure 2.7), moving from a low/high ratio of 0.41 for girls and 0.65 for boys in 1996 to a low/high ratio of 0.83 for girls and 0.89 for boys in 2006. Gender equity in school attendance also increased over the study period in all quintiles, but especially the poorest, with gender equity nearly established by 2006 (female-to-male ratio of 0.94). Thus, school attendance is near-universal among boys and girls in the wealthiest quintile, and is above 80 percent for both girls and boys even among those in the poorest quintile.

Figure 2.7 Percent of girls and boys age 6-10 who currently attend school according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006

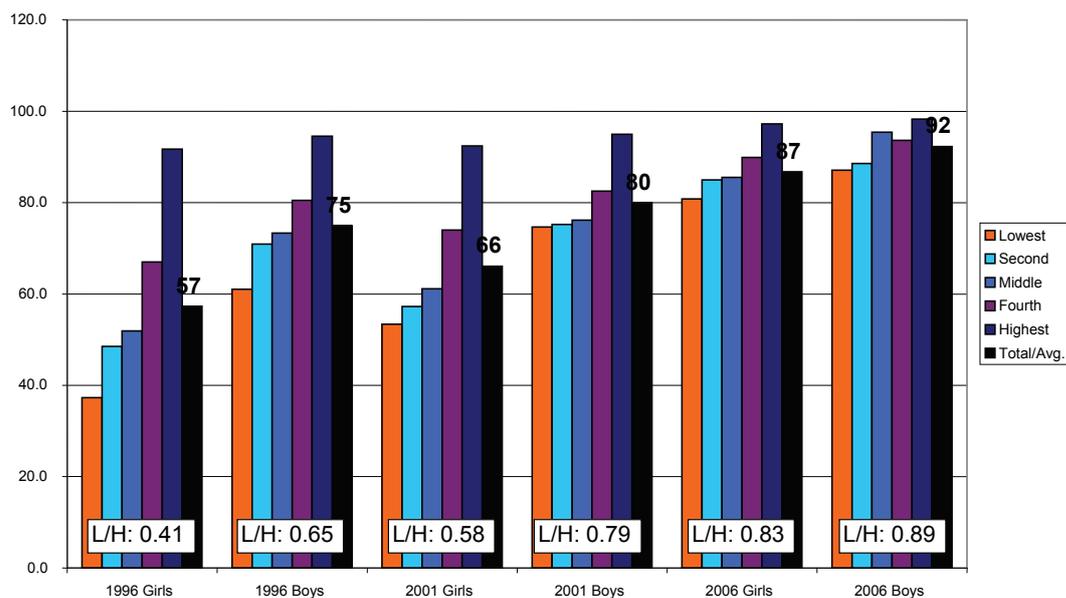
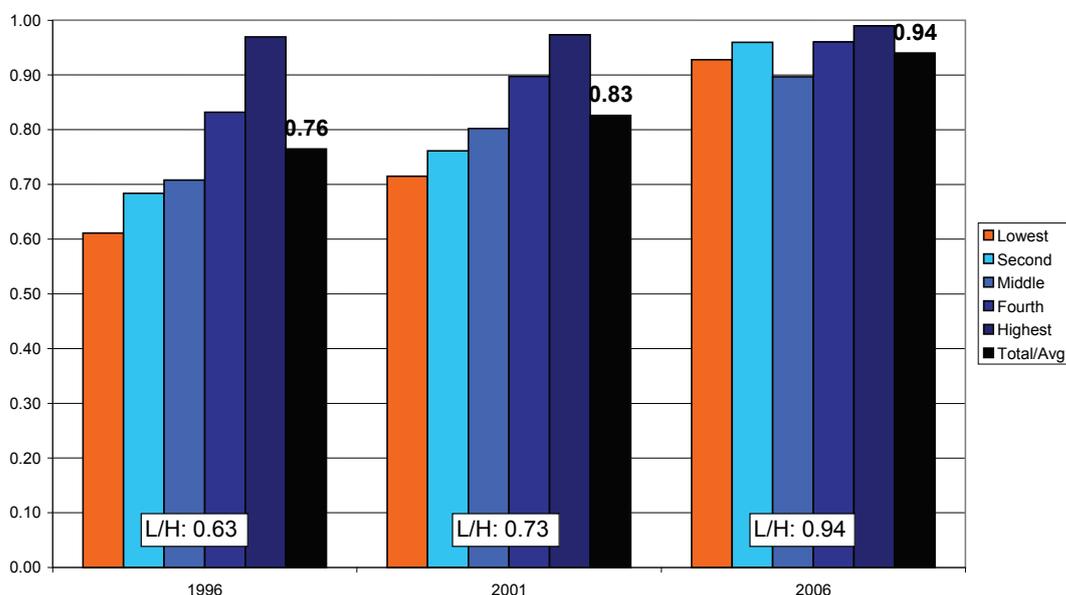


Figure 2.8 Female/male ratio of percent of those age 6-10 who currently attend school, according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006



2.3 Women's status

Studies have repeatedly shown that when women have the ability to make key decisions for themselves and for those under their care, health and population outcomes are improved (e.g. Kishor 2000; Türmen 2003; Koenen et al. 2006). It is therefore important to look at trends in indicators of women's status in Nepal and their association with household economic status. Data for most of the indicators of women's status shown in Table 2.4 are available only for the 2001 and 2006 surveys, with the exception of work-related variables.

2.3.1 Household decisionmaking and justification of domestic violence

The first panel in Table 2.3 shows levels of female participation in household decisionmaking and women's justification of domestic violence. Broadly speaking, women's autonomy in decisionmaking and refusal to justify domestic violence has increased even over the five-year interval between the 2001 and 2006 surveys—an interval typically considered too short to show a change in culture-bound gender indicators. The biggest changes occurred in women's participation in decisions about large purchases, which increased from 34 to 53 percent between the two surveys. While there has been a small increase in the proportion of women who decide for themselves about seeking health care for themselves, the level in 2006 was only 20 percent.

A simple explanation of the increase in women's decisionmaking autonomy is that the considerable increase in female household headship over the same period was directly responsible for the changes—if there is no male head of household to make the decisions, the decisionmaking may then fall to the female household head. However, the indicator reflecting whether women justify domestic violence also shows signs of progressive change, falling from 29 percent in 2001 to 23 percent in 2006. Changes in attitudes toward domestic violence cannot be directly linked to male absence from the household, and taken together with the evidence of increased autonomy in decisionmaking as well as the increases in gender equity in schooling, discussed above, the data suggest that Nepalese society is moving towards gender equity on a number of fronts.

Table 2.3 Percent of women age 15-49 in each category of wealth according to selected indicators of women's status, low/high ratio, and low-high difference, Nepal DHS 1996, 2001 and 2006

Characteristic		Quintile					Total/ average	Low/ high ratio	Low/high difference (abs. val.)	N
		Lowest	Second	Middle	Fourth	Highest				
Household decisionmaking and justification of domestic violence										
Can seek own health care ¹	1996	na	na	na	na	na	na	na	na	na
	2001	16.5	14.2	12.6	14.6	20.4	15.7	0.81	3.90	8,726
	2006	20.2	20.0	15.9	18.9	26.5	20.3	0.76	6.39	8,257
Can make daily household purchases ²	1996	na	na	na	na	na	na	na	na	na
	2001	43.0	41.0	41.0	40.9	57.5	44.7	0.75	14.50	8,726
	2006	56.0	57.0	49.3	55.4	70.6	57.6	0.79	14.63	8,257
Can make large household purchases ³	1996	na	na	na	na	na	na	na	na	na
	2001	32.2	30.8	29.9	31.3	44.8	33.8	0.72	12.60	8,726
	2006	51.9	52.7	45.5	49.7	64.0	52.8	0.81	12.14	8,257
Can travel to visit family/relatives ¹	1996	na	na	na	na	na	na	na	na	na
	2001	19.4	14.5	14.7	15.4	22.6	17.4	0.86	3.20	8,726
	2006	22.7	20.8	15.5	17.9	29.1	21.2	0.78	6.36	8,257
Justifies domestic violence ³	1996	na	na	na	na	na	na	na	na	na
	2001	28.0	30.3	28.7	27.4	29.6	28.8	0.95	1.60	8,726
	2006	27.9	23.9	22.5	19.7	23.0	23.4	1.21	4.88	8,257
Women's work										
Percent of women 15-49 who worked in the past 12 months	1996	94.7	88.8	83.2	82.9	67.9	83.8	1.39	26.82	8,429
	2001	94.9	90.7	81.9	83.8	67.6	84.1	1.40	27.29	8,275
	2006	97.2	90.8	84.8	80.1	59.0	81.7	1.65	38.16	10,793
Percent of women who report cash earnings	1996	5.0	11.9	14.3	9.6	29.0	12.9	0.17	23.99	7,063
	2001	4.6	10.0	14.0	12.7	39.2	14.5	0.12	34.61	7,334
	2006	17.6	28.0	29.9	33.6	61.9	32.5	0.28	44.29	8,819
Among currently married women who earned cash, the percent who have a say in spending money	1996	82.3	85.5	80.9	77.7	89.1	84.2	0.92	6.81	810
	2001	69.4	79.4	71.4	72.7	82.1	77.2	0.85	12.66	968
	2006	87.1	85.9	86.7	80.7	90.9	86.5	0.96	3.81	2,435
Problems in accessing health care⁴										
Getting permission to go for treatment	1996	na	na	na	na	na	na	na	na	na
	2001	20.2	17.5	18.8	17.5	10.5	17.0	1.92	9.64	8,726
	2006	7.6	7.4	6.8	7.5	5.8	7.0	1.31	1.80	10,793
Getting money for treatment	1996	na	na	na	na	na	na	na	na	na
	2001	80.4	79.2	70.7	61.7	37.9	66.3	2.12	42.54	8,726
	2006	49.1	50.8	41.4	32.4	23.0	38.8	2.13	26.04	10,793
Distance to health facility	1996	na	na	na	na	na	na	na	na	na
	2001	66.8	62.9	51.7	45.6	23.4	50.5	2.86	43.44	8,726
	2006	63.3	49.4	44.8	33.3	16.0	40.5	3.96	47.32	10,793
Having to take transport	1996	na	na	na	na	na	na	na	na	na
	2001	70.7	64.7	46.8	47.4	22.8	51.0	3.10	47.88	8,726
	2006	61.5	49.3	42.3	33.2	13.2	39.0	4.68	48.33	10,793

Continued...

Table 2.3—Continued

Characteristic		Quintile					Total/ average	Low/ high ratio	Low/high difference (abs. val.)	N
		Lowest	Second	Middle	Fourth	Highest				
Not wanting to go alone	1996	na	na	na	na	na	na	na	na	na
	2001	67.5	64.4	57.9	56.2	38.8	57.2	1.74	28.68	8,726
	2006	62.4	59.1	60.3	52.2	39.7	54.3	1.57	22.69	10,793
Concern no female provider	1996	na	na	na	na	na	na	na	na	na
	2001	57.1	52.5	47.1	50.9	38.1	49.4	1.50	18.99	8,726
	2006	61.0	52.0	51.4	51.8	37.8	50.4	1.61	23.21	10,793

¹ Percentage who can make decisions for themselves

² Percentage who can make decision for themselves or with others

³ Percentage who agree with at least one reason justifying spousal violence from husband

⁴ Percentage who reported that they have serious problems in accessing health care for themselves when they are sick

Regarding the association between decisionmaking and wealth, the data show a typical pattern, with women in the poorest and the wealthiest quintiles more likely than other women to report autonomous decisionmaking. The women in the wealthiest quintiles, however, report the most autonomy in decisionmaking. There is no meaningful association between wealth and attitudes about domestic violence.

2.3.2 Women's work participation

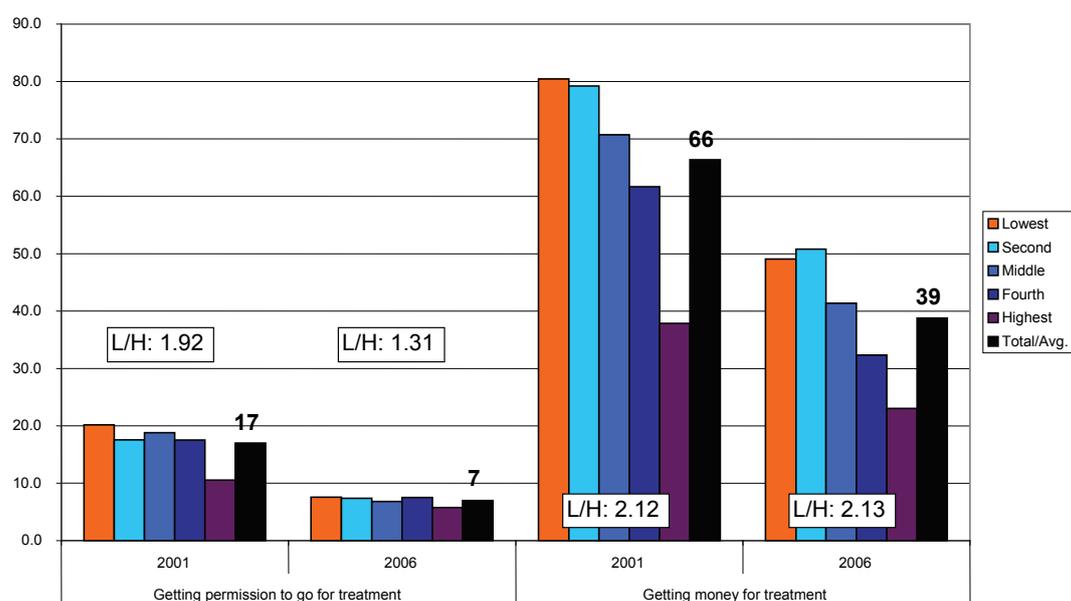
Women's work participation has long been assumed to be empowering for women vis à vis men. However, the relationship between women's work and empowerment is nuanced, and is likely to be dependent on whether the woman earns cash in exchange for her labor, whether she has control over those earnings, and whether the cultural context is amenable to the idea of women's employment. For example, an analysis of the role of employment as a risk factor for domestic violence in Nicaragua demonstrates that women who work—especially women who work in sales occupations—are more likely than women who do not work to report the experience of domestic violence. These findings suggest that in a context characterized by machismo gender ideologies, women who transgress those ideologies by working outside of the home may be at particular risk for gender-based violence (Johnson 2002).

In this analysis, we find that while most Nepali women report that they work, there is a negative relationship between work and wealth: the poorest women are most likely to work, while the wealthiest women are least likely. Further, while the poorest women are most likely to work, they are the least likely to earn cash for their labor, while the wealthiest women are the most likely to earn cash. This illustrates that wealthier women in Nepal are less likely to have to work to support their household, but if they do work, they are more likely to have access to the types of jobs where cash may be earned. The proportion of all women who earn cash for their work has increased across the wealth spectrum in Nepal, on average more than doubling from 15 percent in 2001 to 32 percent in 2006 (Table 2.3), and nearly quadrupling among the poorest women. There is no association between wealth and women's control over earnings: if women earn cash, most have control over those earnings (87 percent in 2006).

2.3.3 Problems in accessing health care

Problems in accessing health care such as getting permission to go for treatment, getting money for treatment, distance to the health facility and needing to take transport to the health facility, have declined across the board in the five years that elapsed between the 2001 and 2006 surveys (Figure 2.9). Only more personal problems such as not wanting to go for health care alone or concern that there is no female doctor are impediments that have not changed between the survey rounds. Inequality in access to health services has increased in two related variables, distance to facility and having to take transport: overall, improvements in these areas have been greatest for wealthier women and minimal for women in the poorest quintile.

Figure 2.9 Impediments to women's access to health care according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006



3 DESCRIPTIVE ANALYSES: FERTILITY, MORTALITY, AND SELECTED HEALTH OUTCOMES

This section describes trends and wealth differentials in a selection of important health related outcomes for women and children. It is expected that the identification of areas of greatest inequality in health care utilization and health outcomes will provide guidance for policy and programmatic intervention.

3.1 Women's fertility and reproductive health

3.1.1 Fertility-related indicators

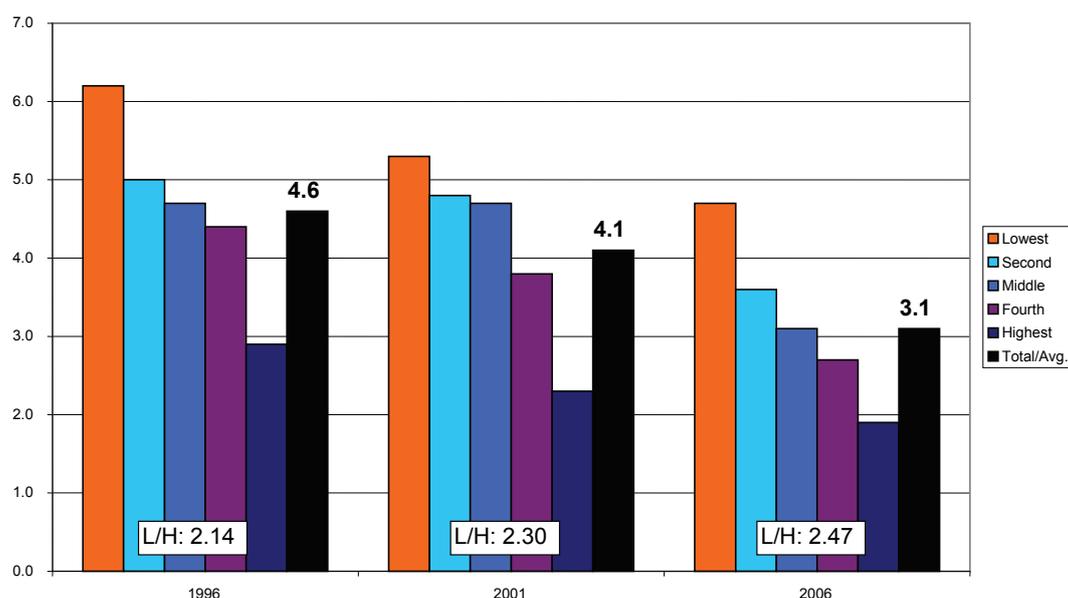
Table 3.1 and Figure 3.1 show that the total fertility rate (TFR) in Nepal has declined quickly over the past decade, dropping from 4.6 in 1996 to 4.1 in 2001, and dropping even more precipitously to 3.1 in 2006. Women in the wealthiest quintile had a TFR below replacement level in 2006. Some of the registered decline in fertility may be a result of the internal conflict in Nepal (McGinn et al. 2004). Although impressive decreases in fertility are registered in all wealth quintiles, the trends in the

low/high ratios for TFR indicate growing inequality: fertility rates are dropping faster among the wealthiest than among the poorest.

Nepal's declining fertility rates may also be a reflection of trends toward later ages at marriage: the country may be reaping a one-time fertility-decline dividend as a result of progressively fewer women entering into early marriages in a cultural context where fertility is dependent on marriage. The proportion of ever-married women who report that their age at first marriage was less than 15 has dropped by nearly half over the study period, from 30 percent in 1996 to 16 percent in 2006. For each of the three surveys, only women in the wealthiest quintile are less likely than other women to have married before age 15.

Increases in modern contraceptive prevalence have also contributed to Nepal's fertility decline: contraceptive prevalence has steadily increased over the study period, climbing from 26 percent in 1996 to 44 percent in 2006. Growth in contraceptive uptake has been somewhat faster among the poorest as indicated by the corresponding trend in the low/high ratio, although a sharply positive and monotonic relationship between contraceptive use and wealth remains, with 30 percent of women in the poorest quintile using a modern method in 2006, as compared to 54 percent of the women in the wealthiest quintile. It is interesting to note that there was no increase in contraceptive prevalence among women in the wealthiest quintile between the 2001 and 2006 surveys; this may indicate that a contraceptive use ceiling has been reached in this subgroup.

Figure 3.1 Total fertility rates according to wealth quintiles, and low/high ratio, Nepal DHS 1996, 2001 and 2006



Desire for larger families among women with 3 or more children has declined over time by half among the poorest and among the wealthiest women, but among women in the second through fourth quintiles, the desire for larger families has decreased more dramatically. For example, among women with 3 or more children in the second-poorest quintile, 11 percent wanted more children in 1996; by 2006, this figure was down to just 3 percent. When women's desires for reduced fertility are not well-aligned with access to and use of contraception, it is said that such women have an "unmet need" for contraception. The results in Table 3.1 show that the percent of currently-married women with an unmet need for family planning has declined somewhat over time, from 31 percent in 1996 to 25 percent in 2006. Unmet need is considerably higher among the poorest women than among the wealthiest women for each survey period (e.g., 32 among the poorest and 19 among the wealthiest, with a low/high ratio of 1.66 in 2006).

Table 3.1 Total fertility rates according to wealth quintile, low/high ratio, and low-high difference; and percent of women age 15-49 in each category of wealth according to selected maternal health indicators, low/high ratio, and low-high difference, Nepal DHS 1996, 2001 and 2006

Characteristic		Quintile					Total/ average	Low/ high ratio	Low/high difference (abs. val.)	N
		Lowest	Second	Middle	Fourth	Highest				
Family-related indicators										
Total fertility rate ¹	1996	6.2	5.0	4.7	4.4	2.9	4.6	2.14	3.30	28,178
	2001	5.3	4.8	4.7	3.8	2.3	4.1	2.30	3.00	29,990
	2006	4.7	3.6	3.1	2.7	1.9	3.1	2.47	2.80	11,336
Early age at marriage ²	1996	31.3	32.1	34.9	30.2	21.2	30.1	1.48	10.08	8,429
	2001	23.5	22.7	22.4	19.9	15.0	20.8	1.57	8.50	8,726
	2006	17.8	16.4	16.2	17.8	14.3	16.3	1.24	3.48	8,644
CPR, women ³	1996	15.7	21.2	23.2	26.6	44.9	26.0	0.35	29.20	7,982
	2001	23.8	28.7	31.7	38.9	55.2	35.4	0.43	31.40	8,342
	2006	30.3	40.6	46.8	48.2	53.9	44.2	0.56	23.60	8,275
High fertility desires ⁴	1996	13.0	11.7	10.0	9.0	3.8	9.77	3.44	9.25	4,183
	2001	6.48	6.13	7.68	5.24	2.16	5.6	3.00	4.32	4,373
	2006	6.25	2.95	3.3	3.29	1.6	3.61	3.91	4.65	4,033
Unmet need for family planning planning ⁵	1996	36.49	34.2	30.77	31.45	23.38	31.37	1.56	13.11	7,982
	2001	33.47	31.28	30.97	25.54	17.02	27.77	1.97	16.45	8,342
	2006	31.97	26.78	22.69	23.08	19.3	24.6	1.66	12.67	8,257
Maternal health										
Delivered with a trained provider ¹⁰	1996	2.9	5.2	6.4	9.1	33.7	9.6	0.09	30.80	3,813
	2001	3.6	4.9	9.9	14.3	45.1	12.9	0.08	41.50	6,948
	2006	4.8	10.1	12.4	23.0	57.8	18.7	0.08	53.00	5,545
Use of antenatal care ⁷	1996	21.5	34.7	35.6	43.5	66.5	37.6	0.32	45.00	3,813
	2001	30.4	37.9	50.8	57.5	79.5	48.6	0.38	49.10	4,745
	2006	17.7	30.4	38.4	60.7	84.1	43.7	0.21	66.46	4,065
Tetanus toxoid ⁸	1996	29.1	44.3	48.2	51.5	70.5	46.3	0.41	41.40	3,813
	2001	37.1	47.0	57.9	63.8	78.3	54.6	0.47	41.20	4,745
	2006	48.9	73.4	78.1	85.2	89.9	73.5	0.54	40.99	4,059
Iron supplementation ⁹	1996	4.2	8.1	7.5	10.8	29.7	10.6	0.14	25.50	3,813
	2001	10.2	13.7	21.3	28.3	50.9	22.7	0.20	40.70	4,745
	2006	34.3	55.5	64.6	70.8	80.1	59.3	0.43	45.80	3,000
Delivered in a public facility ¹¹	1996	1.3	3.5	4.1	5.5	24.3	6.4	0.05	23.00	3,813
	2001	1.9	2.3	4.3	7.2	27.4	7.0	0.07	25.50	6,948
	2006	3.0	6.9	9.3	15.3	41.2	13.1	0.07	38.15	5,545
Delivered in a private facility ¹²	1996	0.4	0.0	0.7	0.7	5.6	1.2	0.07	5.20	3,813
	2001	0.1	0.3	0.3	0.4	5.3	1.0	0.02	5.20	6,948
	2006	1.3	2.4	2.6	6.5	13.8	4.6	0.09	12.50	5,545
Delivered at home	1996	97.5	95.5	94.5	93.6	68.8	91.7	1.42	28.70	3,813
	2001	95.4	94.8	92.7	88.8	61.9	88.9	1.54	33.50	6,948
	2006	93.3	90.0	87.1	77.0	44.3	81.0	2.11	49.00	5,545
Use of home delivery kit	1996	1.3	1.7	1.2	2.8	2.8	1.8	0.46	1.52	4,010
	2001	4.4	5.8	11.0	12.8	21.1	9.3	0.21	16.66	6,335
	2006	8.3	17.4	20.3	24.4	26.5	17.6	0.31	18.20	3,275
Vitamin A consumption ⁶	1996	na	na	na	na	na	na	na	na	na
	2001	4.3	7.0	9.6	11.8	24.1	10.3	0.18	19.80	4,745
	2006	17.8	23.8	34.7	31.6	44.0	29.4	0.40	26.20	4,066

¹ Births per woman age 15-49

² Percentage of ever-married women who report age at first marriage under 15 years old

³ Percentage of married women aged 15-49 who use a modern method of contraception

⁴ Among currently married women with 3+ children, proportion desiring more

⁵ The proportion of married women who do not want another child within two years or at all, but are not currently using family planning. Pregnant or postpartum amenorrheic women are included in this estimate if they say their last or current birth was unwanted or mistimed. The definition of unmet need has changed slightly between 1996 and 2006, so estimates from the different time points are not perfectly comparable. However, most of the refinements to the definition of unmet need affect whether women are categorized as having unmet need for spacing vs. limiting, and have a very minor impact on the total unmet need estimate.

⁶ Among women who had a live birth in the past 5 years, % who took vitamin A supplement within 2 months of last birth

⁷ Among women who had a live birth in the past 5 years, % who had 1+ antenatal care visits with a doctor, nurse, or nurse-midwife

⁸ Among women who had a live birth in the past 5 years, % who received 1+ tetanus toxoid injections

⁹ Among women who had a live birth in the past 5 years, % who took iron tablets

¹⁰ Percentage of live births in the 5 years preceding the survey assisted by a medically trained person (Doctor, nurse, or nurse-midwife)

¹¹ Percentage of live births in the 5 years preceding the survey delivered in a public facility, which includes government hospitals, health centers, and health posts.

¹² Percentage of live births in the 5 years preceding the survey delivered in a private facility, which includes private hospitals, clinics, and doctor's offices, as well as facilities operated by other private medical providers including non-government organizations.

3.1.2 Maternal health

Use of antenatal care in Nepal peaked in 2001 and was lower in 2006; inequality in receipt of ANC also worsened: whereas 84 percent of the wealthiest women received antenatal care, only 18 percent of the poorest did. Impressive gains have been made in tetanus toxoid and iron supplementation across all wealth quintiles over time, but inequality is a persistent problem: the poorest women are only half as likely to receive tetanus toxoid and iron supplementation as the wealthiest.

Trained attendance at delivery is the single-most important intervention to increase the chances of neonatal and maternal survival (Filippi et al. 2006). Proportions of women receiving trained attendance at delivery have increased over time at the national level, but as of the 2006 survey, only 19 percent of women were delivering with a trained attendant. Furthermore, little improvement has been seen among the poorest women: as of 2006, only 5 percent of the poorest women had trained attendance at their most recent delivery in the past 5 years, while the corresponding figure for the wealthiest women was 58 percent. The low/high ratios have not changed over time, and reflect severe inequality in access to trained delivery care (l/h ratio of 0.08). No other health utilization indicator, so critical to maternal and child health and survival, is so inequitably distributed (Figure 3.2).

Most women deliver at home, though the proportion of women delivering in a health facility has increased somewhat over time, from 8 percent in 1996 to 19 percent in 2006 (Table 3.1). As expected, the women in the wealthiest quintile are most likely to deliver in a health facility (56 percent), while the poorest women nearly universally deliver at home. The likelihood of the poorest women delivering at home compared to the wealthiest women actually increased over time, with the low/high ratio increasing from 1.42 in 1996 to 2.11 in 2006 (Table 3.1 and Fig. 3.3).

Although obstetric emergencies requiring caesarean section or blood transfusion cannot be handled at home, one way to improve the safety of homebirth is through reducing infection by using a clean delivery kit. These home delivery kits typically contain a small bar of soap for washing hands, a plastic sheet to serve as the delivery surface, clean string for tying the umbilical cord, a new razor blade for cutting the cord, and pictorial instructions that illustrate the sequence of delivery events and hand-washing⁵. Use of clean delivery kits has improved over time in Nepal, from just 2 percent of births in 1996 to 18 percent in 2006 (Table 3.1). However, again, there is economic disparity in terms of who has access to these kits: as of 2006, only 8 percent of women who deliver at home (homebirthing women) in the poorest quintile—nearly all of whom deliver at home—use a clean delivery kit, whereas 27 percent of homebirthing women in the wealthiest quintile used such kits. Thus, while it must be recognized that usage of clean delivery kits is lowest where the need for them is greatest, even women in the wealthiest quintile who give birth at home have insufficient access to clean delivery kits.

Vitamin A supplementation is given to postpartum women both because it increases their own levels of vitamin A thereby reducing nightblindness associated with lactation, and because it increases the levels of vitamin A in their breastmilk, which is then passed to their nursing infant. In Nepal, Vitamin A consumption among postpartum women tripled between 2001 (the first year for which data are available) and 2006, and the absolute size of the increase was negatively related to wealth: the poorest women experienced a four-fold increase in Vitamin A consumption between 2001 and 2006, while the wealthiest women's consumption of a postpartum Vitamin A capsule nearly doubled. This is primarily because of the success of the nationwide vitamin A distribution program. Nevertheless, inequality in consumption of Vitamin A is considerable: in 2006, only 18 percent of the poorest postpartum women took Vitamin A, as compared to 44 percent of the wealthiest.

⁵ Information obtained from PATH, which produced clean delivery kits in Nepal: http://www.path.org/projects/clean-delivery_kit.php

Figure 3.2 Percent of women age 15-49 whose last birth in the past 5 years was attended by a trained health care provider according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006

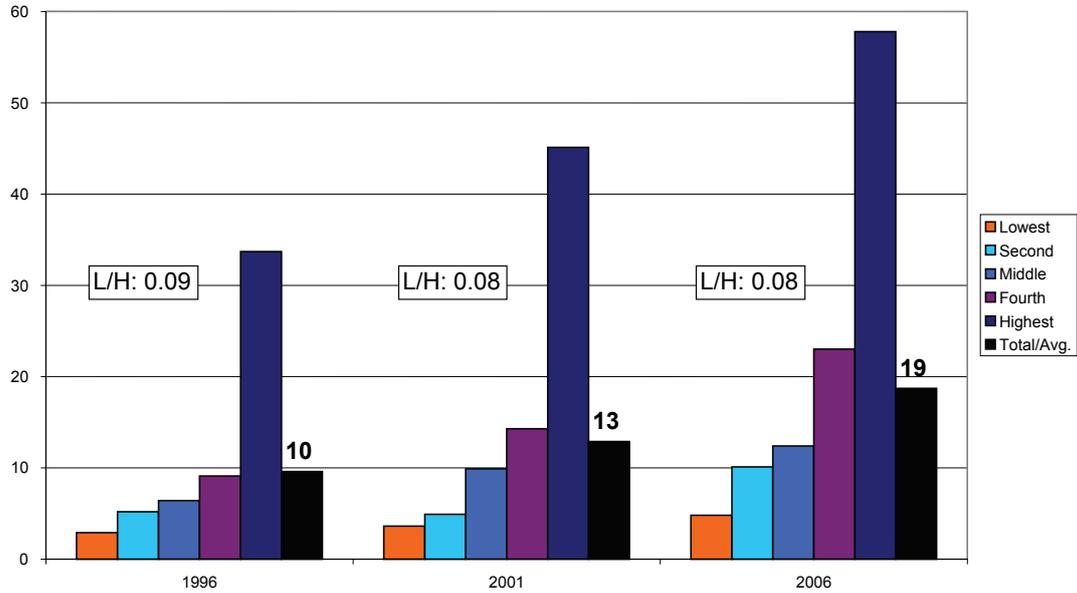
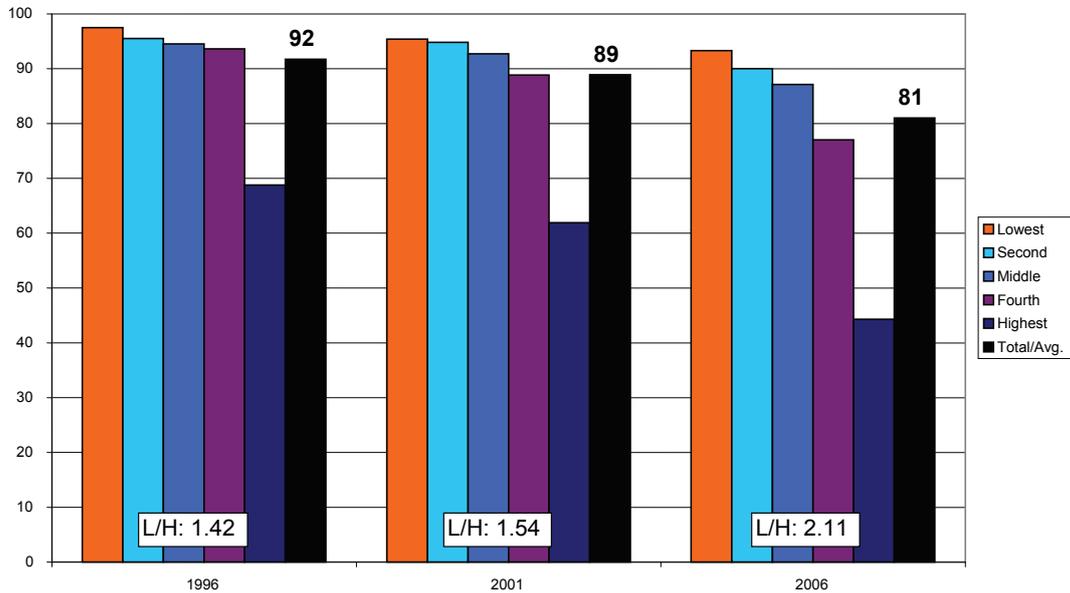


Figure 3.3 Percent of women age 15-49 who delivered their most recent birth in the past 5 years at home according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006



3.2 Child survival and health

3.2.1 Child survival

Table 3.2 and Figure 3.4 show that both infant and under-five mortality rates in Nepal have been on a steady decline over the past 20 years, with 10-year infant mortality rates declining from 93 deaths per 1000 live births in 1996 to 48 in 2006, and 10-year under-five mortality rates declining from 139 to 61 over the same period. However, the improvements at the national level mask growing

economic inequality in child survival: in 1996, infant mortality in the poorest quintile was 50 percent higher than that in the wealthiest; by 2006 it was 78 percent higher. Similarly, under-five mortality rates are more than twice as high for the poorest in 2006 as compared to the wealthiest. This is despite improvements in important interventions such as vaccine administration: 83 percent of all Nepali children age 12-23 months were fully immunized in 2006, with equity in full vaccination coverage increasing over time from a low/high ratio of 0.46 in 1996 to a low/high ratio of 0.73 in 2006 (Figure 3.5). It may be possible to link the inequality in the pace of child mortality reduction to reduced access to oral rehydration therapy (ORT) among the lowest. Diarrhea is the number one killer of children in the developing world, and oral rehydration is critical to improving a child's chances of survival. Yet the proportion of children in the poorest quintile who received ORT for diarrhea actually declined from 42 percent in 2001 to just 27 percent in 2006. ORT use also decreased among those in the wealthiest quintile, but not as sharply, from 47 percent in 2001 to 40 percent in 2006.

Table 3.2 also shows that use of health care services for both acute respiratory infection (ARI) and diarrhea has increased over time, both at the national level and across wealth quintiles. While diarrhea can safely be treated at home, ARI may signal the presence of another known killer of children, pneumonia. It is therefore important that children with ARI be taken to see a health care provider quickly (UNICEF 2000). While taking a child for health care during ARI has increased over time, levels have only reached 43 percent nationally (36 percent among the two poorest quintiles).

Table 3.2 Infant and under-five mortality rates according to wealth quintile, low/high ratio, and low-high difference; and percent of children in each category of wealth according to selected indicators of women's status, low/high ratio, and low-high difference, Nepal DHS 1996, 2001 and 2006

Characteristic		Quintile					Total/ average	Low/ high ratio	Low/high difference (abs. val.)	N
		Lowest	Second	Middle	Fourth	Highest				
Child survival										
Infant mortality rate ¹	1996	96	107	104	85	64	93	1.51	32.40	
	2001	86	88	77	73	53	77	1.61	32.30	
	2006	71	62	70	51	40	48	1.78	31.00	
Under-five mortality rate ²	1996	156	164	155	118	83	139	1.89	73.60	
	2001	130	125	104	97	68	108	1.92	62.20	
	2006	98	83	91	63	47	61	2.09	51.00	
Immunization coverage³										
BCG	1996	63.9	75.8	77.5	78.7	93.6	76.0	0.68	29.70	1,379
	2001	74.9	81.5	89.2	90.7	92.6	84.5	0.81	17.70	1,313
	2006	84.7	94.7	97.4	96.6	97.0	93.4	0.87	12.30	984
Measles	1996	45.4	52.4	55.9	62.0	78.3	56.6	0.58	32.90	1,379
	2001	61.1	67.5	69.1	79.9	83.2	70.6	0.73	22.10	1,313
	2006	73.2	84.9	87.4	91.3	94.5	85.0	0.77	21.30	984
DPT3	1996	40.5	46.5	51.8	61.1	81.6	53.5	0.50	41.10	1,379
	2001	62.1	68.9	72.3	80.2	85.4	72.1	0.73	23.30	1,313
	2006	75.2	88.0	96.0	93.4	96.3	88.6	0.78	21.10	984
All ⁴	1996	32.4	34.6	40.8	51.0	71.1	43.3	0.46	38.70	1,379
	2001	54.2	62.4	64.5	74.7	81.6	65.6	0.66	27.40	1,313
	2006	68.0	82.4	87.1	90.7	93.5	82.8	0.73	25.50	984
None ⁵	1996	33.0	20.6	15.7	17.2	5.8	20.2	5.69	27.20	1,379
	2001	0.7	0.7	0.5	1.8	0.7	0.9	1.00	0.00	1,313
	2006	6.0	2.0	0.4	1.1	3.0	2.7	2.00	3.00	984
Treatment of childhood illnesses										
Medical treatment of ARI ⁶	1996	11.7	16.6	18.6	22.4	26.7	18.2	0.44	14.96	1,386
	2001	23.0	23.5	26.3	24.7	37.1	26.1	0.62	14.10	1,474
	2006	36.0	36.3	43.5	49.9	(54.0)	42.9	0.67	90.00	890
Use of oral rehydration therapy for diarrhea ⁷	1996	41.3	48.6	52.6	49.7	63.8	49.0	0.65	22.50	1,119
	2001	41.8	41.4	45.2	51.5	64.3	46.5	0.65	22.50	1,320
	2006	26.6	38.2	39.5	52.6	58.6	40.7	0.45	32.00	623
Medical treatment of diarrhea ⁸	1996	9.5	14.9	14.3	16.6	18.3	13.8	0.52	8.80	1,119
	2001	15.0	25.3	23.4	22.0	21.8	21.2	0.69	6.80	1,320
	2006	21.4	26.8	29.8	28.9	31.8	26.9	0.67	10.40	623
Breastfeeding										
Exclusive breastfeeding ⁹	1996	86.7	88.0	77.7	81.9	72.6	81.9	1.19	14.10	430
	2001	76.2	83.8	81.4	81.3	66.5	78.8	1.15	9.70	372
	2006	84.1	72.0	64.6	70.8	47.2	70.0	1.78	36.88	274
Bottle-feeding ¹⁰	1996	1.2	2.2	4.2	4.5	10.5	4.1	0.11	9.30	1,361
	2001	1.8	2.5	3.0	1.7	12.8	3.6	0.14	11.00	1,276
	2006	0.7	2.0	2.5	4.0	12.5	3.5	0.05	11.83	968

Continued...

Table 3.1—Continued

Characteristic		Quintile					Total/ average	Low/ high ratio	Low/high difference (abs. val.)	N
		Lowest	Second	Middle	Fourth	Highest				
Nutritional status										
Moderate stunting ¹¹	1996	33.6	29.6	28.7	25.0	20.0	28.2	1.68	13.60	3,705
	2001	32.7	30.6	26.8	28.8	24.6	29.2	1.33	8.10	6,235
	2006	29.2	30.7	27.7	24.5	18.8	26.8	1.55	10.36	5,545
Severe stunting ¹²	1996	59.0	51.7	48.1	43.0	31.8	48.4	1.86	27.20	3,705
	2001	28.8	23.1	20.2	17.8	11.2	21.3	2.57	17.60	6,235
	2006	29.3	22.2	20.2	14.0	9.5	20.2	3.08	19.80	5,262
Moderate underweight ¹³	1996	53.3	52.1	50.1	43.3	28.3	46.9	1.88	25.00	3,705
	2001	40.1	36.9	37.5	33.7	26.4	35.7	1.52	13.70	6,235
	2006	29.2	30.2	26.7	22.3	15.0	25.5	1.95	14.18	5,545
Severe underweight ¹⁴	1996	20.1	19.6	17.6	14.1	4.4	16.1	4.57	15.70	3,705
	2001	16.7	15.5	11.9	10.4	5.0	12.7	3.34	11.70	6,235
	2006	14.2	12.9	12.5	7.8	2.5	10.6	5.68	11.70	5,262

¹ Deaths under age 12 months per 1,000 live births

² deaths under age 5 per 1,000 live births

³ Children age 12-23 months who received vaccinations, by vaccination card or mother's report

⁴ Children age 12-23 months who received BCG, measles, polio, and DPT vaccinations

⁵ Children age 12-23 months who did not receive BCG, measles, polio, nor DPT vaccinations

⁶ Among children with acute respiratory infection (ARI) symptoms in the 2 weeks preceding the survey, Percentage taken to a health facility/provider

⁷ Among children with diarrhea in the 2 weeks preceding the survey, Percentage who were given oral rehydration salts (ORS) or increased fluids

⁸ Among children with diarrhea in the 2 weeks preceding the survey, Percentage who were taken to a health facility/provider

⁹ Percentage of children under 4 months who are exclusively breastfed

¹⁰ Percentage of children under 12 months who are fed with a bottle using a nipple. Bottles with nipples are difficult to clean properly, and are not recommended because unhygienic conditions and poor formula preparation associated with bottle-feeding can put the child at a greater risk of illness and malnutrition.

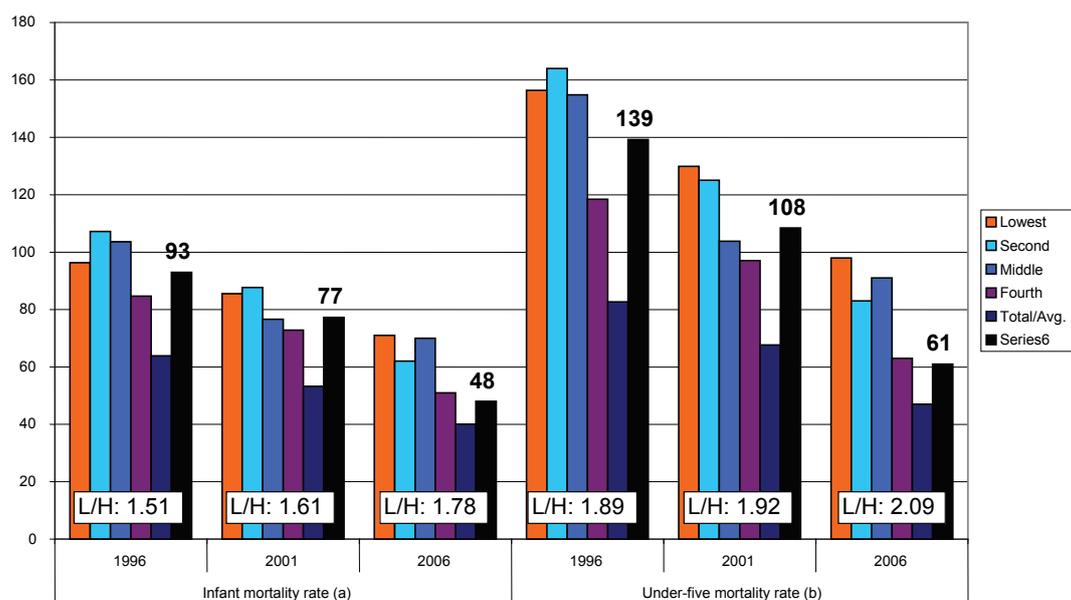
¹¹ Percentage of children whose height-for-age z-score is between -2 to -3 standard deviations of the median reference standard for their age. The reference standards used are those established by the World Health Organization, the U.S. Centers for Disease Control, and the U.S. National Center for Health Statistics.

¹² Percentage of children whose height-for-age z-score is below -3 standard deviations of the median reference standard for their age.

¹³ Percentage of children whose weight-for-age z-score is between -2 to -3 standard deviations of the median reference standard for their age.

¹⁴ Percentage of children whose weight-for-age z-score is below -3 standard deviations of the median reference standard for their age.

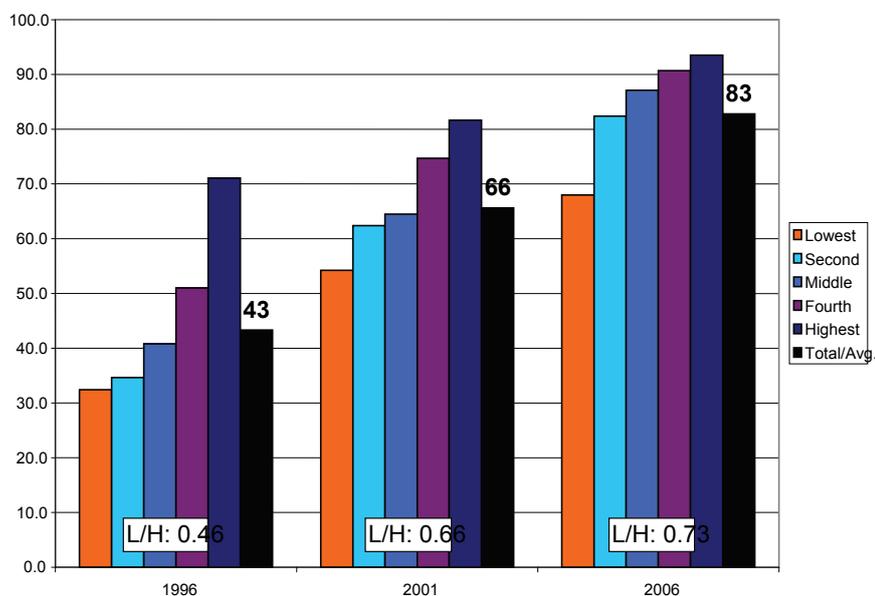
Figure 3.4 10-year infant and under-five mortality rates according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006



Exclusive breastfeeding of children under 4 months of age has declined in Nepal, from 82 percent in 1996 to 70 percent in 2006. Declines registered in all quintiles except for the poorest, where levels of exclusive breastfeeding seemed to dip to 76 percent in 2001 only to rise again to 84 percent in 2006.

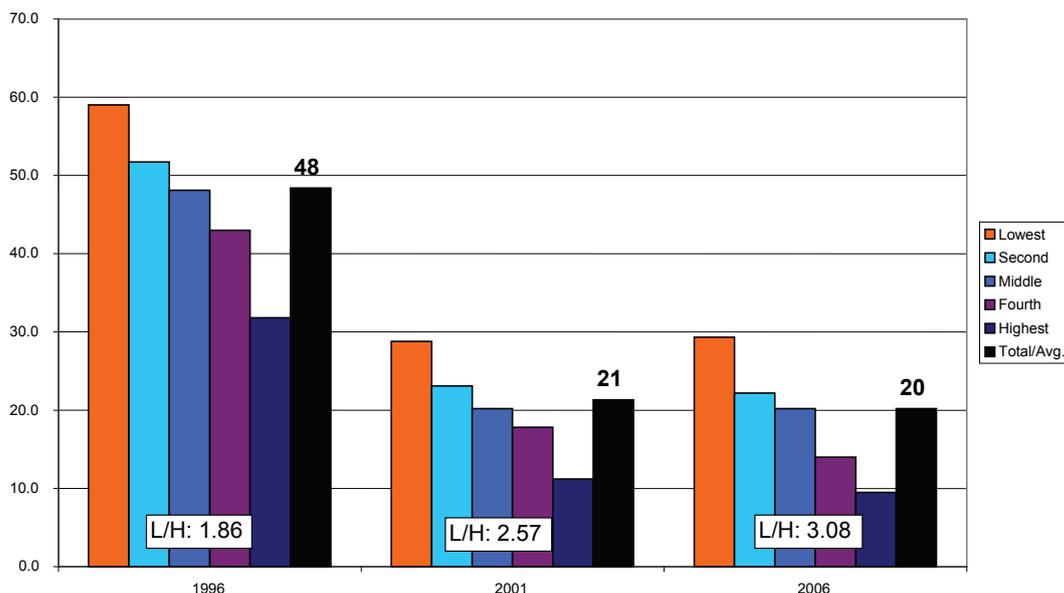
Indicators of moderate and severe stunting and underweight⁶ generally show a decline over time, the exception being moderate stunting, which has remained fairly constant over the three surveys at nearly 30 percent. Nationally, levels of severe stunting decreased impressively by more than half between 1996 and 2006, from 48 percent to 20 percent. Similarly, moderate underweight declined from 47 percent to 26 percent over the study period, and severe underweight declined from 16 percent to 11 percent. There is concern, however, with the equity of the declines in undernutrition, specifically regarding severe stunting. Looking at the low/high ratios, one can discern that inequality in levels of severe stunting has increased over time, with low/high ratios increasing over the study period from 1.86 in 1996 to 3.08 in 2006. By 2006, nearly one third of the children of the poorest women were severely stunted, as compared to one-tenth of the wealthiest (Figure 3.6).

Figure 3.5 Percent of children age 12-23 months who have received all vaccinations according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006



⁶ Measures of nutritional status, based on the CDC/NCHS standards, are comparable across all three surveys.

Figure 3.6 Percent of children under age 5 who are severely stunted according to wealth quintile, and low/high ratio, Nepal DHS 1996, 2001 and 2006



4 MULTIVARIATE ANALYSES OF KEY HEALTH OUTCOMES

In this section, we look at the association between wealth and three key health outcomes (trained assistance at delivery, complete vaccination, and stunting) over time, net of other associated factors. The discussion of the results here will be focused primarily on the role of the wealth variable, with brief discussion of notable findings thereafter. Selection of covariates was based on evidence from the body of empirical literature associated with each dependent variable, and the covariates are the same for each survey year for each respective dependent variable.

This multivariate analysis was conducted for the selected outcomes in an effort to discern the effects of household wealth net of other competing factors that might underlie the simple bivariate associations between wealth and health outcomes. Nevertheless, it must be acknowledged that the findings demonstrate only correlation; causation cannot be inferred given the cross-sectional nature of the data. There may be combined effects of multiple and conflicting causes that are not apparent in the results of the analysis. As with all analysis, results must be interpreted with caution.

4.1 *Trained assistance at delivery*

Table 4.1 shows the results (in terms of odds ratios) of a logistic regression analysis of the likelihood of receiving trained delivery assistance among all women who had a birth in the five years preceding the survey, for their most recent birth.

Regarding the trend in the association between wealth and receipt of trained delivery assistance, it appears that inequality in access to delivery care has become more stratified over time (Figure 4.1). In 1996, only the wealthiest women were significantly more likely than the poorest to receive trained attendance at delivery, being twice as likely as the poorest to obtain such care. In 2001, increased access to delivery care had reached women in the middle quintile, who were 75 percent more likely than the poorest women to receive delivery care; women in the 4th quintile, who were twice as likely as the poorest women to receive delivery care; as well as women in the wealthiest quintile, who received delivery care at a level nearly four times that received by those in the poorest

quintile. By 2006, there is a positive and linear association between wealth and receipt of delivery care. These results suggest that access to delivery care is slowly “trickling down” to women of lesser means. Nevertheless, present levels of access to delivery care are unacceptably low for all women, even the wealthiest among whom just over half received trained care at delivery.

Findings that support the viability of the regression model include the expected positive associations between education, urban residence, and use of ANC and the use of delivery care (Figure 4.2). It is notable that a woman’s education has a greater impact on her use of delivery care than husband’s education. One counterintuitive result apparent in the 2001 and 2006 models is the significant positive association between age and receipt of delivery care, especially given the expected concomitant result indicating a negative relationship between parity and receipt of delivery care.

Figure 4.1 Trends in adjusted odds of having trained attendance at delivery according to wealth quintile, Nepal 1996, 2001 and 2006

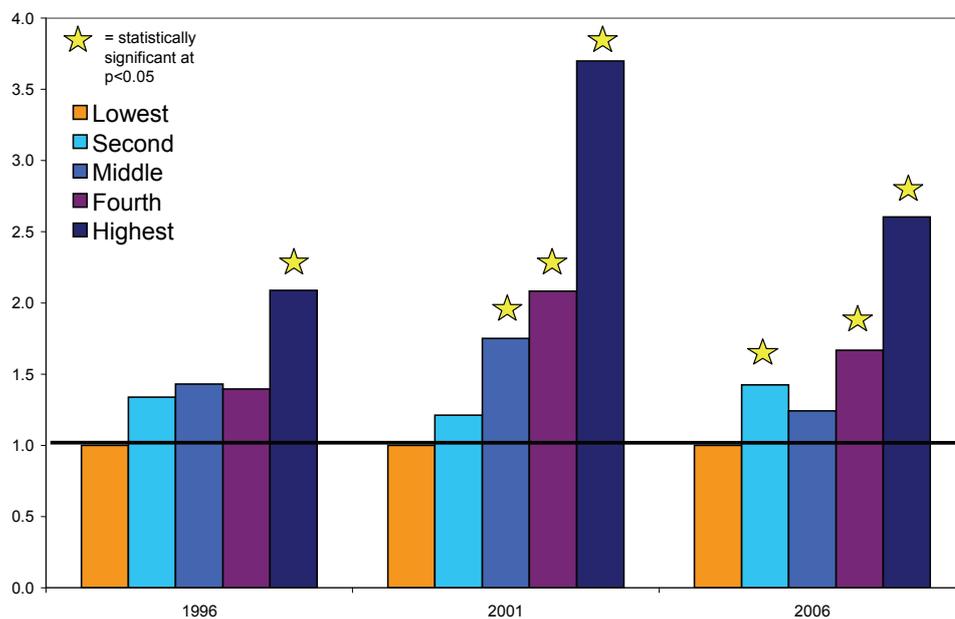


Figure 4.2 Trends in adjusted odds of having trained attendance at delivery according to selected covariates, Nepal 1996, 2001 and 2006

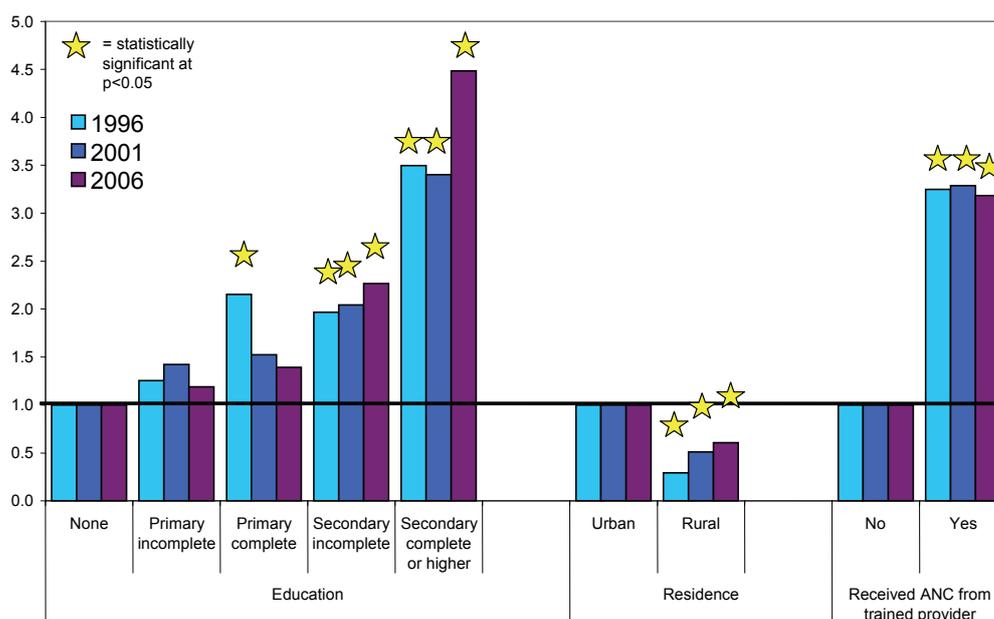


Table 4.1. Likelihood of receiving trained delivery assistance among all women who had a birth in the past 5 years, according to selected demographic and social characteristics, Nepal 1996, 2001, and 2006.

Demographic characteristics	1996		2001		2006	
	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)
Age group						
15-19 ®	--	ref	--	ref	--	ref
20-24	0.548	1.144	0.471	1.144	0.870	1.026
25-29	0.200	1.404	0.035	1.577	0.001	1.788
30-34	0.353	1.370	0.000	2.712	0.001	2.010
35-39	0.132	1.893	0.001	2.777	0.001	2.522
40-44	0.004	4.383	0.000	4.627	0.001	3.075
45-49	0.178	3.198	0.663	1.415	0.001	5.091
Number of children ever born						
1	--	ref	--	ref	--	ref
2-3	0.000	0.453	0.000	0.408	0.000	0.300
4-5	0.000	0.367	0.000	0.258	0.000	0.173
6+	0.001	0.272	0.000	0.204	0.000	0.206
Wealth index						
Lowest ®	--	ref	--	ref	--	ref
Second	0.326	1.338	0.386	1.212	0.019	1.425
Middle	0.209	1.430	0.007	1.751	0.169	1.242
Fourth	0.235	1.396	0.000	2.082	0.001	1.667
Highest	0.013	2.087	0.000	3.699	0.000	2.604
Urban/rural residence (® = urban)	0.000	0.292	0.000	0.510	0.000	0.608
Region						
Eastern ®	--	ref	--	ref	--	ref
Central	0.050	1.499	0.171	1.214	0.000	1.598
Western	0.652	1.106	0.025	0.698	0.266	1.165
Midwestern	0.573	0.856	0.155	0.758	0.110	1.261
Farwestern	0.985	0.995	0.558	1.111	0.534	1.097
Religion						
Hindu ®	--	ref	--	ref	--	ref
Buddhist	0.628	0.860	0.064	0.673	0.150	1.297
Muslim	0.517	0.783	0.188	1.384	0.577	0.884
Other	0.157	2.035	0.687	0.872	0.518	0.838
Dalit (® = no)	0.015	1.662	0.907	1.019	0.128	0.813

Continued...

Table 4.1—Continued

Demographic characteristics	1996		2001		2006	
	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)
Community characteristics						
Whether had a visit from a family planning worker (@ = no)	0.371	1.242	0.770	1.046	0.751	1.039
Community-level ANC	0.000	4.175	0.172	1.399	0.000	2.226
Women's Autonomy						
Whether discussed family planning with husband (@ = no)	0.993	1.001	0.506	1.081	0.141	1.142
Received ANC from trained provider (@ = no)	0.000	3.249	0.000	3.286	0.000	3.183
Work status						
Not working @	--	ref	--	ref	--	ref
Working, not for cash	0.000	0.477	0.002	0.653	0.000	0.632
Working for cash, no say on spending	0.092	0.385	0.137	0.640	0.123	0.702
Working for cash, has say on spending	0.010	0.515	0.299	0.826	0.056	0.768
Access to Information						
Woman's education						
None @	--	ref	--	ref	--	ref
Primary incomplete	0.302	1.255	0.021	1.424	0.199	1.190
Primary complete	0.020	2.152	0.084	1.524	0.078	1.391
Secondary incomplete	0.002	1.966	0.000	2.043	0.000	2.266
Secondary complete or higher	0.000	3.496	0.000	3.401	0.000	4.485
Husband's education						
None @	--	ref	--	ref	--	ref
Primary incomplete	0.467	1.198	0.302	1.207	0.934	0.987
Primary complete	0.010	2.195	0.055	1.530	0.347	1.189
Secondary incomplete	0.014	1.726	0.016	1.477	0.513	1.099
Secondary complete	0.135	1.502	0.000	2.042	0.229	1.243
Higher	0.004	2.138	0.001	2.030	0.078	1.438
Has access to TV/radio/newspaper at least once per week (@ = no)	0.144	1.261	0.069	1.258	0.053	1.230

Trained delivery assistance is defined as a doctor, nurse, or trained midwife.

4.2 Vaccination status

Table 4.2 shows the results (in terms of odds ratios) of a logistic regression analysis of the likelihood that a woman's most recently-born child age 12-23 months has received all recommended vaccinations (BCG, measles, DPT-3 and polio 3+).

Again, the strength of the effect of wealth and the stratifying effect it has on receipt of all vaccinations appears to increase over time, so that by 2006, children that fall into the second through wealthiest quintiles are 2-3.5 times more likely to have received all vaccinations than children in the poorest quintile (Figure 4.3).

In 1996, girls were significantly less likely than boys to have received all vaccinations, while in 2001 and 2006, girls were still less likely to have received all vaccinations but the relationship was no longer significant. Dalits/members of occupational castes were considerably less likely to have received all vaccinations in 1996 and 2006; this finding suggests that programmatic interventions may be appropriate. Trends in the relationships of region and religion to immunization are inconsistent over time and, particularly the regional effect, deserve further investigation. Figure 4.4 shows the trends in the association between vaccination completion and sex, dalit identity, and region. The positive significant association between receipt of ANC and child vaccination status indicates that contact with health care providers prenatally may provide opportunities for health workers to encourage women to get their children vaccinated; conversely, it may simply reflect that women who have access to health care and think it is important do use it, whether for themselves or for their children.

Figure 4.3 Trends in adjusted odds of receiving all vaccinations among children age 12-23 months according to wealth quintiles, Nepal 1996, 2001 and 2006

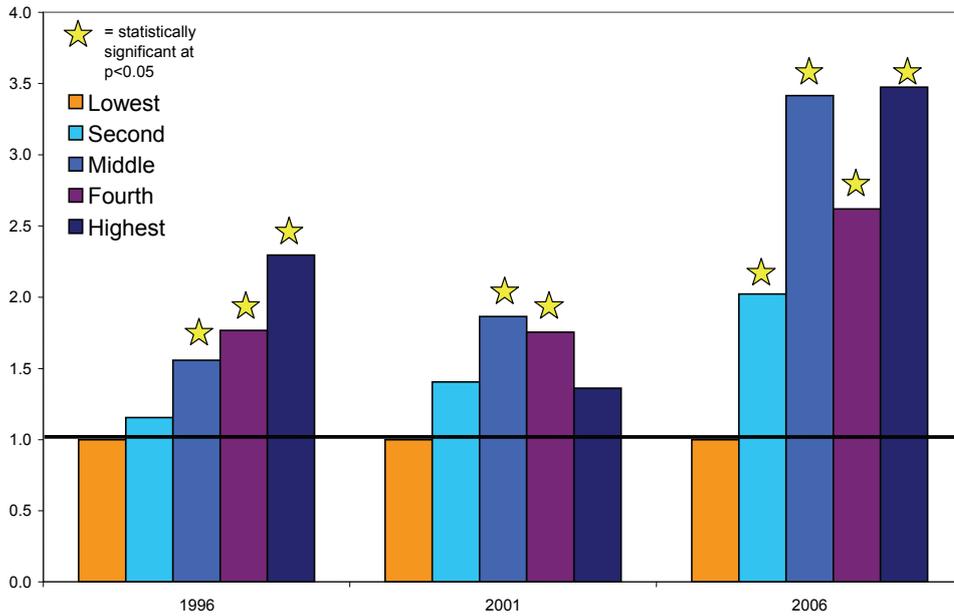


Figure 4.4 Trends in adjusted odds of receiving all vaccinations among children age 12-23 months according to selected covariates, Nepal 1996, 2001 and 2006

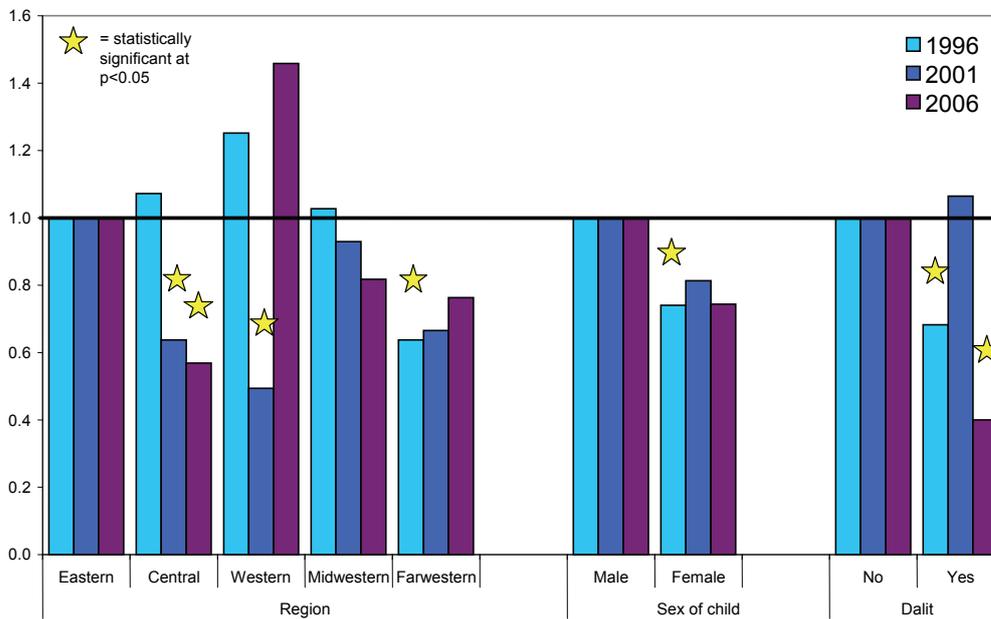


Table 4.2. Likelihood of most recent-born child age 12-23 months receiving all vaccinations (BCG, measles, DPT-3 and polio 3+) among all women who had a birth in the last 5 years, according to selected demographic and social characteristics, Nepal 1996, 2001, and 2006

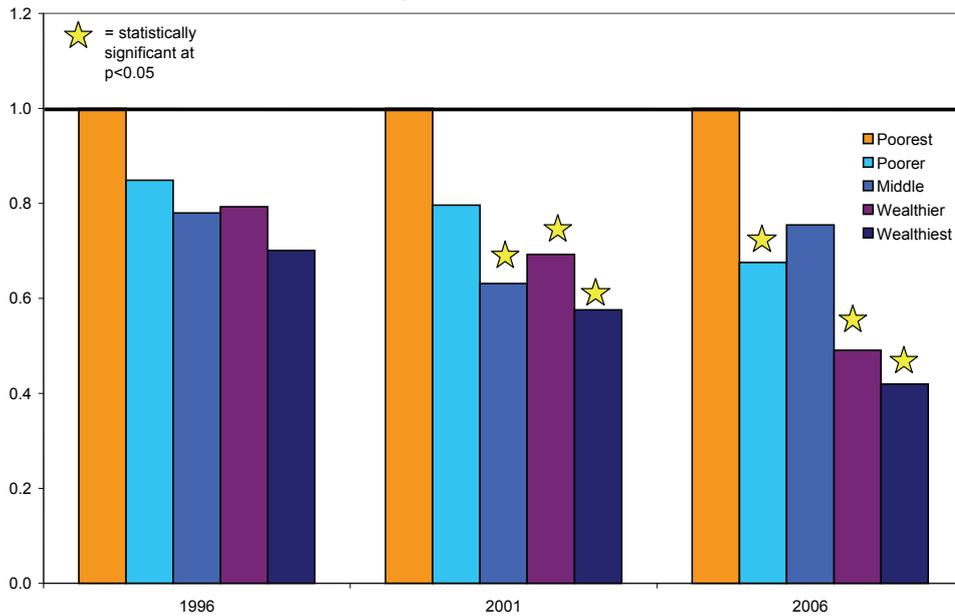
Demographic characteristics	1996		2001		2006	
	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)
Sex of child (® = male)	0.014	0.740	0.126	0.813	0.111	0.744
Age of mother						
15-19 ®	--	Ref	--	ref	--	ref
20-24	0.066	1.560	0.285	1.323	0.540	0.800
25-29	0.052	1.613	0.236	1.374	0.440	0.748
30-34	0.139	1.497	0.674	1.126	0.806	0.901
35-39	0.098	1.629	0.806	1.081	0.097	0.478
40-44	0.956	1.022	0.620	1.239	0.287	2.078
45-49	0.026	4.094	0.657	1.343	0.187	0.248
Wealth index						
Lowest ®	--	ref	--	ref	--	ref
Second	0.437	1.155	0.071	1.404	0.005	2.022
Middle	0.018	1.557	0.003	1.864	0.000	3.416
Fourth	0.002	1.766	0.012	1.753	0.008	2.621
Highest	0.001	2.295	0.340	1.361	0.017	3.475
Urban/rural residence (® = urban)	0.001	0.400	0.457	1.246	0.064	1.744
Region						
Eastern ®	--	ref	--	ref	--	ref
Central	0.712	1.072	0.029	0.638	0.049	0.568
Western	0.278	1.252	0.003	0.494	0.301	1.458
Midwestern	0.899	1.027	0.763	0.930	0.525	0.817
Farwestern	0.045	0.637	0.078	0.666	0.388	0.763
Religion						
Hindu ®	--	ref	--	ref	--	ref
Buddhist	0.029	1.693	0.645	0.889	0.054	0.497
Muslim	0.000	0.207	0.001	0.363	0.779	0.875
Other	0.870	0.927	0.682	0.839	0.563	0.734
Dalit (® = no)	0.035	0.683	0.740	1.065	0.000	0.400
Received ANC from trained provider (® = no)	0.000	2.333	0.000	2.806	0.000	2.679
Work status						
Not working ®	--	ref	--	ref	--	ref
Working, not for cash	0.005	1.777	0.032	1.643	0.050	1.881
Working for cash, no say on spending	0.176	0.391	0.605	0.795	0.553	1.440
Working for cash, has say on spending	0.389	1.304	0.354	1.371	0.446	1.308
Access to Information						
Woman's 3ducation						
None ®	--	ref	--	ref	--	ref
Primary any	0.260	1.270	0.000	2.368	0.071	1.679
Secondary any	0.042	1.730	0.001	2.830	0.058	2.268
Husband's education						
None ®	--	ref	--	ref	--	ref
Primary incomplete	0.192	1.253	0.270	1.223	0.874	0.962
Primary complete	0.072	1.567	0.266	1.324	0.692	0.882
Secondary incomplete	0.003	1.706	0.003	1.785	0.203	1.425
Secondary complete or higher	0.173	1.326	0.009	2.139	0.068	2.310
Has access to TV/radio/newspaper at least once per week (® = no)	0.293	1.158	0.011	1.501	0.025	1.569

4.3 Child nutritional status

Table 4.3 shows the results (in terms of odds ratios) of a logistic regression analysis of the likelihood that a woman's most recently-born child under age 3 is stunted, either moderately or severely.

In 1996, the association between wealth and stunting, although in the expected direction, is small and is not significant. However, in 2001 and 2006, the effect of wealth is highly significant, with the children of the wealthiest women nearly 60 percent less likely to be stunted than the children of the poorest women (Figure 4.5).

Figure 4.5 Trends in adjusted odds of stunting (moderate or severe) among children under 3 years of age according to wealth quintiles, Nepal 1996, 2001 and 2006



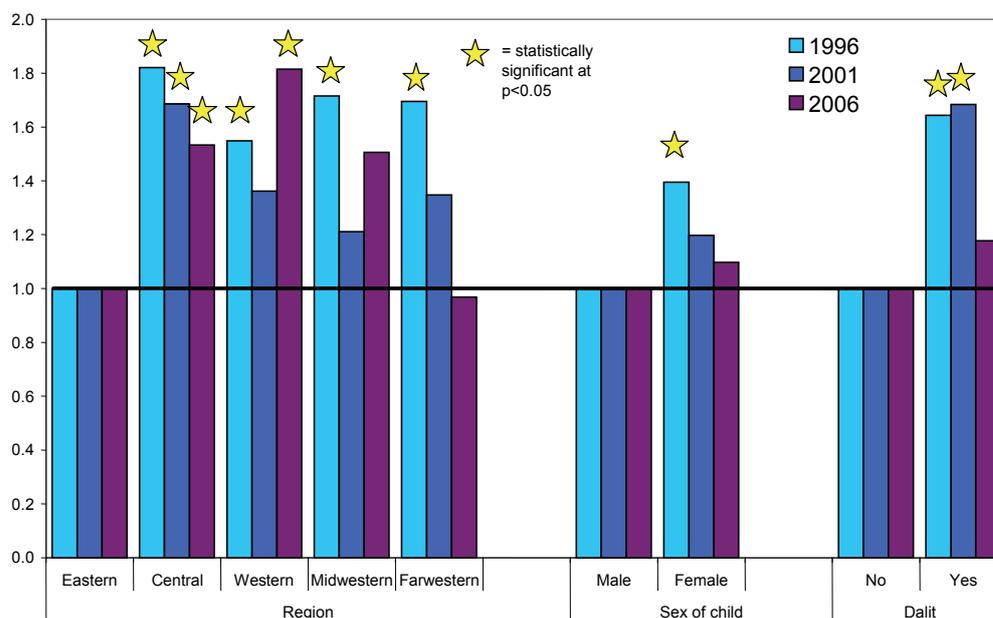
Again, in 1996, girls were significantly more likely than boys to be stunted, but by 2001, the relationship was no longer significant, and by 2006, there appears to be no relationship between sex and stunting at all. Regional effects were also strong and significant in 1996, but there is no discernible trend in the findings for the 2001 and 2006 models. Children who belonged to dalit/occupational caste households were at a significant nutritional disadvantage in 1996 and 2001, but not in 2006 (Figure 4.6).

In all survey years, the typical association between age and stunting is found, such that the likelihood of stunting increases with child's age. This is because the youngest children have access to a good source of nutrition and immunological fortification from their mothers' breastmilk. Once children have grown to the point that breastmilk alone is no longer nutritionally sufficient—at about 4-6 months of age—their nutritional status is dependent on the availability and proper provision of high-quality complementary foods. Their consumption of breastmilk may also decline, leaving them more exposed to illness which can in turn increase the likelihood of becoming stunted.

Table 4.3 Likelihood of most recent-born child under age 3 being stunted (moderately or severely), among all women who had a birth in the last 5 years, according to selected demographic and social characteristics, Nepal 1996, 2001 and 2006.

Demographic characteristics	1996		2001		2006	
	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)
Sex of child (@ = male)	0.001	1.395	0.090	1.197	0.484	1.097
Age of child (@ = 0-5)						
6-11	0.000	5.313	0.000	7.769	0.005	4.647
12-17	0.000	17.228	0.000	19.276	0.000	12.969
18-23	0.000	26.133	0.000	33.904	0.000	28.026
24-29	0.000	29.972	0.000	23.625	0.000	15.873
30-35	0.000	37.514	0.000	28.439	0.000	23.058
Skilled attend at delivery (@ = no)	0.195	0.737	0.065	0.669	0.283	0.799
Previous birth interval (@ = none)						
<24 months	0.692	0.923	0.743	1.073	0.780	1.074
24-35 months	0.464	0.871	0.202	0.816	0.978	1.006
36+ months	0.220	0.789	0.015	0.668	0.181	0.759
Age of mother						
15-19 @	--	ref	--	ref	--	ref
20-24	0.120	0.716	0.539	0.865	0.259	0.731
25-29	0.800	0.940	0.971	1.010	0.200	0.653
30-34	0.451	0.812	0.876	1.048	0.765	1.120
35-39	0.535	0.826	0.594	1.200	0.858	0.928
40-49	0.172	0.607	0.466	0.740	0.975	0.984
Children ever born						
1-2 children	--	ref	--	ref	--	ref
3-4 children	0.306	1.172	0.363	1.168	0.269	1.270
5-6 children	0.210	1.281	0.051	1.530	0.531	0.830
7+ children	0.072	1.544	0.027	1.841	0.063	1.976
Has access to TV/radio/newspaper at least once per week (@ = no)	0.001	0.664	0.323	0.883	0.001	0.612
Woman's education						
None @	--	ref	--	ref	--	ref
Primary incomplete	0.167	0.767	0.006	0.576	0.219	0.770
Primary complete	0.641	0.835	0.326	0.705	0.358	0.720
Secondary incomplete	0.005	0.424	0.011	0.502	0.003	0.435
Secondary complete or higher	0.299	0.591	0.020	0.281	0.047	0.283
Work status						
Not working @	--	ref	--	ref	--	ref
Working, not for cash	0.671	1.075	0.715	0.934	0.518	1.166
Working for cash, no say on spending	0.416	0.691	0.739	0.877	0.260	1.531
Working for cash, has say on spending	0.850	1.048	0.564	1.170	0.674	0.890
Wealth index						
Lowest @	--	ref	--	ref	--	ref
Second	0.231	0.849	0.118	0.796	0.027	0.675
Middle	0.089	0.780	0.005	0.631	0.155	0.755
Fourth	0.123	0.793	0.031	0.693	0.003	0.491
Highest	0.092	0.701	0.039	0.576	0.025	0.420
Urban/rural residence (@ = rural)	0.156	1.394	0.257	1.338	0.212	1.322
Region						
Eastern @	--	ref	--	ref	--	ref
Central	0.000	1.821	0.001	1.685	0.041	1.533
Western	0.013	1.549	0.105	1.362	0.010	1.815
Midwestern	0.002	1.715	0.320	1.211	0.067	1.506
Farwestern	0.004	1.695	0.100	1.348	0.886	0.968
Dalit (@ = no)	0.000	1.643	0.000	1.684	0.350	1.178

Figure 4.6 Trends in adjusted odds of stunting (moderate or severe) among children under 3 years of age according to selected covariates, Nepal 1996, 2001 and 2006



5 Discussion and Conclusions

Nepal has made a surprising number of improvements in population and health outcomes during a trying period in its history. These improvements are to be applauded, while recognizing that challenges do remain. In this report, we have focused on the equity of the improvements that have been made, given the concern that national level indicators can improve while masking subnational economic inequalities. We find that in many cases, both levels and equity differentials of critical indicators have improved over time, such as in the case of increased access to safe water and school attendance among children age 6-10. Nevertheless, there is also evidence of severe and worsening economic inequity in some population and health outcomes as well as in access to and use of important health services. It is also important to note that there is no way of knowing how the mortality and displacement of a large number of Nepali people during the course of recent internal conflict have biased the results of this trends analysis.

In this discussion, we highlight the areas of concern with the hope that it will provide useful focus for policy implementation and for programmatic intervention.

- Regional disparities:** The increasing concentration of poverty in the Farwestern region is of concern. In all other regions, the proportion of household population that falls in the poorest quintile has declined over time. This holds true even in Central region, where proportions falling into the poorest quintile have been disproportionately high (i.e., over the expected 20 percent) across all three surveys. The linear increase in concentration of poverty in Farwestern suggests human crisis, and context-appropriate steps should be taken to relieve the problem.
- Water and sanitation:** While the overall improvement in access to safe water—and the particular improvement in access among the poorest—is impressive and commendable for its pro-poor focus, the challenge to Nepal is to further extend access to safe water to the remaining population that still does not have it.

An even greater challenge to the equitable distribution of basic public health measures is the issue of sanitation: by 2006, nearly all of those in the wealthiest quintile used improved sanitation facilities, whereas among the poorest, only 3 percent did. While the data do indicate that improvements in sanitation are slowly being made among the poorest two quintiles, programmatic interventions could accelerate access to improved sanitation.

- **Female headship and gender issues:** Likely as a result of increased employment-related out-migration, Nepali women are increasingly likely to act as head of household. Similarly, women are increasingly likely to have a say in various types of household decisionmaking. That Nepal is moving towards gender equity in several regards, including girls' schooling, seems clear. However, as a country where preferential treatment of boys has been statistically evident as recently as 1996, Nepal's government and civil society must remain vigilant on gender issues which include:
 - Ensuring that women have equal opportunities for decisionmaking and employment in the wider community, especially given recent increases in female household headship, which is often associated with increasing poverty
 - Ensuring that all girls currently attending school do in fact stay in school until completion, in order to keep the current near-equity in education among boys and girls (female-to-male ratio of 0.94)
 - Increasing women's access to secondary education, which significantly increases the likelihood of having skilled attendance at delivery, among other desirable health-seeking behaviors
 - Increasing the proportion of women who can decide for themselves to seek health care, particularly important in a context of high maternal mortality and morbidity
 - Increasing working women's access to the cash economy, which can be limited by lack of education, lack of access to credit, and culturally restricted mobility—also a problem in Nepal where only about 1 in 5 women can decide for themselves to visit family members or friends
- **Education:** Completion of primary education among men and women has improved over the study period and completion has become more equal, but the female/male ratio remains inequitable at 0.57. Looking to school participation among children age 6-10, both gender equity and economic equity in school attendance have registered impressive gains. While current school attendance is a promising indicator of future school completion, efforts must be made to ensure that all children regardless of economic status or gender can stay in school.
- **Fertility and contraception:** Unmet need is considerably higher among the poorest women than among the wealthiest for each survey period. In order to help women achieve their fertility desires and to help reduce maternal and child mortality, it would be appropriate to take a pro-poor approach to family planning programming in Nepal.
- **Maternal health:** Perhaps Nepal's most significant and important challenge is to prioritize maternal health policies and programs. Levels of access to maternal health services are egregiously low in Nepal and must be improved overall, with particular attention to ensuring economic equity in the distribution of maternal health services. Key areas for intervention include the following:
 - Trained attendance at delivery is the single-most important intervention to increase the chances of neonatal and child survival. Yet few women have access to trained attendance, and the inequity in access is severe: only 5 percent of the poorest women had trained care at their most recent birth, compared to a still-insufficient 58 percent among the wealthiest. Implementing strategies to increase facility-based delivery along with the provision of

outreach maternity services in rural areas may help in raising the level of maternal care provided to Nepali women.

- Usage of home delivery kits is lowest where the need for them is highest—among the poorest women. However, even for the wealthiest women, among those who give birth at home, insufficient numbers use clean delivery kits. Increasing the distribution of kits to needy areas and disseminating them among rural midwives could increase uptake and usage of clean delivery kits. Given the finding that consumption of Vitamin A supplements is distributed similarly, it may be appropriate to include a Vitamin A tab in the clean delivery kits.
- **Child survival, health and nutrition:** Overall, there have been many improvements in child survival and health indicators. However, even where there have been improvements at the national level, there have been exacerbations of inequities in health outcomes over time. Below is a summary of findings:
 - Levels of infant and under-five mortality have been decreasing among all wealth quintiles, though declines have been faster among the wealthiest. Twice as many children under age five die in the middle to lowest quintiles as compared to the wealthiest; as such, child-survival interventions must focus on this segment of the population.
 - Vaccination efforts in Nepal have been successful, with complete vaccination coverage increasing at the national level as well as within each quintile. Equity in vaccination coverage has improved over time, and such efforts serve as a model for other preventive health interventions.
 - Since 1996, there has been a reduction at the national level, and in almost all quintiles, in the use of ORT to treat diarrhea. This is a serious regression, given the important role of ORT in improving chances for child survival in the face of diarrhea, which is the primary cause of death among children in this age group. Distribution and usage of ORT must be reinvigorated.
 - The proportion of Nepali children who are severely stunted has been reduced by more than half since 1996, and reductions have been experienced in all quintiles. However, inequity in stunting has increased over time, with the poorest children being three times more likely than the wealthiest to be stunted in 2006. Future initiatives in this area should focus on increasing food security and improving child care and feeding practices among the poorest families.

Given the stark association between age and undernutrition, it is critical that high-quality complementary foods are available for children, and that parents are taught to ensure the nutritional density of the foods they give their children, with particular attention paid to foods that are high in micronutrients such as iron, zinc, and vitamin A.

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Appendix A

Appendix Table A. List of assets included in the wealth index constructed for, respectively, the 1996, 2001 and 2006 Nepal DHS

Asset	1996	2001	2006	Asset	1996	2001	2006
Has electricity	x	x	x	Uses biogas as cooking fuel		x	x
Has radio	x	x	x	Uses kerosene as cooking fuel		x	x
Has television	x	x	x	Uses natural gas as cooking fuel		x	x
Has bicycle	x	x	x	Uses electricity as cooking fuel		x	x
Has telephone	x	x	x	Uses charcoal as cooking fuel		x	x
Owns livestock		x		Uses coal/lignite as cooking fuel			x
Works own or family's agricultural land	x	x	x	Uses other source as cooking fuel		x	x
Uses water piped into residence for drinking	x	x	x	Does not cook			x
Uses water piped into yard/plot for drinking			x	Number of members per sleeping room	x	x	x
Uses water from a tubewell in residence/yard	x	x	x	Has dirt, sand, dung as floor		x	x
Uses water from a public tubewell for drinking	x	x		Has palm/bamboo floor			x
Uses water from a regular spring for drinking		x		Has wood, plank floor		x	x
Uses water from a protected spring for drinking			x	Has cement floor		x	x
Uses water from a public faucet (piped)	x	x	x	Has vinyl, asphalt strip floor			x
Uses water from dhara for drinking		x	x	Has parquet, polished wood floor			x
Uses water from a protected public well			x	Has tile floor		x	x
Uses water from an unprotected public well	x	x	x	Has carpet, linoleum floor		x	x
Uses water from an unprotected well in residence	x	x		Has other type of floor		x	x
Uses water from river, canal or surface	x	x	x	Dwelling has no walls			x
Uses rainwater for drinking			x	Cane/palm/trunk walls			x
Uses water from a tanker truck for drinking			x	Mud/sand walls			x
Uses water from other source for drinking	x	x	x	Bamboo with mud walls			x
Uses flush toilet		x		Stone with mud walls			x
Flush toilet to public sewer			x	Plywood walls			x
Flush toilet to septic tank			x	Cardboard walls			x
Flush toilet to pit			x	Reused wood walls			x
Flush toilet to other			x	Cement walls			x
Flush toilet to unknown			x	Stone with lime/cement walls			x
Shared flush toilet			x	Brick walls			x
Uses a ventilated improved latrine	x	x		Cement block walls			x
Uses a private ventilated improved latrine			x	Wood planks/shingles walls			x
Uses a shared ventilated improved latrine			x	Other type of walls			x
Uses a composting toilet			x	Dwelling has no roof			x
Uses a pit latrine	x	x		Thatch/straw roof			x
Uses a private slab pit latrine			x	Rustic mat roof			x
Uses a shared slab pit latrine			x	Bamboo roof			x
Uses a private pit latrine without slab			x	Wood planks roof			x
Uses a shared pit latrine without slab			x	Cardboard roof			x
Uses a hanging toilet			x	Metal roof			x
Uses bush, field as latrine	x	x	x	Wood roof			x
Uses other type of latrine	x	x	x	Calamine/cement fiber roof			x
Uses a pan as a latrine	x		x	Ceramic tile roof			x
Uses dung as cooking fuel		x	x	Cement roof			x
Uses agricultural crops as cooking fuel			x	Shingles roof			x
Uses wood as cooking fuel		x	x	Other type of roof			x

